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Resent Advances in Engineering & Technology

(RAET-2018)

27th & 28th March, 2018



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INDEX

Sr.No	Title - Author	Paper ID.	Page No.
1	HUMAN IDENTIFICATION USING EVEN-STEVEN FACIAL RECOGNITION - Aditya Agrawal , Rahul Singh, Pranjali Bhondve, Roshana Mothankar , Gaurav Pandey , Nayan Hargule	RAET001	1-5
2	Identifying User by Matching Statistics - Rasika Retar , Pratiksha Dhoble , Abhishek Chauhan, Swati Gourkhede, Bhavna Sonkusre , Prof. Pradeep O. Balbudhe	RAET002	6-9
3	Review on design and Implementation of smart ERP system - Ashwini Deulkar , Karishma Thakre , Priyanka Zade, Rahul Gajbhiye , Prof. Pravin O.Balbudhe	RAET003	10-13
4	A Review on Prevention of Cyberbullying Using Social Media - Prof. Pratibha Ghode, Akash Walke, Pankaj Thakre, Sagar Mendhule , Kalyani Kokse	RAET004	14-17
5	Survey on Voice Based Email Navigation System for Blinds - Suchita K.Khadase, Rashmi R.Gedam, Premila S.Sonkusre, Pragati M. Meshram, Prof. Vivekanand P. Thakare	RAET005	18-20
6	Design and Implementation of Classroom Surveillance System using ZigBee Technology - Vivekanand Thakare, Pratibha Ghode	RAET006	21-27
7	Automated Plant Irrigation System using GSM Modem SIM808 and Arduino - Pravin O. Balbudhe, Pradip O. Balbudhe,	RAET007	28-32
8	Design and Implementation Of Advanced Ticketing Services For Controlling & Monitoring of Public Transport - Poornima Ujjainkar, Kayani Hiwase, Neha Chadokar, Sachin Malke , Nitesh Kamble	RAET008	33-34
9	Implementation of Arduino Based Mini CNC Plotter Machine - Archana Katkade, Ashwini Chavan, Simran Thakur, Monali Yelekar, Rasika Manapure, Shailesh Birthariya,	RAET009	35-38
10	Implementing an Algorithm for Vertical Handoff in Heterogeneous Wireless Networks - Mangesh D. Pawar, Tushar S.Dorlikar, Hrushikesh S.Landge, Madhuri Ninawe, Sagar Ghormade	RAET010	39-43
11	A comprehensive study of spectrum sensing techniques for signal detection in cognitive radios - Shailesh Birthariya, Dr J.D. Kene,	RAET011	44-47
12	Fast Image Processing using GPU - Ms Madhuri Ninawe, Ms Rasika Manapure,	RAET012	48-50
13	A Review on MSW Stabilization for Leachate Management - Abhinav Sharma, Aboli Chavhan, Suraj Thawkar, Paras Sangole, SandipRaghuse	RAET013	51-52
14	Partial Replacement of Waste Glass as Aggregate in Concrete - Aditya Chatap, PranayBawane, AkashRangari, Swati	RAET014	53-55

	Kature, Pranali khandekar		
15	Recycling of Demolished Concrete - Aishwarya Kadu , Ankita Tiwari, Pranali Fulzele , Priya Chaware, Roshan Meshram	RAET015	56-58
16	Flat Slab – Study & Analysis - Ravindra Wakodikar, Suraj Mahajan, Karishma Barde, Vaishnavi Pokale	RAET016	59-61
17	Comparative Analysis of Different Lateral Load Resisting Systems for RCC Structure - Sharad Shrirame, SanketArgelwar, Kunal Mutkure, Varsha Dabale ,	RAET017	62-63
18	An Experimental Investigation of a Partial Replacement of Sugarcane Bagasse Ash With Cement - S.Sonone, S.Tekam, P.Sinha, R.Shivankar, P.Kokurde	RAET018	64-65
19	A Review on MSW Stabilization by Additives - Vaibhav Rahangadale, Trupti Raut, Nohil Wankhede, Assimuddin Ghazi	RAET019	66-67
20	Review on Low – Cost Domestic Wastewater Treatment by Aquaculture - Ashtashil Bhambulkar, Dr. Narendra Shinkar,	RAET020	68-70
21	Rainwater Harvesting - Honey Gaur, Neha Khobragade , Diksha Menghare ,	RAET021	71-72
22	Review on Wastewater Optimization Technique - Priyanka Nagdeve, Shalini Ghabhane,	RAET022	73-75
23	Audit on Water Supply - Vinod Yerpude, Harshit Suchak	RAET023	76-77
24	Adaptive PI Control of STATCOM for Voltage Regulation - Abhijeet D. Naik, Suresh R. Tarfe, Sanjay A. Parihar, Miss. Shital Yende,	RAET024	78-81
25	Protection of Transformer By Using Novel Differential Scheme - Shital S. Daph, Piyush N. Panchalwar, Pravinkumar Jangle,	RAET025	82-84
26	Power Optimization to Reduce Energy Consumption - Suraj Raut, Mukund Daoo, Prashik Bhawe, Rahul Dekate	RAET026	85-88
27	Energy Consumption By Voltage Control - Rohan A. Nagare, Chetan P. Matte, Nirish N. Deshmukh, Rahul Dekate.	RAET027	89-92
28	Renewable Power Generation System By using push-pull inverter - Dhiraj P. Mankar, Mayur S. Udupure, Rashtrapal N. Katkar, Pravinkumar Jangle	RAET028	93-96
29	An Improved Active Power Filter Performance for Renewable Power Generation System - Karishma G. Madavi , Shital S. Bhimte , Abhilash R. Gaykee , Pravinkumar Jangle	RAET029	97-99
30	DC to DC Converter Using Four Quadrant Operations for DC Motor - Sneha A. Shende, Megha R. Bante, Amol N. Bhagat, Shital Yende	RAET030	100-102
31	Load Monitoring With Control and Data Transmission Using PLC - Ajinkya Yelore , Abhishek Mate, Sameer Khan	RAET031	103-106

32	STATCOM Control for Power System Voltage Regulation by PI Controller - Amit B. Bante, Anita R. Prajapati , Shital Yende	RAET032	107-110
33	Design and Fabrication of Advance Four Wheel Steering System - Akash Thakre, Prashant Meshram, Rahul Bhange	RAET033	111-114
34	Design and Fabrication of Double Pass Solar Air Dryer With vee-Corrugated Absorber Plate for Drying Purpose - Manjeet Gabhiye, Gaurav Raut, Atul Tarane, Akash Kalamkar	RAET034	115-119
35	Analysis of Cam in Chilly Crusher Mechanism Using FEM - Jeetendra Gautam, Abhishek Kawle, Kaustubh Chimurkar, Manoj Baseshankar,	RAET035	120-124
36	Performance Evaluation of Automatic Guided Vehicle by Forklift - Kartik Vyas, Manthan Chopde, Shoeb Raza, Niraj Deshmukh, Shashank Warhade, Sachin Chintalwar	RAET036	125-129
37	An Analysis of Improving the Performance of Train Brake Shoes-review - Nikhil Ghonmode, Nitin Girsawale, Krunal Kardbhajane, Prof. Prashant Wanjari	RAET037	130-132
38	Design and fabrication of external Air Bag and Safety - Ninad Falke, Sagar Hadagode, Mangesh Bante, Prof. Prafulla Deshpande	RAET038	133-138
39	Performance analysis of coated and uncoated carbide tool while turning operation (AISI4140 ALLOY STEEL) - Gaurav V. Thombre, Chetan A. Rathod, Dipak C. Vinchurkar, Nitin P. Padghan	RAET039	139-143
40	AN EXTERNAL AIRBAGS AND SAFETY - Arun Yadav, Md Shadab Alam, Ashish Kukade	RAET040	144-148
41	Design and Analysis of Feeder for Ginning Machine - Prafulla D Deshpande, Nitinkumar P Padghan,	RAET041	149-153
42	Performances Evaluation of Vacuum Operated Plastic Molding Machine - Prof. K .K. Tonpe, Prof. P. M. Wanjari,	RAET042	154-161
43	Synthesis and characterization of europium ion doped polymer in optoelectronic Nano Devices - S. G. Itankar, M. P. Dandekar,	RAET043	162-167
44	Comparative chromatographic study of Silica gel-G, Urea formaldehyde & Starch as an adsorbents for the separation of some toxic metal cations by Thin Layer Chromatography - V.S.Nagpurkar	RAET044	168-173
45	Review of Multiplier's Design Circuit Using Reversible Logic Using Tanner Tool - Sumit Chafale, Sachin Malke,	RAET045	174-178

National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

**HUMAN IDENTIFICATION USING EVEN-STEVEN FACIAL
RECOGNITION**

ADITYA AGRAWAL¹, RAHUL SINGH², PRANJALI BHONDVE³, ROSHANA MOTHANKAR⁴,
GAURAV PANDEY⁵, NAYAN HARGULE⁶

^{1, 2, 3, 4, 5}Students, Department of Computer Engineering, SCET, Nagpur

⁶Assistant Prof., Department of Computer Engineering, SCET, Nagpur

Abstract: In this paper we are introducing a new system for human identification using side face by the help of profile based facial recognition. The system has five different stages for capturing of image, processing, segmentation, feature extraction and identification. The five stage works on two modes i.e. enrolment and identification. In first mode it first captures the image and then the image is processed and the features are extracted from the image and stored on the database for later identification. In the second mode it again captures an image process it and extract its feature and then matches it with the image stored on the database and on the basis of threshold value it generates the result.

Keywords – Side Face, Face Recognition, Half Face, Face Detection, Edge Detection, Feature Extraction, Identification.

1. INTRODUCTION:

Various biometrics technologies, use for user authentication like finger-scan, retina-scan, Iris-scan, hand -scan and mostly the facial scan. Biometrics can measure both physiological and behavioural characteristics. In Physiological characteristics it is basically based on data derived and measurement from a part of human body. In behavioural characteristics which are based on measurement and data derived from an action. Recently in last few years facial recognition gain a special attention in the field of biometric security. Currently use of facial recognition is increased in our day to day life due to high accuracy and reliability over the other biometrics technology.

Face recognition has become the need for society and investment in security applications are continuously increasing day to day. But in the current system we are using the front full Face structure in which the whole face is considered as the unity and the features extract are on the basis on whole face structure. So at the time of matching or identification we need full front face with proper quality image which is the main key point with highest accuracy but same time it is the biggest drawback. Because in day to day life the image we got are taken from camera which only capture angular image so the image we got are not full face so it's very hard the extract feature from it and perform the matching on it. Images are top, side angular where the front faces recognition complete fail.

Face recognition basically depends on two techniques, image base method and feature base method. In image base the intensity array is generated and match with template with standard candidate regions to find the best match. It is time consuming method.

In feature based method it extract the feature of the facial structure patterns and the relative position like lips, ears structure, forehead structure and the chin curve that is in simple word it called as the edge detection technique. This technique generate the grey scale image by pixel intensity and then into binary and so on. It is much accurate and faster the image base method.

In day to day averment all the images are from camera are angular like on street signal, on crime scene or at home, shop camera where the theft occur or any other criminal activity happens or on the tollbooth jumping or on the car theft at parking. Only side face capture all the 90 percept images only and only half face capture.

Generally in human face recognition results are more discriminate. So, using the half face gives us the more accurate results in order to identify the person. We have observed that in the side face recognition the nose portion plays an important role in calculating the threshold value. A side face recognition system is more convenient, robust and accurate. In the side face recognition eye detection rates is achieve by the system.

In this paper we propose a system which is based on the side facial recognition of the human face. Use of the side face recognition system can be done in houses, shop, tollbooth, traffic signals, parking etc. we have tested our system in many different scenarios such as in the gates of the parking, house etc. the system uses a simple camera in order to capture the image after capturing the image its first locate the matching points all over the image then it moves

to segmentation. In segmentation the system align the image and the crop it. Then the system converts the image into binary image in order to remove the noises and distortion from the image. After the segmentation it extracts the image features and stores it on the database for later matching and identification process.

2. PREVIOUS WORK:

In the previous work on this related subject the most of the work is done for frontal face and less work on the side view face images with limited variations with pose.

On the side view face image the system is basically work on two methods, the appearance based method and a profile based method where the Appearance-based methods can uses side face image as input and the profile based method uses the feature extracted from the side view face image. I.A. Kakadiaris, H. Abdelmunim[6] proposed that the matching of two image i.e. stored image and captured image is done with the help of its face's shape through the vector distance function. The approach used in this process registration possess high accuracy rate than the other biometrics system.

Baback Moghaddam and Alex Pentland [12] proposed a method for human facial recognition with the help of eigenface. The author also states that the system can automatically detect the face without compromising the accuracy. This is achieved using the view based multiple observer technique.

Bhanu and Zhou [9] proposed that the process for matching the face with the help of DTW i.e. Dynamic time warping. According to this curve value of every point on the face is determine and the non face art is deleted.

The similar points between the face and the probe in gallery are calculated with the DTW generated on the basis of the curve. With the help of these methods the two side face image databases and the recognition rate is almost above the 90%.

Yijun Wu, Gang Pan, and Zhaohui Wu [10] proposed the experiments which can be performed on a low-quality face image. The author shows a human face identification method based on various profiles. An efficient and reliable method was introduced to detect the symmetry of face pick the proposed to detect the symmetry plane of face to extract the central point on the face image. For each pair of range data sets, it use the symmetry planes to align them on the basis of these it gets the horizontal profile curve.

Gao and Leung [12] proposed a matching method for face profile recognition. The profile is first transformed the captured image into a line segments. Then line segment is represented by its features like the length, width and midpoint. After performing this method, the distance score by the probe and the profiles were matched. The approach believe that if two faces are matched together they will have the same edges features and details and face whenever occlusion occurs.

3. METHOD

There are five stages in this system, each stage deals with different kind of work. The system follows a path in a way so that all the five stages can acquire and provide the input and output for calculating the threshold value. On the basis this threshold value the can identify the specific person. The output are either accepted or discarded in the next stage until and unless the face is identified in the final stage. The five stages are 1) image acquisition, 2) pre-processing, 3) segmentation, 4) feature extraction, 5) identification.

3.1 Image Acquisition

The Image acquisition stage is the initial stage in this system. In image acquisition the system acquires the raw image (as the name suggest) of side face of the person whose identity is to be verified as shown in **figure 3.1.1**. This image can be stored in the database after the feature extraction in the fourth stage if the person is enrolling himself in the system. The output of the image acquisition will serve as the input for the second module. The next stage after this stage is the pre-processing.

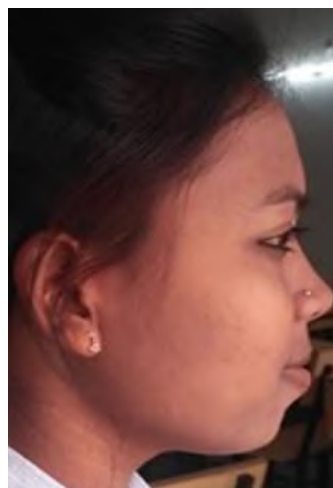


Fig. 3.1.1

3.2 Pre-Processing

The pre-processing is the second stage of the system. After the image acquisition process pre-processing is done. It uses the output of image acquisition as the input. In this stage the system first takes the output of the first stage, the image is misaligned as shown in **figure 3.2.1** and contains some noises and distortion.

After that its masks the image and filter the image to obtain the final face image using the “imfill” function.

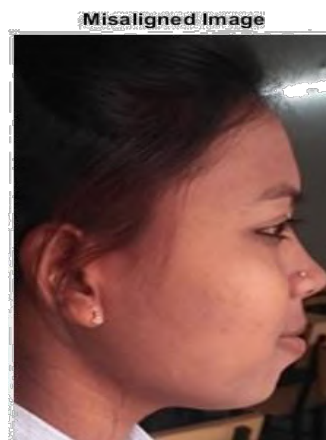


Fig. 3.2.1

So the pre-processing locates the points on the image of side face using the “surf” function as shown in figure 3.2.2. For that it first converts the colure image in grey scale image and for that its use a function called "rgb2gray".

After locating the surf point it aligns the misalign image on the basis of surf points using the “imshow” function. After Aligning of the image of side face it crops the image for later edge detection of the face, and for that the systems uses “imcrop” function. after cropping it removes the noises and distirtion from the image using the “Guassian-filter” and “Imfilter” of Matlab.

When the cropping is done and the image is aligned it converts the cropped side face image in binary i.e. zero's and one's so that all the unusual portion of the image is removed and we get the exact side face image as sown in **figure 3.2.3**. the black part is considered as zero and the white part is considered as one. For converting the image in binary it uses “im2bw” function.

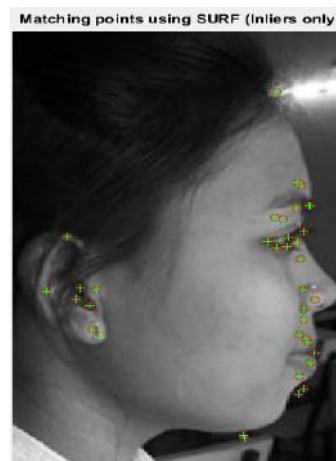


Fig. 3.2.2

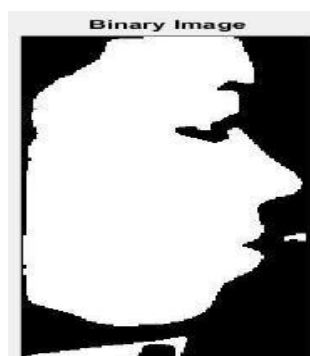


Fig 3.2.3

Now the system detects the side face which will be used in later process as shown in the **figure 3.2.4**.



Fig 3.2.4

3.3 Segmentation

Once the pre-processing is done then the segmentation begins. It's the third stage of the five stages of this system. In the segmentation the system detects the face and edge. For edge detection the system uses an algorithm known as "Canny" algorithm. Canny is an edge detection algorithm for detecting various edges for different ranges. It first detects the edge for segmentation and then it dilates the edge detected in last step. After that it generates the final segmented image as shown in **figure 3.3.1** which will be forwarded to the next stage to feature extraction.



Fig 3.3.1

3.4 Feature Extraction

The feature extraction is an important stage of this system because this is the stage the features are extracted from the image for matching and identification. After feature extraction on the basis of the previous segmentation and pre-processing it stores that on the database with their name and the threshold value. When the person enrolls in the system the image captured during then is stored on this stage i.e. features extraction

3.5 Identification

The identification is the last and the final step in facial recognition process. When the system captures the image and extracts its feature, it asks the database to provide the stored value of that person and starts the matching process. When the matching is complete on the basis of the threshold value it provides result that the person is identified or not. When it matches the extracted features of captured image with the stored extracted image and if & only if matching percentage is 75% or above it will grant the access or show positive result otherwise it will deny the access.

4. RESULT

In this experiment, we have found that in many cases the front face is not available or frontal face recognition is not possible. So, this system is a solution to overcome all those problems this side face recognition is developed. This facial recognition system has high accuracy and can be used where most of the biometrics system can't be used. Our results shows that the 99% correlation of side face images is larger and more accurate then the front face image systems.

5. CONCLUSION

In last we came to this conclusion that the side face recognition is a reliable and accurate security system in biometrics. We have seen that the side face recognition is proven very effective in face detection and human identification. It's a good solution in order to solve the problems occur in front facial recognition. In real world applications like traffic signals, Parking lots, Tollbooth etc. it can be used their because of its reliability, compatibility, less maintenance and high accuracy.

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National Seminar (TECHTRENDS-2018)

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27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Identifying User by Matching Statistics

Rasika Retar¹, Pratiksha Dhoble², Abhishek Chauhan³, Swati Gourkhede⁴, Bhavna Sonkusre⁵,
Prof. Pradeep O. Balbudhe⁶

^{1, 2, 3, 4, 5} Studnets of B.E.,

⁵ Assistant Professor,

Suryodaya College of Engineering & Technology, Near Dighori Naka, Vihirgaon, Nagpur, India

Abstract: Today's we have many as n numbers of online services. Those services use by most of users. Every user has their own unique behaviour or pattern of uses. The users behaviour or we can say usage pattern which can we are going to give a feat by tracking there usage of online services for identifying the user statistically. We are using a powerful algorithm which can help us to identify the user by time, location, as worldwide and which give a output with the help of histogram as a graph.

As user identities of both the database which a database of source one and source two as mention above, then this is a insignificant. A common requirement in our database is to analyzing for identifying user by a feat statistics of their data which we are going to actually work on.

Keywords: system, Web User, Data Flow Diagram, Algorithm.

1. INTRODUCTION:

A common requirement in our database is to analyzing for identifying user by a feat statistics of their data which we are going to actually work on. Now a day we have many applications, which can help us to access some information about the user those using the database or we can say source and the same information about the users we can get of the users from the another database or we can say source, and the requirement is to match the particular information from the first database of information from database that according to same hidden user.

As user identities of both the database which a database of source one and source two as mention above, then this is a insignificant. Although, as we say about some applications, the identities of the users which are unknown either in the first database or in the second database or in both; thus this type of situation, the requirement become significant . for ex. The both database might contain information about the users with there a location , city statistics measure over the time period which we calculated distinct. Another example of the online services for the matching problem the database which collected from the online services which are mention above at the accurate time period.

2. EXISTING SYSTEM:

The studies of this paper which we are using or our subject for study is matching the user those who's have been clearly participated and is to overcome the several problem which occurs in other different communities. For these several problem we present comprise of our approach with related problems of several areas and highlight our contributions. Our work is closely related to de-anonymization concept which is studied in the our reference paper. These concept is closely related to the directly work on the our work with the datasets.

3. PROPOSED SYSTEM:

We resolve all the drawbacks of existing system in our proposed system. The proposed system helps in saving the time and making information flow easy giving beneficial reports.

3.1 SYSTEM DESIGN

The system design deals with data flow diagram & detailed flow graph of the Identifying User By Matching Statistics.

3.1.1 Data Flow Diagram

A Data Flow Diagram (DFD) is a graphical representation of the "flow" can be used to represent a system in terms of the input data to the system, various processing carried out on these data, and the output data is generated by the system.

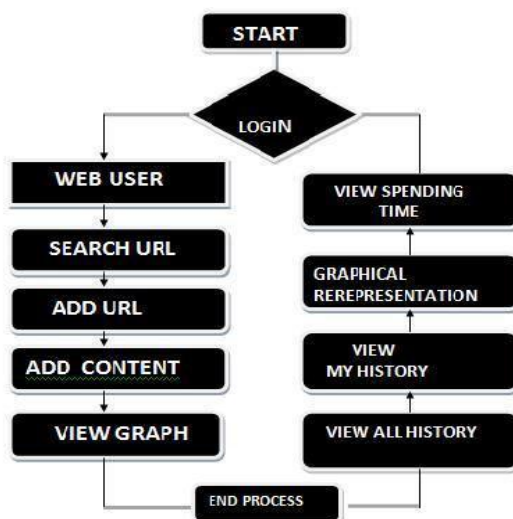


Fig. 1 Data Flow Diagram

3.1.2 Detailed Flow Graph

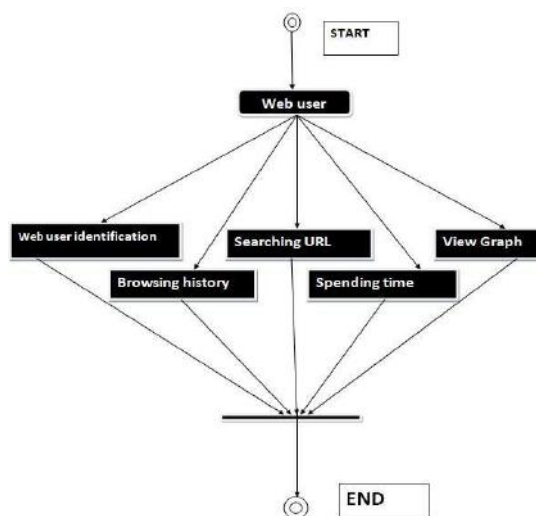


Fig. 2 Detailed Flow Graph

A DFD represents flow of data in a system. Data flow diagrams are commonly used for problem analysis. Movement of information through the different level or processes in the system is shown in Data Flow Diagram of Fig. 1.

In the above flow diagram we can say the fully process of our system which is identifying user by matching statics.

In the above flow diagram we see the various components of our system. The main component of our system which we are gone implemented. Our process start with login from registration; the registration makes our system secure. The web user follows many processes those are included with the search url, add url, add content and view graph.

Web user: The web user is for entering the information regarding new person who are login through the registration, controlling all the database like any changes regarding to the name, phone numbers, location ,url etc. The web user also controls the faulty registration like entering a new registration. The web user also have their own standard for the making or working with all this database. Its controls all the activity for the generating the database in the various of the requirement as the including the registration. The web user will check the all the information about the i.e. person updates, url updates, url content update etc. The web user has the highest level of priority in the our identification of user bt collaborating system.

Web user identification: While the person going to be registries and get there username as well as their password they have choose the option of the web user for them to identified as a web user . if the are once entered in the web user for there particular it help to them to see all these functionality about the web user these are browsing history, searching url ,spending time, view graph .

Browsing history: In the web user as the user done his /her registration, the registered person get on the login page. And add their user name and password and select the web user option which is giving in the dropdown arrow. Than they see the next page in which they have to search for the url. And adding content for the those particular url which is entered the same. This all information help us to generating the database for the browsing history in the web user for the working on it.

Searching url: The searching the url is the target we achieving for the particular web site address. Which is helping for the various types of their particular information that going to be we are searching as well as it helps us to generate the database with respect to the quires, as well as updating the database for their contribution for the working.

The searching url along with the one work is there for us is the add content about the searching url. Is it is very necessary to adding the contents for the particular web site which are we going ton to search it help us to generate the database as with the information about the every url i.e if we search the web site as www.scet.in after searching we have to add something details about the scet such as what is sect?, sect location etc for our database.

Spending time: As we are see above that there are we are going to register and select the web user option for the controlling all these operation then we are selecting the browsing history along with the searching url and adding the contents.

These all procedure is recorded with the particularly time period . such as how many time we are spending the these web site as example given above. Its a way to calculated all the time which is going to we are spending with these website, The web sites are those which are we can searching in the searching the url as well as which are save in our database and with their content.

View graph: At end we can see the after all these process the output for browsing history, searching url, spending time etc. We are getting all these information with the help of their graphically presentation as we can say there are we making the database are of the two types . The one database is compared with the second database graphically and we can get the output graphically for the same .

But all of the sudden its is very in fraction of time we can get the graphically output with the graph according to the searching the url , browsing history , web user can get the output but the most important with the respect of the time.

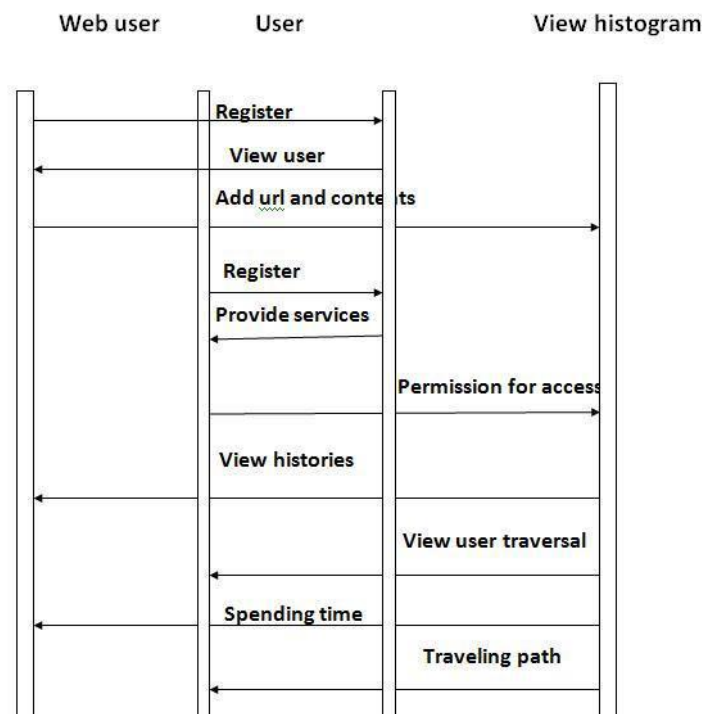


Fig.3 Working of web user

4. ALGORITHM:

The step by step representation of our program is known as the algorithm. In this system the our algorithm is the heart our all the system . as we know that all the procedure we are making with the web user actually we are creating the database. The database the real database we are on working state. For the combining all the database which are separated by the time period and collecting the information with the help of our browsing history , searching url, spending time.

Collaborative filtering

Collaborative filtering algorithm we are using in this system for making automatic predictions (filtering) according to a behaviour of users by collecting the use of their own priority or tested of there information from many users.

The collaborative filtering algorithm which works on the two subgroups, or we can say the two database which we are making in the system.

The collaborative filtering approach is that if a person A has the same point of you as persona B on an issue, A is more likely to have Bs a point of view on a different issue than that of a randomly chosen person.

In the general or popular way ,the collaborative filtering algorithm is the process of filtering for the information or patterns using technique including collaboration along multiple agene view points, data source as database, in etc.

Collaborative a filtering method s have been applied to many different type of data such as in mineral exploration, monitoring data.

5. CONCLUSION:

In the system we which we are implemented in this paper where we have study the requirement for user identification from the stastics of their online uses of services. Accordingly, we are given an data mining concept with database in the form of histograms which accordingly belonging to database of the users and another independent database of histogram which generated by the same users which are using online services. We are spracing in the system the accuracy of our collaborative filtering algorithm. Our proposed system which can be implemented with the help of minimum weight maximal collaborative algorithm on a complete weighted graph and higher accuracy than heuristics beses method with the three databases of different parameters or we can say different natures.

The identification of users via matching collaborative filtering algorithm can something result in higher accuracy than existing system based more complicated data patterns or models.

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REVIEW ON DESIGN AND IMPLEMENTATION OF SMART ERP SYSTEM

Ashwini Deulkar¹, Karishma Thakre², Priyanka Zade³, Rahul Gajbhiye⁴, Prof. Pravin O.Balbudhe⁵
^{1,2,3,4} Student BE (8th sem), ⁵ Professor, Department Of Computer Engineering
Suryodaya College Of Engineering & Technology, Nagpur, Maharashtra, India

Email - ¹ ashwini27deulkar@gmail.com, ² karishmat0703@gmail.com, ³ priyankazade17@gmail.com,
⁴ rahul.gajbhiye@india.com, ⁵ pravin.balbudhe@gmail.com

Abstract: Smart ERP System realization including establishment and maintenance of the database and front-end application development. This paper represents the system functional and architecture design, and emphasizes the system's functionality, database design and functional modules, etc. It will have all details regarding faculty & students in all aspects, the various institutional notifications to the workers and students updated by the college administration. It also make easy us explore all the performance occurrence in the college, different information and Queries can be generated based on unlimited options related to students, group, course, faculty, exams, semesters, documentation and even for the complete college.

Key Words: DFD, PHP, MYSQL.

1. INTRODUCTION:

Smart ERP System is an automated system that is concern with the process of gathering, storing & transferring relevant information to support the management operations in the organization. The data is distributed among the various department in the organization. The smart ERP system is online system and user interface to replace the current paper work. For each of the colleges and universities, faced with such a large amount of data, in order to accurately and efficiently carry out the students and staff management on the basis of a full collection of information, the extent of difficult task is unimaginable. Through the Smart ERP system, we can realize the management of students information network-based digitally, track and collect the students & staff information real-time, precisely, reduce the workload of students information management, promote the scientific and effectiveness of students information management, thus to promote the management of college students to carry out high efficiently. There are incomparable advantages via using computers to manage student information such as quick search, find convenient, high reliability, large memory capacity, confidentiality, long life and low cost and so on, which can greatly improve the efficiency of student information management, and promote college management to scientific, information technology, and standardization transform.[2]

2. RELATED WORKS

2.1 PURPOSE

The idea is to design a web application which contains up to date in sequence of the college. That should look up competence of college record organization.

2.2 OBJECTIVE

- 1) Providing the online interface for students, faculty etc.
- 2) Increasing the efficiency of college record management.
- 3) Decrease time required to access and deliver student records.
- 4) To make the system more secure.
- 5) Decrease time spent on non-value added tasks.

3. SYSTEM DESIGN:

This section deals with data flow diagram & detailed flow graph of the Smart ERP System.

3.1 Data Flow Diagram (DFD)

Modelling is one of the parameter which play an crucial role in designing some project or application. DFD is a one of the graphical modelling tool .DFD represents the entire flow graph of the project from starting point of project to end of project. A Data Flow Diagram (DFD) is a graphical representation of the “flow” of Smart ERP System. A data flow diagram can also be used for the dream of Data Processing. It shows the communication between the system and external entities. A DFD represents flow of data throughout a system. Data flow diagrams are commonly used during problem examination. It views a system as function that converts the given input into required output. Movement of information through the different processes in the system are shown in Data Flow Diagram of Fig. 1. This paper mainly focuses on the control the information of the students, faculty, placement department information, exam section, related information of the college which is maintain by the college management through various levels of controlling.

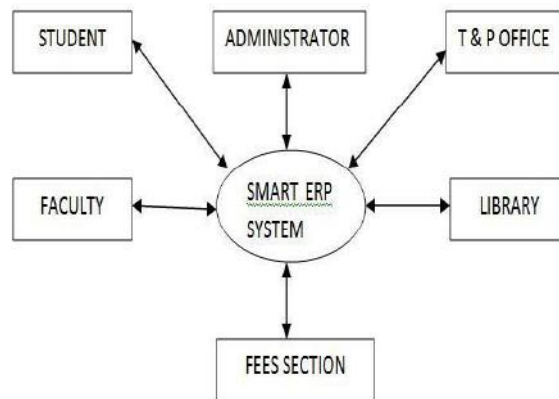


Fig 1 . Data Flow Diagram

3.2. Detailed Flow Graph

In this hierarchical representation is given regarding the Smart ERP System. The detailed flow graph is shown in Fig.2 .The design of the student Smart ERP System includes the invent of the home page which give the facility for all the students, organization and other client to access the Smart ERP System. All customer of the Smart ERP System has a single username and password provided by the web master of the institution. The home page mainly consists a login form through which a new user can register, or an active user can login to the system by incoming the username and password provided by the web master.

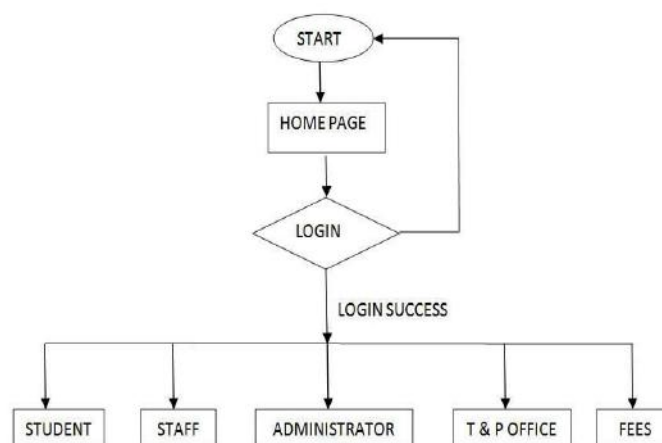


Fig 2 . Detailed Data Flow Diagram

3.2.1 Student:

The student is of center focus, because in every college student acting the very essential role. Student can access the information of the college, course information, subject details, faculty details, training in addition to placement cell information and exam segment information. The course details include information about branch he is

studying, the academic curriculum of the college, year wise subject accessible by the branch, the subject information include the programme of the subjects, information concerning the staff management the subjects, the subjects he currently registered for the semester he is presently studying, attendance and internal marks of the subjects, he can also invite any queries to the staff regarding the subjects. The placement details consists of information about the companies, the eligibility criteria for attendance recruitment of the companies, the procedure of recruitment, the date and time of the recruitment. The placement cell updates the student's information that got selected for a company. The exam section details include the internal and external time tables, the room allotment for the exams, it also contains the semester end results.[3]

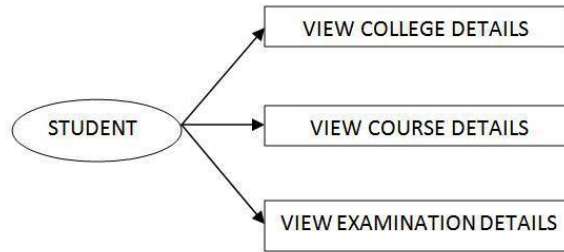


Fig 3 . Student's information

3.2.2 Faculty:

The faculty can update the information concerning the students presence, internal marks of the students and any information regarding the subjects they taught. They can also view the student details for better understanding of the student routine and improving the competence of the student. The staff also gets the update from the college regarding any events occurring in the college. They can also obtain the notification from the T & P cell and examination department.[1]

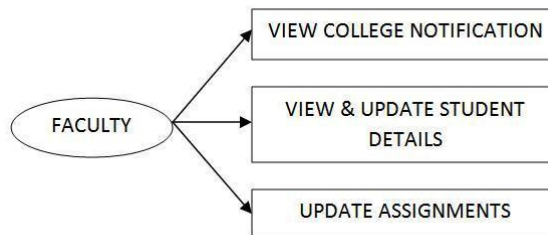


Fig 4. Staff's information

3.2.3 Exam Section:

Examination section handles all the work regarding to the exams.

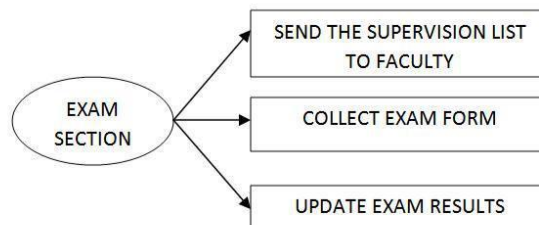


Fig 3 . Exam Section information

4. TECHNOLOGY CHOSEN FOR SMART ERP SYSTEM DEVELOPMENT

4.1 PHP

PHP is a stands for "Hypertext Preprocessor". PHP is a scripting language which uses at the server site that is embedded in HTML language. It is used to manage databases, dynamic content. It is integrated with a number of popular databases, including MySQL, Oracle, Sybase, Informix, and Microsoft SQL Server.PHP is politely zippy in

its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time. PHP supports a many protocols such as POP3, IMAP, and LDAP. PHP adds base for Java as thewell as for distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time. PHP language tries to be as kind as possible.

4.2 MySQL

MySQL is the world's popularly used open-source relational database management system (RDBMS), enabling the profitable delivery of strong, high-performance and expandable Web-based and embedded database applications. It is commonly used as the database component of LAMP (Linux, Apache, MySQL, Perl/PHP/Python) web application software stack. MySQL was developed by Michael Widenius and David Axmark in 1994. Presently MySQL is maintained by Oracle (formerly Sun, formerly MySQL AB). MySQL tutorial of w3resource is a comprehensive tutorial to learn MySQL(5.6). We have hundreds of examples covered, often with PHP code. This helps you to learn how to create PHP-MySQL based web applications.

5. CONCLUSION

This paper uses the client server structure to design the student information management system ,and explains the system design principle ,system plan and structure ,the function module of information system according to current university student information management needs. It provides a interactive students management platform for the information of a large number of students and the management of students.

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A Review on Prevention of Cyberbullying Using Social Media

Prof. Pratibha Ghode¹, Akash Walke², Pankaj Thakre³, Sagar Mendhule⁴, Kalyani Kokse⁵

¹assistant Professor, Suryodaya College of Engg & Technology, Nagpur, India,

^{2,3,4,5}SEM B.E. CE, Suryodaya College of Engg & Technology, Nagpur, India,

akashwalke216@yahoo.com, pankaj.thakre5@gmail.com, sagar72mendhule@gmail.com,

kalyanikokse1996@gmail.com, pratibha201986@gmail.com

Abstract: A major challenge for the extraction of event information from social media is its unstructured and noisy nature. In this paper, in order to detect and describe the real time event, the 5W (What, Where, When, Who, and Why) model is proposed. Firstly, users of social media are set as the target. Secondly, the spatial and temporal information from the social media are extracted to detect the real time event. Thirdly, a notification is sent to users along with GIS based annotation of the detected event. Making use of technology as a medium to bully someone is called cyberbullying. Social networking sites provide a fertile medium for bullies, and teens and young adults who use these sites are vulnerable to attacks. The rumor tweets are detected using syntactic and semantic techniques. The cyberbully detection and rumor detection on twitter network are done separately in the existing technique.

Keywords: OSN Filter Wall, Cyberbullying, Sentiment Analysis, Polarity, Content Based Message Filtering.

1. INTRODUCTION

As we all know that over 2.7 billion users of social networking sites like facebook. The number of users who are active on social media is increasing day by day and might cross 2.77 billion marks in upcoming year 2019. This type of communication platform are commonly provides a powerful means of organizing and posting useful information. In this type of communication we can exchange several types of contents like text, image, audio and video data. So, there is a chance of posting useful unwanted content. On particular user wall by other user in social media, there is no prevision of OSN filter wall services. Indeed, today OSN filter wall provide very little support to prevent unwanted messages on users wall. An important feature of facebook is its real-time nature. Facebook users write post several times in a single day. Users can know what other users are doing and what they are thinking about now. Several important instances exemplify their real-time nature, in the case of an extremely strong incidence pictures gets transmitted through Facebook. People will thereby able to know the circumstances of incidence immediately. It will provide 60-70% security from cyberbullying in social media. A study [1] has shown that 78% of German teenagers between 12 and 17 years regularly use Facebook. So, it is no big issue that interpersonal communication for substantial amount of adolescence is being online and thereby strongly influences their improvement. Though the benefits are clear, such a service is also relinquishing users' physical possession of their outsourced data, which inevitably poses new security risks toward the correctness of the data in cloud. In such a manner, numerous update results in numerous reports related to events. They include social events such as parties, cricket, games, and political campaigns. We had also seen that number of unwanted post also spread by the users who want to create uneasy environment in the society and restriction of that post is required. [10] Considering the cloud data are dynamic in nature, the proposed design further supports secure and efficient dynamic operations on outsourced data, including block modification, deletion, and append generally, launching these attacks needs an intelligent skill level.

2. LITERATURE SURVEY

Recently, with the high speed development of the social networks such as Twitter, research has been going on for using this big data for targeted advertising, marketing, localization of natural disasters, and predicting sentiment of investors. Sakaki et al. investigated the real-time nature of Twitter, and its use in event detection. The twitter users are regarded as sensors. Their messages are used for detecting earthquake. A reporting system is developed for use in Japan by their proposed methods. Unfortunately, automatically detecting and resisting real time urban emergency events using social media is not that easy. Today's OSN facilitates its user to prevent undesired wall messages to a small extent and no preferences for wall messages can be suggested for example one want to avoid vulgar post on his

wall. No blacklist strategy has been implemented to block certain user on tentative or permanent basis. A machine learning based classifier in conjunction with filtering and blacklist strategy can overcome such problem and user can be able to avoid all undesirable post on his wall [8]. There are many social networking sites user facing problem of cyberbullying because of unwanted messages. It is very important to define that problem for beneficial of sites and users of particular site. Cyberbullying is an attack depends on threatening, deliberately insulting, embarrassing or harassing people via mobile phones or on the internet through social networking websites, emails and instant messaging application [5].

It happens that the victim and perpetrator know each other in real life in most cases. Cyber bullying is not taken place by face to face and even people don't know the identity of the individual targeting them, but cyber bullying is no distinct from any other forms of bullying, the impact is no less devastating and the behavior is the similar. As insults, misinformation and rumors can be quickly disseminated to a large number of audiences, Cyberbullying is deliberately painful for victims in social networks. It is more or less impossible to delete it once published. Private information is spread because of the digital media in pervasiveness. Though it is possible to remove the given information, it still resides and remains in the minds of readers. Cyberbullying attacks can happen at any point in time and typically last for long period of time. Thus, victims can't even feel secure and protected in their own house [5].

3. MACHINE LEARNING TECHNIQUE

Text classification is accomplished on the basis of endogenous collection of data. The machine learning, based classifier learns how to classify the categories of incoming data on the basis of features extracted from the set of training data. A Machine learning approach learns from training data and creates classifiers for the classification of new dataset. The main task of text classification is to assign a predefined category with each text below are the key methods which are commonly used for text classification.

i) Neural Network Classifier

Neural network classifiers consist of neurons arranged in layers converting an input vector into output. The most commonly used neural network is multilayer feed forward network in which a unit feeds its output to all the units of the next layer but there is no feedback to the previous layer. Radial basis function network is an artificial neural network which uses radial basis function as an activation function. The output of this network is a linear combination of radial basis functions of the inputs and neuron parameters. It is robust to outliers [5] and therefore more suitable in this context. The solutions investigated in this paper are an extension of those adopted in a previous work by us from whom we inherit the learning model and the elicitation procedure for generating pre classified data. The original set of features, derived from endogenous properties of short texts, is enlarged here including exogenous knowledge

ii) Support Vector Machines

The support vector machine classifiers analyse data and recognize pattern in it. They are based on supervised learning model and are able to perform nonlinear classification in addition to linear classification. In particular, we base the overall short text classification strategy on Radial Basis Function Networks (RBFN) for their proven capabilities in acting as soft classifiers, in managing noisy data and intrinsically vague classes. Moreover, the speed in performing the learning phase creates the premise for an adequate use in FACEBOOK domains, as well as facilitates the experimental evaluation tasks. The support vector machine classifier is suitable for large amount of unlabelled data and small amount of labeled data [4]. The high dimensional input space, irrelevant features, sparse document vectors and linearly separable text classification makes support vector machine classifier suitable for text categorization [4].

iii) Naive Bayes classifier

Naive Bayes classifier is a probabilistic classifier based on Bayes theorem with independence assumption [4]. Given a class variable, it assumes the presence or absence of specific feature is unrelated to the presence or absence of any other feature. For instance a fruit is considered to be cherry if it is red, round and small in size. Bayes classifier considers each of these features independently to the probability that the fruit is cherry regardless of the presence or absence of any other feature. The main advantage of this classifier is that it requires a small amount of training data to estimate the parameters required for classification. The data analysis is to measure the accurate of the tweet. This will validate the tweet content and their account details such as ip address, Credential and Date time stamp of the received tweet. All details are captured in the dataset to validate the account properties for the user. We address short text categorization as a hierarchical two level classification process.

iii) Decision Trees

Decision trees classifiers are used for a hierarchical decomposition of the data space. It determines the predicate or a condition depending on attribute value. Class labels in the leaf node are used for classification. It is very important to use filter in a two stage so that message filtration can be done in a proper way and it will give appropriate result which we expect from system. In order to reduce the over fitting data pruning is required in decision tree. This classifier requires iterative training procedure and is oversensitive to training data [5]. Decision will be made in two phases, once data will be sorted in two classes i.e. Neutral and Non-neutral. After that non neutral data will be classified in four type's i.e. vulgar, offensive, hate and racism, Sexual.

4. SHORT TEXT CLASSIFIER

A hierarchical two level classification is advantageous to short text classification as per the suggestion in [1]. The first level of a classifier labels the message into neutral and non-neutral. In second level non neutral messages are estimated into one or more of the conceived categories.

i) Text Representation

Text representation of a given document is important task strongly affecting the performance of classification process. It is done by extracting features for a given document. The investigations from [7, 35, and 36] suggest three types of features important for text representation. They are Bag of Words, Document properties (DP) and Contextual Features (CF). The first two types of features are entirely derived from the information contained within the text of the message [7] whereas contextual features are exogenous. Text representation using endogenous in Bag of Words representation terms are identified with words. It is also important to use Feature which is extracted from outside the message content but related to message itself. A contextual feature is introduced in [8] that characterize the environment where the user is posting. According to [6]. It determines the semantics of message [6]. Vector space Model is the model of text representation by which a text document is represented as a vector of binary or real weights. These three features are experimentally evaluated for short text classification in [8] for their appropriateness.

ii) Machine Learning-based Classification

As short text classification is hierarchical two level tasks and it should be robust to outliers hence RBFN is used for short text classification. An RBFN model is chosen as per the experimental evaluation in [14] [11] among the other classifiers.

5. FILTERED WALL ARCHITECTURE

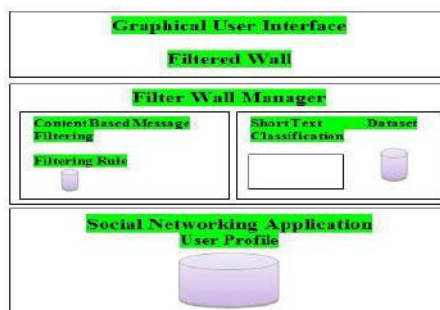


Fig.5.1. The proposed framework Architecture

6. BLACKLIST MANAGEMENT

i) Blacklists

To prevent undesired wall messages to a small extent and no preferences for wall messages can be suggested for example one want to avoid vulgar post on his wall. No blacklist strategy has been implemented to block certain user on tentative or permanent basis. A machine learning based classifier in conjunction with filtering and blacklist strategy can overcome such problem and user can be able to avoid all undesirable post on his wall [8].

7. EVALUATION METRICS

First level of classification is evaluated by means of contingency table approach. The Overall Accuracy index giving the percentage between truth and classification results is complimented with in this project, we investigate the problem of data displaying in social media user profile, which is essentially a distributed storage system. The second level of classification is evaluated on the basis of Precision and Recall. Precision gives the number of false positive and Recall gives the number of false negative of classification. The overall metric F- is then computed by the harmonic mean between Precision and Recall [12].

8. INVESTIGATIONAL OUTCOME

Existing technique works well for long text classification but suffers when the text is short. Short text does not have multiple occurrences of words therefore classification of short text is a challenging task. Short text classification is a hierarchical two level task consisting of hard and soft classification. Among the variety of Machine Learning models for text classification, RBFN model is well suited. RBFN's main advantages are that classification function is non-linear and the model can generate confidence. It is also robust to outliers and this makes this model well suited in this context

9. CONCLUSION

In this paper, we successfully studied real time nature of project to predict the sentiment of the statement and to prevent cyber bullying and also to send notification to the user about the event happening on social networking sites. Approach for short text classification and design of a system to filter undesired messages from OSN walls. Additionally the flexibility of a system can be enhanced through filtering rules and blacklist management. The system develops a ML soft classifier to implement customizable content-dependent FRs. In particular, we aim at investigating a tool able to automatically recommend trust values for those contacts user does not individually identified. It is an area full of challenges and of paramount importance. This survey paper presents approach of short text classification and design of a system to filter undesired messages from OSN walls.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Survey on Voice Based Email Navigation System for Blinds

¹ Suchita K.Khadase, ² Rashmi R.Gedam, ³ Premila S.Sonkusre, ⁴ Pragati M. Meshram,

⁵ Prof. Vivekanand P. Thakare

^{1,2,3,4} Students of B.E.,

⁵ Assistant Professor

Computer Engineering Department,

Suryodaya College of Engineering & Technology, Near Dighori Naka, Vihirgaon, Nagpur, India

Email - ¹ankitakhadse12@gmail.com, ²rashmig1503@gmail.com, ³premilasonkusare@gmail.com,
⁴meshrampragati92@gmail.com, ⁵vivekanand.5977@gmail.com

Abstract Because of the Internet, today's communication becomes so easy. However visually impaired people unable to use this technology. Even though new technologies introduced to help blind people because they are not able to behave like a normal user. The aim of this paper is developing an email system that will help even blind person to use services for communication without any training. Users do not need to use keyboard instead he will work only on mouse operation and speech conversion to text. The system can also be used by normal person who everare not able to read. The system is based on interactive voice response (IVR). This make it user friendly and efficient. The listener will be used to listen users' voice and recording voice. Our desktop application aim is to help and communicate to send or retrieve an email without the help of other person if they can understand our application then they will help to understand. When application start then first up all they will ask as registered or login for these most of the use of listener will listen when our mouse click on the screen then they recording will start and for a particular second they will record and further action will be taken out.

Key Words: Listener, Visually Impaired people, IVR, Email navigation system.

1. INTRODUCTION

Consider the users of the system use TTS (text to speech) for visually impaired persons to provide services through voice. This is independent program and fairly cheap and is possible to install onto the Desktop. This allows blind user to easily Read the mail. Software considers system of instant message to favour interaction of blind users with any other user connected to network. It has been observed that 60% of total blind population across the world is present in the India. In this paper we have described the voice mail system for blind people to access email and multimedia function of the operating system easily and efficiently. This system reduces the load taken by blind user to remember and type characters using keywords. It also helps handicapped and illiterate. The blind people will not able to see a mail for this purpose we developing are System. In a world there is a commonly all the important document and for many purpose email navigation system will user The system first will say that welcome to the application and take a point of mouse on the screen next process will login or the registration and then if we can take up a login process.

1. Screen Reader has drawback that its create noisy audio interface. It is difficult for blind user to accesses email system.
2. ASR (Automatic speech recognition) has low performance in case of noisy environment.
3. Smartphone is very common word.
4. It is known to all people even though children but blind people are unable to use smartphone.

2. EXISTING SYSTEM

Until 2014 there were total 4.1 billion email accounts created and there will be estimated 5.2 billion accounts by the end of 2018. This makes email the useful medium of communication. The most common services that we used in our day to day life cannot be used by visually impaired people. Because they do not provide any facility so the

person in front can hear the contents of the screen. They cannot see what is present on the screen they cannot make out where to click to perform required operation. For blind person using computer for the first time is not convenient as it is for first time is not convenient as it is for a normal user even though it is user friendly.

There are many screen reader available yet people face some more minor difficulties. Screen readers read out content there on the screen and to perform operations. User need to use keyboard shortcuts because mouse location cannot trace by screen readers. Another Drawback of Screen is it read out all the content in a sequential method. So, user can make content of screen only if it is the form of basic HTML. For eliminating all the drawback we are developing proposed system.

3. PROPOSED SYSTEM

This system allows blind people to send and receive email messages in their native language. We had described the voice mail system architecture which is used by blind people to access email easily and efficiently. The proposed system is based on a completely new idea and is like a existing mail system. The most important fact about this system is its accessibility .A system called as perfectly accessible only if it can be used efficiently by all types of people irrespective of people are able or disable. The current systems do not provide this accessibility. Thus the system we are developing is totally different from the current system. Our system is w based more on the user friendliness of normal users, our system focused user friendliness of all types of users including normal people, blind people and illiterate people. The system is completely based on IVR interactive voice response. While using system the system the computer prompts the user to perform specific operation to avail respective services then he/she need to perform that operation. One important benefit of the system is that user will not require using keyboard .All operation based on mouse click events. Particular location cannot be traced by blind user the system had given the user a free will to click blindly anywhere on the screens. IVR is responsible for which type of click will perform which type of operation.

4. DESIGN

A. user interface design

The system is completely focuses more on efficiency in Understanding IVR instead of look and feel of the system. This system is mainly developed for visually impaired people to whom look and feel would not be more importance as efficiency of understanding the prompting would be

B. Database design

Our system has maintained database for user validation and storing mails of the user. The inbox, send, mail and trash Schemas would store all mails of respective services that belong to that particular use.

C. System design

Its gives the complete detailed flow of events in the system. All the operations are performed by only mouse click events. Some places voice input is required.

5. SYSTEM ARCHITECTURE

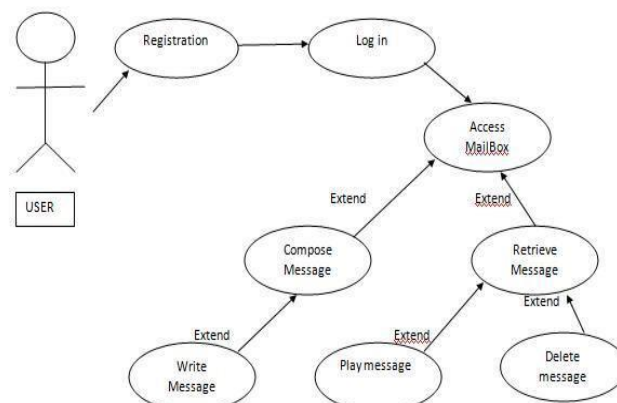


Fig. System Architecture

Through the registration the user can visit our software. The user will be guided with help of voice communication. While registration all the field should be filled. By clicking on that box, the user is able to fill that box. for example if user will move mouse cursor over the registration icon it will sound. "you are on registration page".

Also the voice is recorded in the database. After the registration, user has to login to the page and type user id and password which is recorded through the database which enables the correct user to get access right to the fields which has entered.

While filling the necessary fields the speech will be recorded in the database. There will also present the very frequently used words. Means when the user will speak it would type automatically. The voice would be recorded in the database. After the registration user has to login.

6. ADVANTAGES

- Easy to use.
- Do not need to remember keyboard shortcuts.
- Voice based email system helps visually challenged people to access email services efficiently. .
- This system makes the disabled people feel like a normal user.
- They can hear the recently received mails to the Inbox, as well as the IVR technology proves very effective for them in the terms of guidance.
- Use of more than one sensor increases the accuracy of our system.

7. APPLICATION

This desktop application will be used to access mail and send mail, in school, colleges and hospitals, etc.

8. CONCLUSION

This system helps the blind user to access mail efficiently without any difficulty. This project is very useful for today's generation for blind or handicapped even for illiterate. The system is based on benefits of blind in making use of advance technology for their growth and improvement. The system will reduce the unnecessary load taken by user to remember and type character using keyboard. This system will help in removing some drawback that was found in blind people in accessing emails. We had eliminated keyboard shortcut also screen readers.

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Design and Implementation of Classroom Surveillance System using ZigBee Technology

¹Vivekanand Thakare, ²Pratibha Ghode

¹Assistant Professor, ²Assistant Professor

¹Computer Engineering Department,

Suryodaya College of Engineering & Technology, Nagpur, India

Email – ¹vivekanand.5977@gmail.com, ²pratibha201986@gmail.com

Abstract: This paper facilitates a classroom surveillance system using Zigbee technology. This Technology consists of a transmitter with switches and a receiver module with LED display. The transmitter module transmits the information through wireless sensor network by using ZigBee module structure which uses IEEE'S standard 802.15.4. After getting the input of ongoing lecture details the receiver will sound a buzzer and will display the current ongoing lecture information on screen. The results displayed on receiver module screen shows that the system can satisfy the need of automated surveillance of ongoing lectures.

Key Words: Zigbee, 802.15.4 standards, LED display, wireless sensor network.

1. INTRODUCTION

In the past several years we have seen a rapid growth in wireless technology. Uptill now wireless technology has been concentrated on high-speed communication and especially longer ranges application like WLAN. Bluetooth was the first well known standard that focuses on Low-Rate Wireless Personal Area Networks (LR-WPAN) [1]. But for networking of more no. of nodes it has limited capacity. Nowadays, many industrial & home automation control applications recommends long battery life, lower data rates and less complexity than the existing standards. Hence for such wireless applications, a new standard called Zigbee has been developed by IEEE. Its IEEE specification is IEEE 802.15.4 [1].

That's why the most leading institutes & organizations in India are now focusing on the fully automated systems. But in reality, the only few institutions are capable to implement it due to its high implementation cost and maintenance.

In our proposed system we provide two types of modules. Those are Transmitter and receiver. These modules communicate with ZigBee device, and form a self-organized network.

The transmitter transmits the data using ZigBee device. The receivers are able to receive this signal in the range of 1.5 Km.[3] As the data get received by the receiver it will send an acknowledgement to the transmitter that the data is received. This acknowledgment will only in the form of buzzer.

The arrangement of this paper is as follows. In section II, the system architecture is introduced. In section III, the design of Network is introduced, which includes the ZigBee Topologies, Traffic types and ZigBee Protocol stack. In section IV, we will introduce the Implementation of the project. The conclusion is in section V.

1.1 WHY ZIGBEE

ZigBee (i.e. IEEE 802.15.4) have the following features.

1. capable to create personal area networks
2. Small, low-power digital radios.
3. It is simple & less expensive than other WPANs, e.g. Bluetooth or Wi-Fi.[4]
4. Less power consumption
5. Transmission distance is between 10–100 meters line-of-sight,
6. Typically used in low data rate applications that require secure networking.
7. It has a bandwidth of 20- 250 kbit/s.[6]
8. Longer life battery.

Table 1: Comparison of ZigBee with Other wireless technologies

Market Name	ZigBee™	---	Wi-Fi™	Bluetooth™
Standard	802.15.4	GSM/ GPRS/ CDMA	802.11b	802.15.1
Application Focus	Monitoring & Control	Wide Area Voice & Data	Web, Email, Video	Cable Replacement
System Resources	4KB- 32KB	16MB+	1MB+	250KB+
Battery Life (days)	100- 1,000+	1 – 7	5 - 6	1 - 7
Network Size	Unlimited (26+)	1	32	7
Bandwidth (KB/s)	20 - 250	64- 128+	11,000+	720
Transmission Range (meters)	1 - 100+	1,000+	1- 100	1 - 10+
Success Metrics	Reliability, Power, Cost	Reach,Quality	Speed, Flexibility	Cost, Convenience

Zigbee is primarily designed for the wide range control applications and to replace the existing non-standard technologies. It currently operates in 868MHz band at a data rate of 20Kbps in Europe, 914MHz band at 40kbps in USA, and the 2.4GHz ISM bands Worldwide at a maximum data-rate of 250kbps. Table II. shows a comparison of different transmission media.[2]

Table 2: Comparison of ZigBee with different transmission media

Characteristics	Infrared	RF Module	Blue Tooth	Zigbee
Power Consumption	Low	Medium	Medium	Low
Controlled Units	1	1	7	254
Distance	15m	50m	100m	100m
Transfer Rate	38Kbps	4800bps	1Mbps	250Kbps
Expansion	Low	Low	Medium	High

2. SYSTEM ARCHITECTURE

The system architecture with transmitter and receiver are shown in fig.2.1 and fig.2.3 respectively.

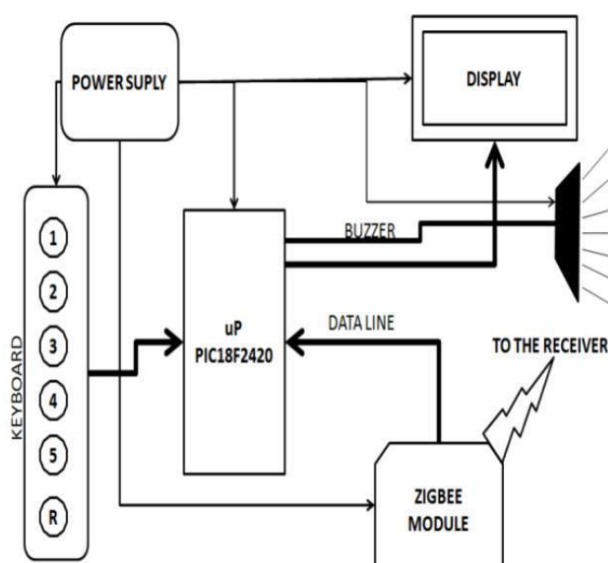


Fig.2.1: Transmitter Module



Fig.2.2: Circuit of Transmitter Module

The transmitter module and receiver module both have following components in common.

ZigBee Module: XBee and XBee-PRO ZB embedded RF modules provide cost-effective wireless connectivity to devices in ZigBee mesh networks. Utilizing the ZigBee PRO Feature Set, these modules are interoperable with other ZigBee devices, including devices from other [11].

µP PIC18F2420: It is the microprocessor which is responsible for processing the ZigBee signals so that those signals can be used in the so developed embedded system.

Buzzer: The main purpose of buzzer is to beep and provide information to the user of system and ZigBee device itself that the data is received.

Power Supply: provides direct power to system when it is not running on the battery.

Display: On receiver side it provides visual display to the user which gives information about the ongoing lecture. On transmitter side the display is used for testing purpose.[3]

Keyboard: In transmitter the keyboard is present which has six buttons in which the first five buttons are for the subjects of Computer engineering branch and the last button is used to reset the data.[10]

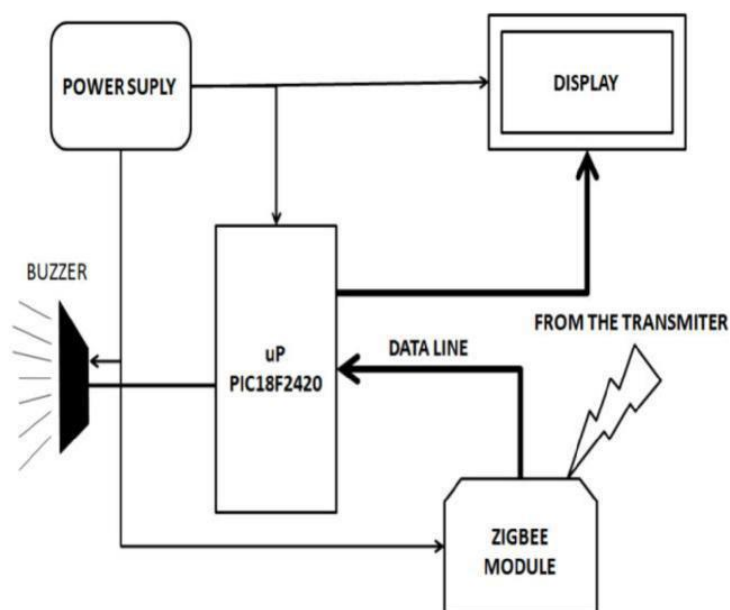


Fig.2.3: Receiver Module



Fig.2.4: Circuit of Receiver Module

[1] DESIGN OF THE NETWORK

Network plays an important role in any communication system. In this system, the management of network is based on the IEEE's standard of Zigbee named as 802.15.4[5]

3.1 NETWORK ARCHITECTURE

3.1.1 Topology

Zigbee has the following topologies as illustrated in figure:

1. Star,
2. Cluster tree &
3. Mesh

ZigBee is technology that is designed specifically to replace the use of individual remote controls. Zig Bee can easily satisfy the market's requirement for a cost-effective, standards-based wireless network. It supports low data rates, low power consumption, security, and reliability. To fulfill this requirement, the Zig Bee Alliance, an industry working group (www.ZigBee.org), has developed a standardized application software.[3] [6]

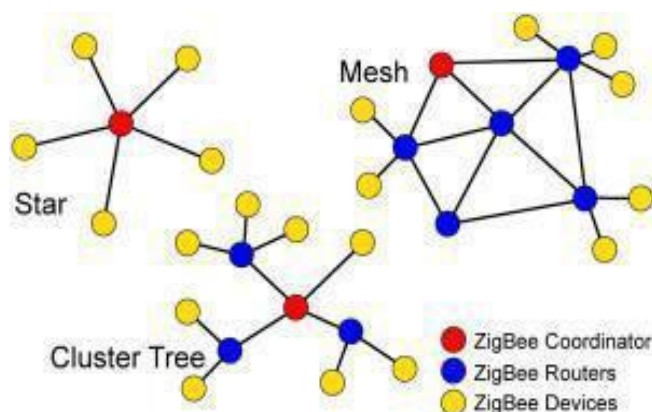


Fig.3.1:ZigBee Topologies

The alliance is working closely with the IEEE to ensure an integrated, complete, and interoperable network for the market.

3.1.2 Traffic Types

ZigBee/IEEE 802.15.4 addresses three typical traffic types. IEEE 802.15.4 MAC can accommodate all the types.

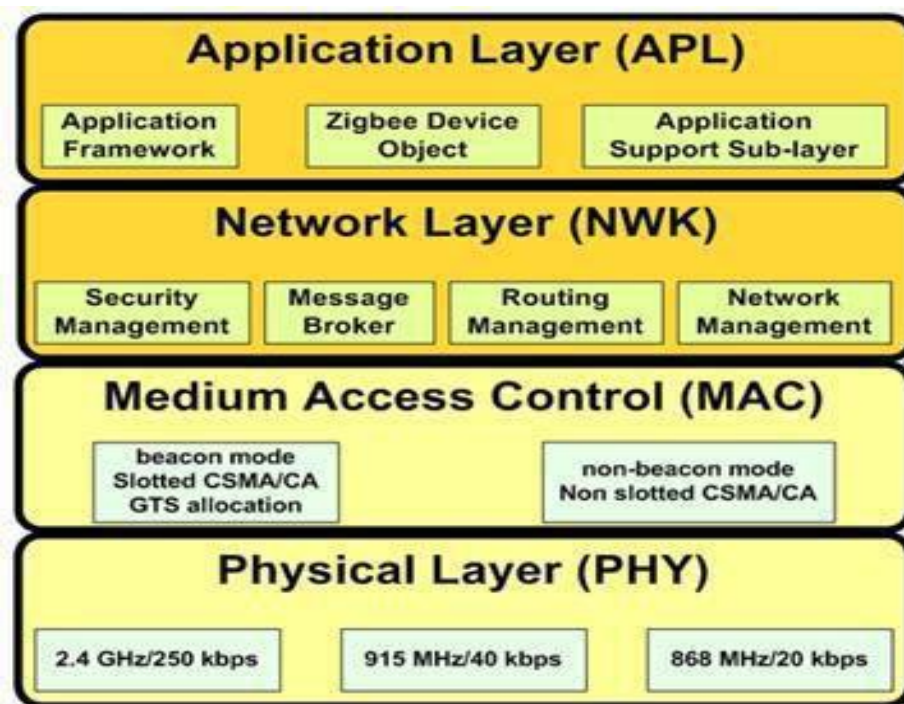
1.Data is periodic: The application specifies the rate, and the sensor activates accordingly to check the data and then deactivates.

2.Data is intermittent: The application, or other encouraging aspects of the application, determines the rate. The device must be connecting to the network only when communication is mandatory. This can saves optimum energy.

3.Data is repetitive: Depending on the time slots allotted, devices operate for fixed durations. Such allotted time is called GTS (guaranteed time slot).[7]

ZigBee works in either of two modes. i) beacon or ii) non-beacon These modes can enable the to-and-fro data traffic.

i) Beacon Mode:- For the modules that run on batteries, Beacon mode is used and can offers maximum power savings. In this mode, a device watches the coordinator's beacon that gets transmitted at periodically, locks on and looks for messages addressed to it. If message transmission has been completed, the coordinator provides a schedule for the next beacon so that the device 'goes to sleep'. That is, the coordinator itself switches to sleep mode. In this mode all the devices in a mesh network know when to communicate with each other. However, the timing circuits have to be quite accurate, or wake up sooner to be sure not to miss the beacon. This increases the power consumption by the receiver, due to which cost is highly increases. [8][10]



ii) Non-beacon mode:- When the modules run on main power supply, the non-beacon mode is used. The system where devices are nearly always 'asleep', the non-beacon mode will be included such as in smoke detectors and burglar alarms. At random intervals, the devices wake up and confirm their continued presence in the. On detection of any activity, the sensors 'focus on attention', and transmit to the ever waiting coordinator's receiver (since it is mains powered). However, there are very less chances that a sensor finds the channel busy, in that case the receiver would be 'missed call'. [4][6]

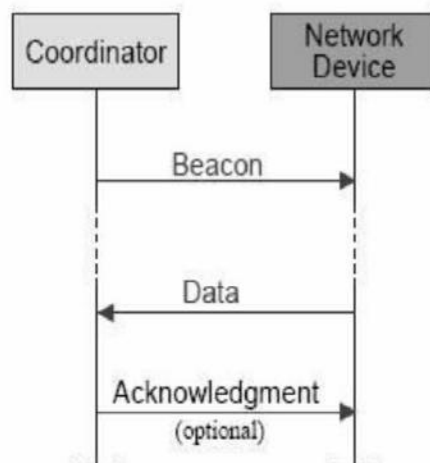


Fig.3.3: Beacon Network Communication

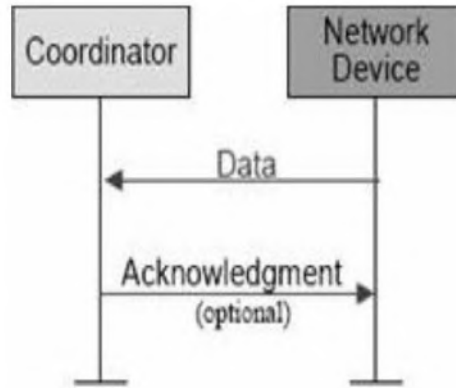


Fig.3.4: Non-Beacon Network Communication

4. IMPLEMENTATION

Each transmitter module contains the database of subjects related to the respective semester. The block diagram shows the transceiver in fig. 4.1. There is one display on each classroom. The professors have to set the ongoing subject name in the transmitter display after reaching in the class room. This transmitter can transmit the details of ongoing lecture by using ZigBee Transceiver.[1] [13]

A signal receives by receiver module display the name of ongoing lecture with current date and time at the bottom of display by using RTC controller in receiver module. Similarly all the running lectures can also be displayed at the same time as shown in fig. 4.3. In this system we have considered the syllabus of computer engineering branch of RTM Nagpur University Nagpur.

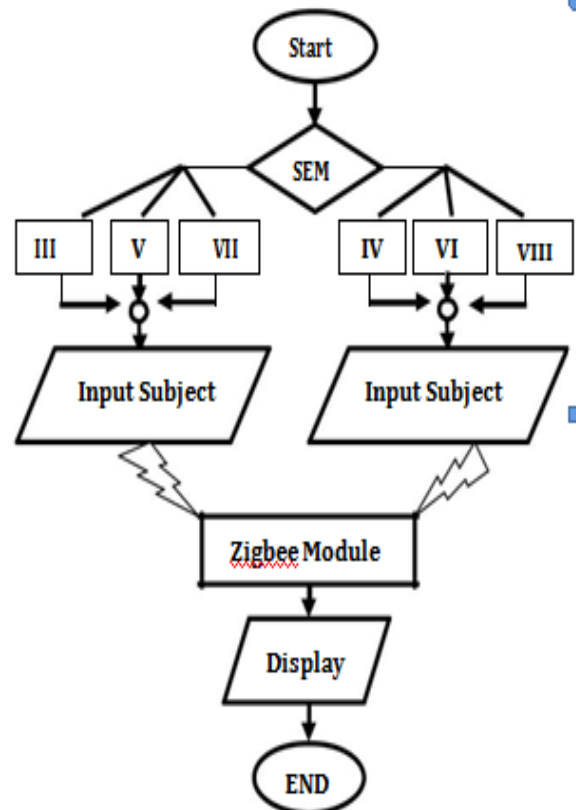
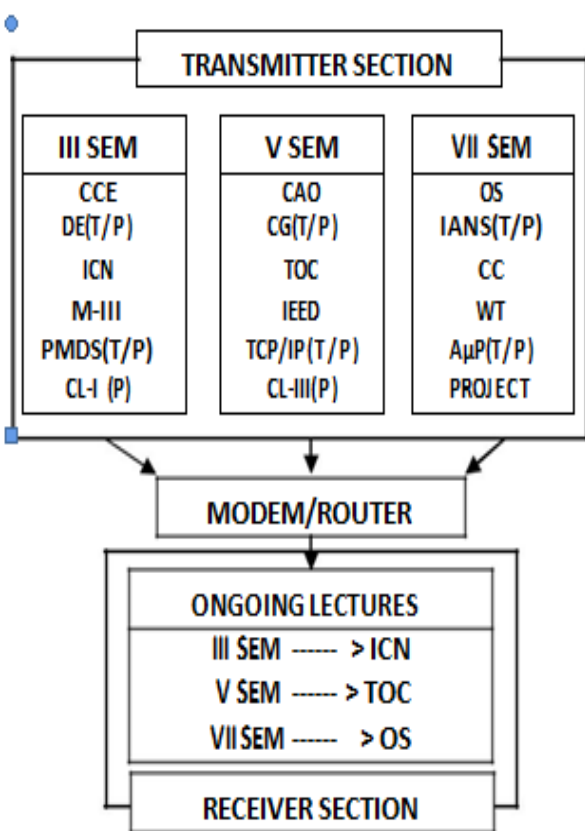


Fig.4.1: Transceiver section Fig.4.2: Work flow of the device

The receiver section will display the message on LED display as shown below.

SCET NAGPUR		
III SEM	: OOM	<SUBJECT>
V SEM	: SEPM	<SUBJECT>
VII SEM	: USP	<SUBJECT>
Date: dd/mm/yy		Time: Hr : Min : Sec

Fig.4.3: Receiver section showing ongoing Lectures

5. CONCLUSION :

We believe that there is definitely a place on the market for ZigBee, since no global standard exists today in the wireless sensor network area. If the ZigBee interoperability works between different brands of ZigBee devices, the ZigBee standard may be the dominating standard for wireless sensor networks in the Future. Two fully functional ZigBee/802.15.4 modules have been developed. It is possible to design a module with RF parts on a low cost. By using a four layer PCB the size is reduced significantly. Finally it is clear that class surveillance can be integrated with the developed ZigBee-ready modules.

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Automated Plant Irrigation System using GSM Modem SIM808 and Arduino

¹Pravin O. Balbudhe, ²Pradip O. Balbudhe,

¹Assistant Professor, ² Assistant Professor,

^{1,2}Computer Engineering Department,

S.C.E.T., Nagpur, India

Email - ¹pravin.balbudhe@gmail.com, ²pb6143@gmail.com,

Abstract: Now a days it's a challenge to improve development of plant in respect of its growth and to reduce costs which leads to an innovative idea of using an automated irrigation system which will further help in better management of water and human resources. An automated irrigation system using GSM have been developed using sensors technology with Arduino UNO and GSM module to efficiently utilize water for irrigation purpose. The system has soil moisture sensor inserted into the soil of the plants and a water level sensor placed in a water container from where water will be pumped to plants for irrigation. An algorithm has been build out with threshold values of soil moisture sensor to control the water quantity in soil and also a water level sensor has been implemented to measure the water level in tank. This project requires Arduino UNO board having inbuilt ATmega328 microcontroller. This project is need of the hour to convert manual irrigation into an automated irrigation which with the help of soil moisture sensor will detect dankness content of soil and user or owner make a request call leading to turn ON/OFF of pumping motor. Human efforts can be reduced using this technique and increase saving of water by efficiently irrigating the plants. The design has been made with better resource management and low power consumption. This project brings into play a micro-controller which is of ATmega328 family, this programmable microcontroller collects the input signals converted into values of moisture in the soil via soil moisture sensors. GSM module receive the request call and send the all current status of sensor riding through SMS. As the microcontroller starts obtaining the signals, it creates an output that forces a relay for running the water pumping motor. An LCD screen is also linked to the micro-controller to show moisture conditions of the soil and water pump. The water level sensor is used to detect the level of tank so that tank contains efficient water to transfer into crops.

Keywords: Microcontroller, GSM/GPRS Modem, LCD display, Temperature Sensor, Humidity Sensor, Water Level Sensor, Soil Sensor, Water Flow Sensor

1.INTRODUCTION:

85% of worldwide available water resources is used in agriculture and this percentage will not decrease keeping in mind the rate of population growth and hence leading to high demand of food. It's high time to create and implement new methodologies using smart technologies for sustainable agriculture. In this electronics era, a smarter approach of leading a life should be carried out and thus we have made "Automated Plant Irrigation System using GSM Modem SIM808 and Arduino" for smarter irrigation. Automated Irrigation System will regulate water flow in soil without much human intervention, while maintaining moisture of the plants. This project automatically turns ON or OFF by detecting the GSM request from the user throw Phone call. An automated irrigation system will not only minimize the excess wastage of water but also imply reduction of labor and other overheads. This project is a mini model for gardening purpose at home which contains modules for measuring soil moisture content in soil and the other for detecting water level in tank and detecting and display temperature and humidity of air and receive request throw the phone call using GSM module and provide acknowledgment sending SMS, crate all the data record and uploading into cloud system for better analysis.

2.LITERATURE REVIEW

2.1 Automatic Water Sprinkling or Irrigation System

Numerous researchers have worked with automatic water sprinkling or irrigation system. They opted for different metrics for determining the soil condition and quantity of water. They also discussed about different sources of power for the sensors. Besides, the technology for creating network among the sensors and design of control system were also heavily discussed by the scholars. An article on the automated water supply system for urban residential areas showed that such a system can be used to effectively manage water resource

2.2 Automatic Irrigation System Which Is Based On Microcontroller and Solar Power

This paper design a model of automatic irrigation system which is based on microcontroller and solar power was used only for source of power supply. Various sensor are placed in paddy field. Sensors sense water level continuously and give the information to farmer through cellular phone. Farmer controls the motor using cellular phone without going in paddy field. If the water level reaches at danger level, automatically motor will be off without conformation of farmer.

3. OBJECTIVES

This project was to design an automated irrigation system (AES) using GSM for indoor that would count use of water in a more efficient ways and save records for analysis and upload on cloud in order to prevent water loss and minimize human effort and cost efficient.

The following expect we are considered in a choice of a design solution in this project.

- Low Installation cost.
- Easy analysis of data.
- Water saving.
- Less Power consumption
- Need low Maintenance
- Expandability

Critical condition installation cost because cost is generally determine facility and viability of a project and its important in objectives and the installation a simple, cheap and easy enough for a domestic uses the water saving was also important aspects and creating its data as a record for analysis is there is a demand to minimize water loss saving more water and reduces its usage and maximize efficiency of water used.

The objective system must operate with maximum consistency and also less power consumption and monitoring. And all the systems makes easy to install in the case of unable to implementations the system in larger scale.

4. MATERIALS:

In this project we used materials listing are below

4.1 Hardware:

Arduino UNO board: - there are the main component of the project The Arduino Uno is a microcontroller board based on the ATmega328 microcontroller. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, relay circuit, DHT-11 sensor, GSM/GPRS module, display 16x4, and a reset button. It having everything like jumpers and all input output pins those support the microcontroller to interface with other modules, simply for uploading program code from computer throw the micro USB cable and power it with AC-to-DC adapter or battery connation to get started. Actually those board we using this project that is upgraded mean to say the all the other component implanted on Arduino UNO board.

Microcontroller ATmega328P:- Heart of whole system based on 8bit AVR RISC, flash memory 32kb with read and write capability, 2 I/O lines, 2kb SRAM, EEPROM 1kb, internal and external interrupt, power saving mode and having 1MBPS per MHZ achievable throughput. Basically it's like programmable heart of system.

FC-28 Soil Moisture sensor: The soil moisture sensor which is detected moisture of the soil and send the reading to microcontroller.

DHT11 humidity sensor: The humidity sensor which is detect humidity and the temperature of air.

Water level sensor: The water level sensor detect the water levels in The Water Tank the number of a sensor used to measure different levels of a water on water storage.

Water flow counter: during the filling the water tank count the consuming flow of water in the water tank.

GSM module: GSM 808 with external connected antennawith cellular network receive and sending SMS and calls.

LCD: 16X4 LCD is used to display, in this project we display soil moisture, temperature and humidity on air, water level and water consumptions, triggering motor turn ON/OFF, massage sending.

Buzzer: It sounds when the soil moisture low or water level get low as warning purpose.

Relay circuit: this circuit work only ON and OFF throw microcontroller command. Basically its logical gate work on 0 and 1.

Power supply: The power supply allows AC signal to DC signal which is required to run the system components.

Submersible pump: The submersible pump which is place in the water tank when you get the moisture level is low the microcontroller switch on the relay and submersible pump start water supply.

Plants and pipe for water supply: - normal pipe which is used to supply water and indoor plant's.

4.2 SOFTWARE:

Arduino IDE The open-source Arduino Software (IDE) basically used for all Arduino. The Arduino integrated development environment written in the java programing language. Using basic code structuring it will support C and C++ languages.

WORKING:-When power on the system first initialisesand collect all the data from sensors and display.

Display all the relate data like soli moisture température and humidity of air, total uses of water in unit of Liter. Our project works in following modes.

- I. Request call to start Water supply to plants.
- II. Error condition when water tank get empty.
- III. Water flow counter.
- IV. IOT & cloud ennobled system.

I. Request call to start Water supply to plants.

User make a phone call to start motor GSM module receive command and send to microcontroller. Microcontroller process the command start submersible pump, as well as all sensors current reading status like soil moisture, temperature, humidity, tank water level, total uses of water for harvesting sendto user throw the SMS on system's saved number.

II. Error condition when water tank get empty.

After request microcontroller analyse all readings like soil moisture and water level if water level low in this condition error accord and submersible pump unable to start. And send the error message throw the SMS to user and gives warning to fill the water tank and start buzzer.

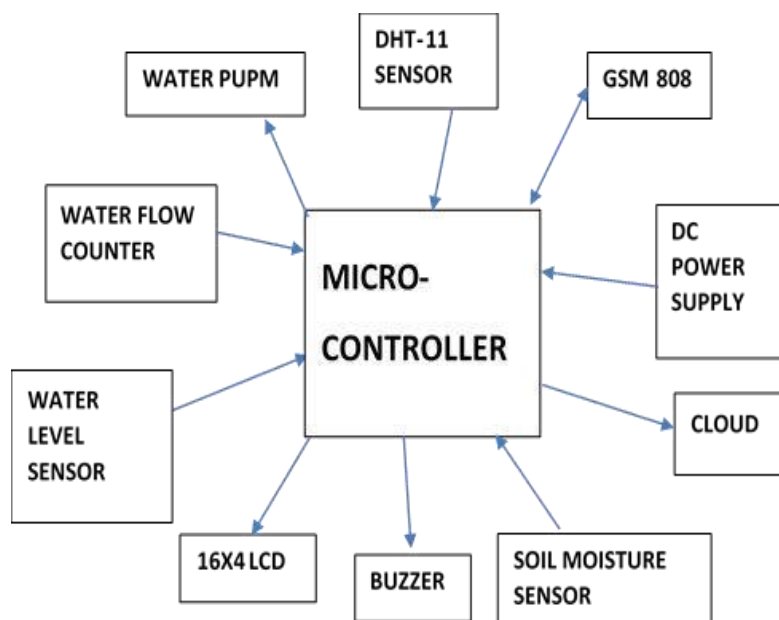
III. Water flow counter.

On water tank mouth we connected the water flow counter which is count the water how much it is used. It's like water reading meter those get reading of water usage.

IV. IOT & cloud embedded system.

All the reading and collected data sore to create the database for batter analyse and better planning. For storage we using the concept of IOT (Internet of Things) and data directly uploaded to Claude storage system authorise person can access the data and use for research and further analysis.

BLOCK DIAGRAM:



The system architecture is based on the working of project. In our project the user must fit the system small space. He must store the relatives and owners number in the system. In our project the above figure shows the block diagram of the system. The microcontroller is the heart of our system. All the devices are connected to the microcontroller. From which some devices gives input to the microcontroller and some takes output from the microcontroller. In this shows all the module which we used in the project and as well as those are I/O's. Sensors, power supply, and GSM 808 module are the data inputs and LCD, buzzer, water pump, cloud steerage.

5 RESULT:

5.1 Project Prototype

Request call to start Water supply to plants

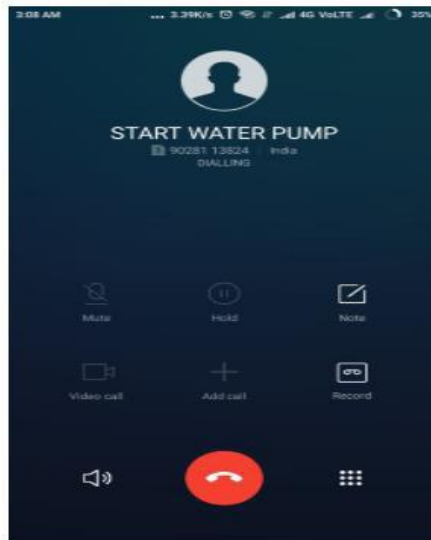


Fig. Call request for Start motor



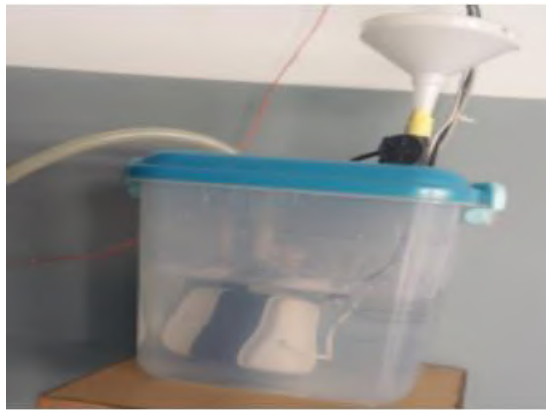
Fig. Start motor then Disconnect call Triggering SMS

In the Stand By mode when the sensors records is detected, the information displayed on the LCD display of the microcontroller. After detecting phone call request to the GSM, the system makes a call start the submersible pump and triggered message to owner of the system whose number is stored in the microcontroller.

2. Water tank filling mode.



fig. tank filling



Water tank

In this the water tank is in filling mode. In the water filling mode, water flow counter system is on. In water filling mode the water flow is detected by the water flow and sends the data to the microcontroller for further processing. After detecting the water flow, the water filling mode is activated.

6 CONCLUSION:

In this project according to user request call water pump turn on and off means start the water supply.

If water level getting low send the SMS to owner to fill the water tank. This project presents **Automated Plant Irrigation System using GSM** with SMS to the user defined mobile numbers. This project can track all information automatically and display regarding plant irrigation also usage of water. The result shows that higher sensitivity and accuracy is indeed achieved using this project.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

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Near Dighori Naka, Vihirgaon, Nagpur, MH, India

**Design and Implementation Of Advanced Ticketing Services For
Controlling & Monitoring of Public Transport**

¹Poornima Ujjainkar, ²Kayani Hiwase, ³Neha Chadokar, ⁴Sachin Malke, ⁵Nitesh Kamble

¹Student, ²Student, ³Student, ⁴Assistant Professor, ⁵Assistant Professor

¹Department of Electronics & Telecommunication Engineering,
Suryodaya College of Engineering & Technology, Nagpur, India

¹poornima150397@gmail.com, ²khiwase01@gmail.com, ³nehachadokar25@gmail.com, ⁴sachininfo123@gmail.com
⁵knitesh008@yahoo.co.in

Abstract: The main purpose of the system in these system is a advanced ticketing monitoring & controlling For the bus services. Public transportation in many countries is used as means of transport for travelling. These system is prefer for public transportation. It has been found that quiet an amount of research work has been carried out in this sector by way of using RFID technology in the public conveyance system. Public transportation in many countries is being used as a mean of transport for travelling & consequently people would prefer these public conveyance to be scheduled properly on time & the frequency be increased for commuters to make good use of it.

Key Words: RFID Reader, LCD, Microcontroller Atmega 328, QR-Code

1. INTRODUCTION:

Having hundreds of vehicles in a public, Transformation system employ rife resource to keep them functional and efficiently serving the public's need. The user friendly automated ticketing system suggested in this paper will not only automatically deduct the passenger's tickets according to the distance travelled but also detect the passenger's identification. RFID technology can be effectively employed in number of application due to its bias for efficiency. The amount can be withdrawn from the smartcard. Challenges faced by commuters in respect of referring to the static bus timetable or looking into LCD display screen which would forewarn the expected arrival time of the next bus.[3]

2. MATERIALS:

Components Required

- Microcontroller Atmega 328
- RFID Tag
- RFID Reader
- Display Unit

Microcontroller Atmega 328:

The Atmega328 is a very popular microcontroller chip produced by Atmel. It is an 8-bit microcontroller that has 32k of flash memory, 1k of EEPROM, and 2k of internal SRAM. The Atmega328 is one of the microcontroller chip that are used with the popular Arduino Duemilanove boards.[1]

RFID Tag:

RFID tags are the components which are used for the purpose of designation. The tag has a Microchip and an Integrated antenna. Related to each tag, the microchip contains single digital data. These cards may be of different size and range.

RFID Reader:

The single digital data of tag is decoded with the use of RFID reader. The RFID reader transmits an Electromagnetic wave which is input to the tag. RFID tag is thrilled due to these electromagnetic waves hence resulting in the creation of a confined magnetic field, which has a nosiness pattern.[2][3]

Display Unit:

Cheapest display unit accessible is LCD. But Pi has an advantage that other display units can be connected to it in a straight line through display port.

3. METHOD:

This system consists of an RFID reader which is used to classify the passenger, a control unit which uses the list to monitor factors like account balance, ticket charge etc. The system also includes a distance measuring unit which uses the GPS to find exit place and new place to calculate distance, and an internet access for updating database. Most RFID tags contain at least two parts, One is an included circuit for storing and processing information ,modulating & demodulating a radio-frequency (RF) signal, and other specific functions. The second is an antenna for receiving and transmitting the signal. The passenger entering the preferred bus should display/place the RFID tag in front of the reader. When the tag is placed before the reader circuit, the tag gets wound up and the reader reads the unique digital data behind it.

Hence the tag reveals related information to the reader circuit. The reader circuit stores this information in its internal memory temporarily and also links to the common database system which has all the details of the particular passenger. It verifies the identity of the person. Having coupled with the common database system, it also checks if the passenger has enough balance in his account for the travel. Only a person with minimum account balance & verified identity will be able to travel in the buses which assure secure & reliable transportation system. After each travel, the individual bus units update database by transfer credit to the equivalent account and also the information can be found in the main database.[4]

4. FINDINGS:

Hardware debugging is the major problem. We made-up all the components in PCB and test power Supply; input and output, if the ports are not working then check the code and revise in hardware.

5. RESULT:

By implementing this project as real time project. This Process can made better by implementing the rechargeable RFID tag as ATM card (or) debit card just by changing the program. The system is fully automated, consistent, apparent and convenient. The cards being reusable, they are much more suitable compared to the paper based ticketing system.

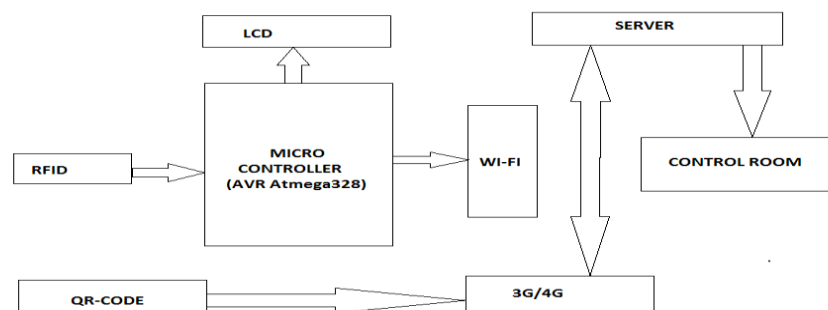


Fig:1 Block Diagram of Advanced Ticketing System

6. CONCLUSION:

Also currently in many countries display system available at bus stop to know expected time of entrance and wait if any.

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Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Implementation of Arduino Based Mini CNC Plotter Machine

¹Archana Katkade, ²Ashwini Chavan, ³Simran Thakur, ⁴Monali Yelekar, ⁵Rasika Manapure, ⁶Shailesh Birthariya,

¹Student, ²Student, ³Student, ⁴Student, ⁵Assistant Professor, ⁶Assistant Professor

¹Department of Electronics & Telecommunication Engineering,
Suryodaya College of Engineering & Technology, Nagpur, India

Email - ¹katkade.arch94@gmail.com, ²ashwini.reena26@gmail.com, ³simranthakur382@gmail.com,
⁴monali.yelekar79@gmail.com, ⁵rasikamanapure@gmail.com, ⁶sbirthariya@gmail.com

Abstract: The purpose of this project is reuses the part like CD-Drive. The 3D printer is existing in market but the range of 3D printer is high so the aim of this project is to make a 3D printer in low cost. Mini CNC Plotter Machine is an embedded system that works on the Principle on 'Computer Numeric Control (CNC)'. The system mainly works with two stepper motors and one servo motor. In Arduino Circuit plots the input given from the computer through 'INKSCAPE SOFTWARE' on the sheet which is located on the drawing board using micro-controller. The plotter has three axis control and a micro-servo controller for movement of pen. This system reduces human effort and also reduces the chances of error. The efficient and correct mounting of all the parts and proper use of software and correct alignment of circuit makes the system more competent. The microcontroller converts G-code into a set of machine language instruction to be sent to the motor driver of the CNC plotter.

Key Words: Computer Numerical Control (CNC), Printed Circuit Board (PCB), G-code, INKSCAPE SOFTWARE,

1. INTRODUCTION:

A Plotter is a special type of printer that uses a pen to draw images on solid surfaces. In Computer Numeric Control (CNC), microprocessor is used which is capable of processing logical instructions interfaced with a computer. The logical instructions are provided by using a computer in the form of code or text or image which is then transformed into a machine language by microprocessor to be executed by the machine.

A CNC plotter machine is a 2D plotting machines which uses a pen to draw text or image on any given solid surface. It can be used for the purposes such as PCB Design, logo design, etc. It is based on CNC plotter machine. With the increasing demand for the use of CNC plotters in universities and laboratories, a low-cost and less complex design is an absolute need. The parts used for the plotter in our project are easily available at a very low price and spare parts are also used. The construction is very simple and strong. Its advantages include high effectiveness, high flexibility, and high production rate, low cost of production, less working time and fewer losses in production. It includes three main steps that is getting data, interpreting data and accordingly control action [2]. Based on special characters letter codes and numbers a form of program called part program is used for automatically operation of a manufacturing machine to produce a specific part of specific dimension. The program is then converted in to electrical signal to provide for as input to motors that run the machine and do the tool movements. There are three axis of rotation x, y, z for three dimensional motion of tool plus an axis of rotation. The z-axis is one of the three which allows the movement of router in up and down direction. This axis is very important because it controls the depth. The y-axis functions as motor mount to move z-axis in addition with slide mechanism, x-axis uses two pieces one for front and one for back which serves as height stands.[1][3]

2. MATERIALS:

Components Required

- Steeper Motor (2 Pieces)
- Servo Motor
- Motor Driver (2 Pieces)

- Arduino UNO
- Old Computer DVD drives

Stepper Motor

A stepper motor or stepping motor is a brushless bipolar DC electric motor that divides a full rotation into a number of equal steps. The motor's position can then be commanded to move and hold at one of these steps without any feedback sensor, as long as the motor is suspiciously sized to the application in respect to torque and speed. Switched reluctance motors are very large stepping motors with a reduced pole count, and generally are closed-loop commutated. Steeper motor has two separate windings & its move 360 degree direction that's why we know the exact position of output.

Stepper Motor Driver

A Steeper motor act is depend on motor driver. Two L293D motor drivers are used to manage the movement of stepper motors along the X, Y and Z axis. Stepper driver are positioned on Arduino. We have supplied input current & motor will be gives result as a replacement of lead screw. The movement of pen is controlled by lead screw

Servo Motor

A Servo motor is a rotary actuator that allows for precise control of angular or linear location, speed and increase of rate. It consists of a suitable motor attached to a sensor for position feedback. The servo motor is move the 180 degree direction.[4]

Arduino UNO

Arduino is an open source platform used for building electronics projects. Arduino consist of both a physical programmable circuit Board and a piece of software that runs on your computer, used to write and upload computer code to the physical board. Mainly Arduino is converting the coding language into machin language.

It controls the position of stepper motor with the help of program. It is a open source prototyping platform easy to use hardware & software. The arduino consists of digital & analog input pins that allows user to attach various extension boards. The Arduino UNO board is microcontroller based on the ATMEGA 328, two L293D motor driver ICs. It has 16 digital I/O pins in which 6 pins can be used as PWM output & 6 pins are used for inputs. Arduino Uno board is simply connected to the computer with USB cable. The boards in clock by 16 MHz ceramic resonant & has a USB connection for power & communication. Mainly Arduino is converting the coding language into machin language.

3.METHOD:

Operation of Mini CNC Plotter Machine

Our CNC machine consists of three axis X, Y, Z for three dimensional motion of tool. The numeric data is required for working of the plotter is provided by a program called part program which converts numeric data into electrical signals are then given input to stepper motor. The machine control unit (MCU) consists of Data Processing Unit (DPU) & Control Loop unit (CLU).The receiving data DPU interprets & encode it into internal machine codes then it is passing to CLP. The CLU converts electrical signal into discrete mechanical rotation. Driving System includes stepper motor which converts electrical pulses into mechanical displacement.[5][6]

4.RESULT:

We had made successful Arduino based CNC plotter machine. Which works as G-code based 2D printing machine. Hence the result of this project is in working.



5.RECOMMENDATIONS:

CNC Plotter Machine

CNC plotter machine is capable to draw any image on solid surface. First scan the image file. In this we are using the Inkscape software which import image file into G-code. Then G-code is transferred to microcontroller which instructed motor mechanism to draw the image[2]

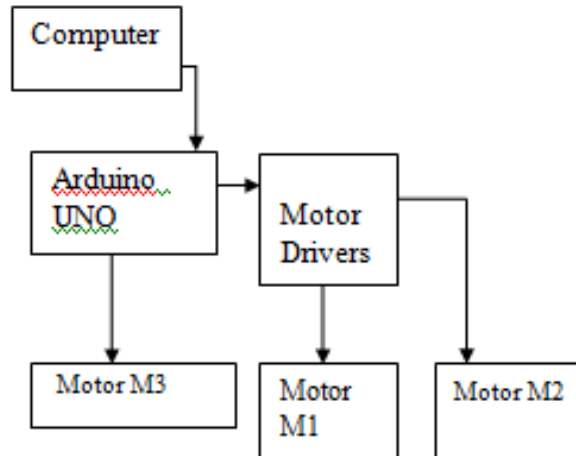


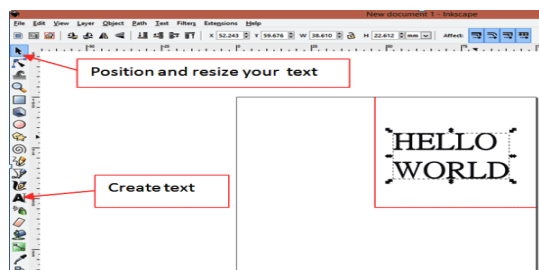
Fig.1 Block Diagram of CNC Plotter Machine

G-Code File Using Inkscape Software

G-code is a language in which we tell computerized machine (CNC) to do something. It is basically a file contains X, Y, Z co-ordinates. Inkscape software we are used for G-code generating. We mentioned that Inkscape is the software we are use to generate our G-code in this for example we will create a simple text “HELLO WORLD” as shown in below,



the create & edit text object tab. Type the text “HELLO WORLD” & position it at the top right corner of the square as shown below,



Click text & choose the type of font style that you prefer. Click apply & the close. Now click on path & select ‘Object to path your text is now ready to be saved as G-code. Click on file save as & then

6.CONCLUSION:

In this paper we have presented the concept of a low cost three-axis mini CNC plotter. The existing CNC machines are of high cost, difficult to maintain and requires highly experienced operators. Our CNC plotter overcomes these problems. It is of low cost and easy to control and there is no need of highly experienced operators. It consumes low power and works with high accuracy due to precise controlling of stepper motors. It is made with

easily available components and spare parts. It can be used for long hours at a extend which is not possible in existing ones.

It is designed for private manufacturing and small scale applications in educational institutes. The machine is designed with a very simple construction scheme and can be carried anywhere without much effort. The algorithm used is simple. It is hoped to extend this work for future development. The pen can be replaced with a pinhead or laser head or any other tool for different purpose of use. Software that has been used is open source and user friendly

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27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

**Implementing an Algorithm for Vertical Handoff in
Heterogeneous Wireless Networks**

¹Mangesh D. Pawar, ²Tushar S. Dorlikar, ³Hrushikesh S. Landge, ⁴Madhuri Ninawe, ⁵Sagar Ghormade,

¹Student, ²Student, ³Student, ⁴Asst. Professor, ⁵Asst. Professor

¹Electronics & Tele-Communication Department

Suryodaya College of Engineering, Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Email - ¹mangeshp49@gmail.com, ²tushar.dorlikar1@gmail.com, ³hrushi420@gmail.com,,

⁴madhuri.snimje@gmail.com, ⁵sagargormade@rediffmail.com

Abstract: A heterogeneous network is consisting of different wireless access standards. For seamless data transfer a vertical handoff (VHO) plays a major role. Vertical Handoff decision (VHO) is totally based upon Received Signal Strength (RSS) measurements. Handoff (HO) decision is made individually without considering other HO user equipments (UE). User mobility is a factor, which having important role in VHO decision. VHO is required only at lower speeds and high speed user velocity may cause unnecessary handovers that can degrade system capacity and QoS level. UE velocity make a HO decision, we can reduce the transmission cost and transmission time. Because of high bandwidth and ease of networking we consider the wireless access standards: Wi-Fi and Wi-max and LTE system. The algorithm is simulated in NS2 and the performance of the network is evaluated in terms of user velocity and handover numbers.

Keywords - Heterogeneous wireless network (HWN), Vertical Handoff(VHO), Horizontal Handoff(HHO).

1. INTRODUCTION

A mobile move into a different cell, at that time a conversation is in progress, the MSC automatically transfers the call to a new channel belonging to the new base station referred to as handoff (HO). HANDOFF can be classified into:

- Vertical Handoff
- Horizontal Handoff

The handoff between access networks with different link layer technologies is defined as vertical handoff (VHO). Whereas handoff between different access points within the same link layer technology is defined as horizontal handoff (HHO). The considerations for vertical handover include:

- The VHO supported device must contain a mobile node remain connected to the temporary dual card that enables connection between different wireless standards.
- Various handover metrics are considered to decide the wireless standard that can support handoff efficiently.

The different metrics includes:

- Receiving signal strength (RSS)
- User velocity

In order to achieve seamless vertical mobility it is essential to consider the mobility pattern of the user which can be obtained from the LTE System. Received node chooses an access point (AP) which offers maximum signal strength.

HO is initiated when the corresponding RSS from an AP falls below a threshold value due to the various fading effects. The RSS threshold is fixed based on mobile node (MN) location and velocity information. Thus the combination of mobility pattern and RSS reduces the unnecessary handoffs. The main reasons for unnecessary HOs are:

- Network congestion.
- Unable to identify temporary coverage.
- Scarcity of required resources.

Among these problems, identifying the temporary coverage is one of the main problems faced by the heterogeneous network. That means the temporary signal strength (RSS) is a parameter which is to be coverage network at least for a minimum amount of time called HO recovery period. If a VHO occur before HO recovery period, all the optimal resources and favorable network conditions provided by the new network for establishing the new connection does not get successfully utilized. This will also cause large signalling overhead and delay.

Monetary cost, offered services, network conditions and user preferences are the other additional factors considered besides RSS and user velocity. This paper considers the influence of other users requesting HO, i.e., considering the collision among different users when they try to access the same APs or base station. This will degrade the This paper considers the influence of other users requesting HO, i.e., considering the collision among different users when they try to access the same APs or base station. This will degrade the overall network performance due to higher congestion delays and dropped call probability. So, in order to improve the performance of the heterogeneous network an objective function is developed which considers all the above mentioned parameters and through the optimization of this objective function system performance can be improved. The new VHO scheme involves two steps:

- Picking HO candidates: It is purely based on the parameters such as RSS, velocity and user type.
- Optimization of objective function: The objective function comprises different factors which the network operators concern, for e.g.: load, cost, battery life time etc. This paper considers mainly the parameters load and cost and generalizes the objective function. [1]

Due to ever growing demand for packet-based mobile broadband systems, the 3GPP has introduced LTE (Long Term Evolution) specifications as the next step of the current 3.5G cellular networks. An enhanced access network (i.e., the E-UTRAN, Evolved-UMTS Terrestrial Radio Access Network) and an evolved core network have been defined. *Overview of Wimax and Wi-Fi and LTE System* In this paper we consider the network that integrates both Wimax and Wi-Fi and LTE access standards. The Wimax and WiFi are considered due to their high bandwidth availability and ease of networking.

- *Wimax*: The Wimax is a wireless Ethernet standard (802.16). It provides wide range of user mobility and It is accessible everywhere. The operation of Wimax is same as that of Wi-Fi, but Wimax can operate at higher speed. Also the coverage area of Wimax is large therefore it can support large number of users. The coverage area is about 400m at 3.5GHz with a data rate of 20Mbps.

- *Wi-Fi*: A well developed wireless technology of present day which uses high frequency radio signals for data transmission. Wi-Fi(802.11) operates in 2.4GHz band with a data rate of 11Mbps and a coverage area of about 70-80meters. It can also operate in the 5GHz band which offers a maximum data rate of 54Mbps and uses OFDM based air interface.

- *LTE*: The LTE radio access is based on Orthogonal Frequency Division Multiplexing (OFDM) and provides a highly flexible bandwidth (from 1.4 to 20 Mhz). Both frequency division duplex (FDD) and time-division duplex (TDD) multiple access techniques are supported. Radio resources are distributed among users in a time-frequency domain. The eNB schedules radio resources among uplink/downlink flows at the beginning of each sub-frame. LTE-Sim supports all six channel bandwidths (i.e., 1.4, 3, 5, 10, 15, and 20 MHz) available for the LTE system and the cellular frequency reuse.

2. System Description

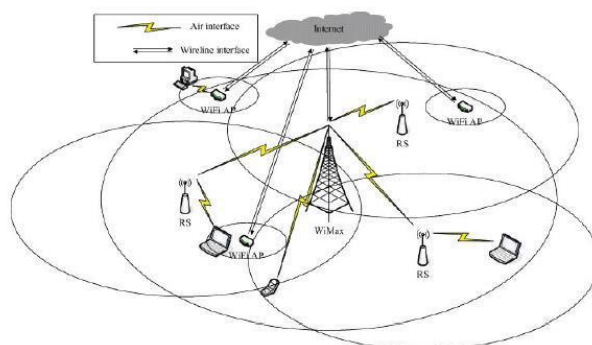


Fig.1. System Description

We consider a heterogeneous network with Wimax and Wi-Fi as the sub networks with one Wimax BS and three Wi-Fi APs. The number of BS is always selected as one except in the case of highly dense urban environment. The number of user equipment in the particular network is assumed as ten. [2][3]

Figure1 is the grammatical representation of the simulation model. The inner circle with larger radius represents the Wimax service range and the other three circles with equal radius represent the Wi-Fi service range.

3. Vertical Handoff Algorithm (Vho)

The VHO scheme is explained using flow chart as given below

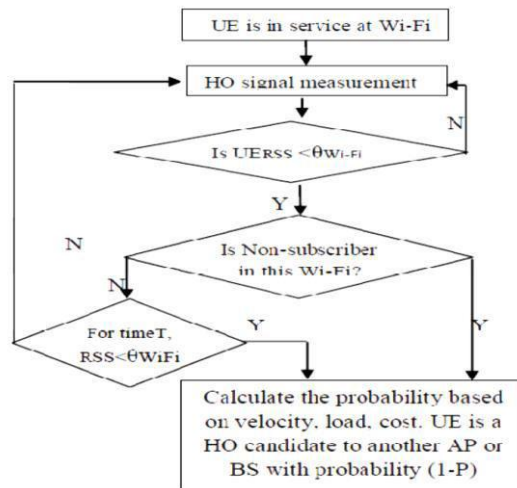


Fig 2. Flowchart for picking HO candidates in Wi-Fi

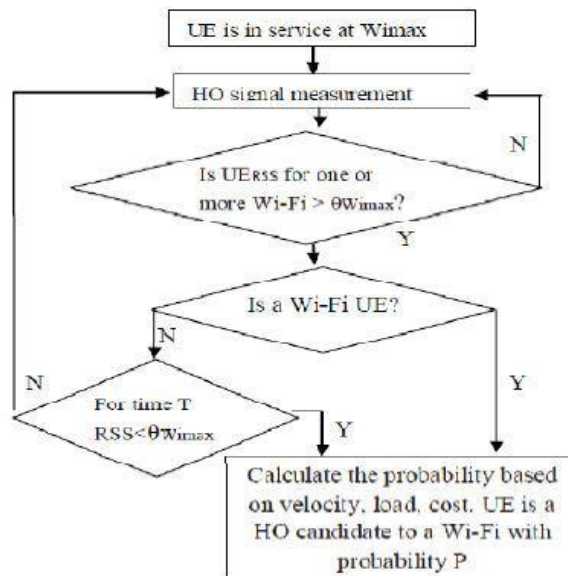


Fig.3.Flowchart for picking HO candidates in Wimax

As shown in the flowchart, a UE requesting HO can either belongs to a BS or an AP. For a UE in service at a BS, HO may occur if the RSS from one or more AP exceeds a specific threshold, say Wimax or it may also happens when in service at an AP, the User Equipment RSS falls below a threshold them it is called as Wi-Fi. If the above conditions satisfy, then the network checks whether the UE is its subscriber or not. This is done to ensure QoS of the subscribers, i.e., the subscriber belongs to a particular BS or AP gets a higher priority than the non-subscribers. This is achieved by introducing a time duration T, such that if the HO requesting UE is under the service of corresponding network(a subscriber), the UE can remain in the network for a time duration T till $RSS < (Wi-Fi \text{ or } Wimax)$. If the HO requesting UE is a non-subscriber to the current network, then the network immediately performs HO and releases the resources for the subscribers. To avoid the unnecessary HO, probability of HO is measured by considering some parameters such as velocity of the UE, maximum load that a particular network can tolerate. For a high speed UE, the probability of remaining in the BS is high, if the other constraints such as bandwidth availability and service cost offered by the network also satisfy. [1]

4. ESTABLISHED NODES

For the simulation purpose, there are 17 nodes, which are divided into following specifications. There are nodes from 0 to 17, where 0 node defines Server, node 1,2,4 defines nodes of Wi-Fi, node 3 define node of Wi-Max and Remaining nodes as a mobile users.

5. Network Performance Evaluation

RESULTS ANALYSIS

Performance Evaluation The performance of the network is evaluated by following scenarios:

- i. WiFi+WiMax
- ii. Wi-Fi+WiMax+LTE
- iii. WiFi
- iv. WiMax
- v. LTE

A network is considered that is covered by one BS and three APs. Remaining users are distributed in the network and are assigned velocities in the range. The threshold is set, The Wimax range is set to be 500m and the Wifi range is set in the range [200m 400m] and their corresponding frequencies are 5GHz and 2.5GHz respectively. The maximum tolerable system bandwidth is assigned. *Results analysis* In the following scenario, HO prediction is made based on the parameters RSS and velocity. In the second scenario we propose a new VHO scheme considering an optimized objective function along with RSS and velocity. For that we are considering Wi-Fi Network or WiMax Network or LTE Network. The following result obtained.

- i. Call Dropping
- ii. Comparison delay
- iii. Performance under Diff. Packet Loss
- iv. Overall packet delivery ratio
- v. Overall throughput

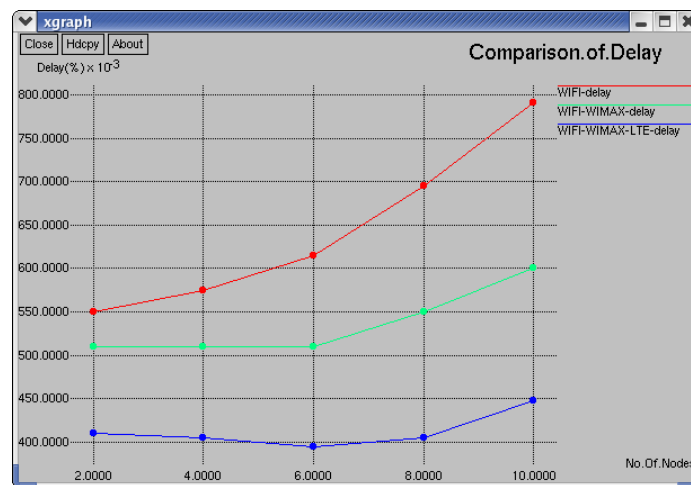


Fig.4. Comparison of Delay Wi-Fi, Wimax,

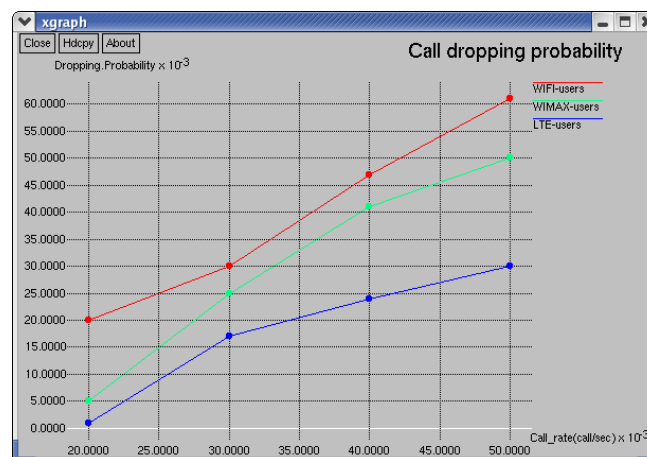


Fig.5. Call drop probability Wi-Fi, Wimax, LTE

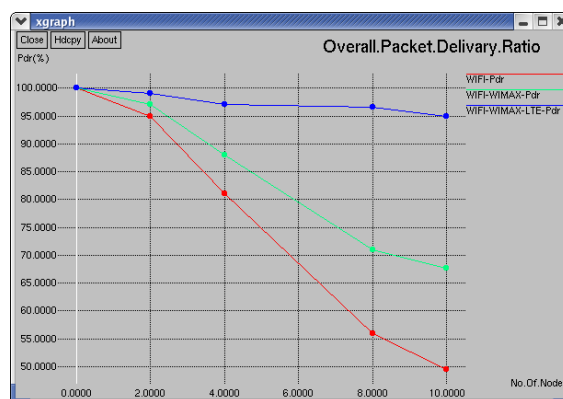


Fig.6. Overall Packet Delivery Ratio

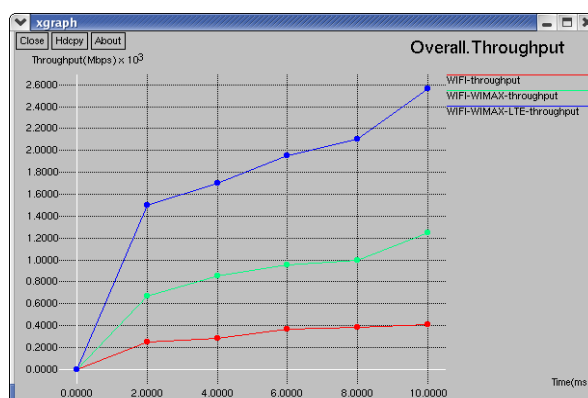


Fig.7. Overall Throughput

5. CONCLUSIONS

In this paper an open source framework to simulate LTE networks, namely *LTE-Sim*, has been proposed. Features covered by this simulator will allow both researchers and practitioners to test enhanced techniques for improving 4G cellular networks, such as new physical functionalities, innovative network protocols and architectures, high performance scheduling strategies, and so on. The open nature of this software can allow people interested in research in this field to contribute to the development of the framework, furnishing a reference platform for testing and comparing new solution for LTE systems.[4]

Effectiveness of the developed simulator has been verified with several simulations to study the scalability and the performance of the framework. Such as the Wi-Fi, Wimax and LTE comparatively represented in above graphical representation.

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**A COMPREHENSIVE STUDY OF SPECTRUM SENSING
TECHNIQUES FOR SIGNAL DETECTION IN COGNITIVE RADIOS**

¹Shailesh Birthariya, ²Dr J.D. Kene,

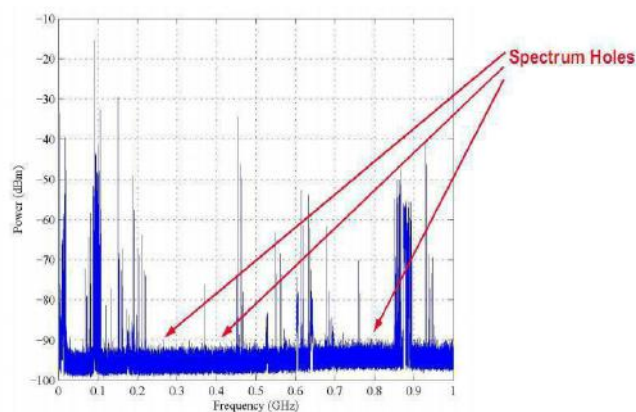
^{1,2} Assistant Professor, Electronics & Telecommunication Engineering,
Suryodaya College of Engineering & Technology, Nagpur, India
Email – ¹sbirthariya@gmail.com, ²jagdish_kene@yahoo.com

Abstract: Aiming the efficient utilization of radio spectrum resources, the Cognitive radio (CR) is considered as a promising approach. The CR technology allows the unlicensed users also called secondary user to opportunistically access the licensed spectrum without causing any type of interference to licensed user also called the primary user. One of the important key technologies of cognitive radio is spectrum sensing. A survey of spectrum sensing methodologies for cognitive radio is analyzed in the paper. The advantages and disadvantages of several spectrum sensing techniques are presented and the challenges of spectrum sensing to be realized are also proposed.

Key Words: Cognitive Radio, Energy Detector, Matched Filter Detector, Cyclostationary Detection

1. INTRODUCTION:

The necessities for the higher data rates are increasing day by day due to result of the transition from voice-only communications to multimedia type applications. Because of the limitations of the natural frequency spectrum, it becomes obvious that the current static frequency allocation schemes cannot accommodate the requirements of an increasing number of higher data rate services. So new innovative techniques that can offer new ways of exploiting the available spectrum are needed. The *Cognitive radio* comes with a tempting solution to the spectral congestion problem by introducing opportunistic usage of the frequency bands that are not heavily occupied by licensed users. Cognitive radio is a form of wireless communication in which a transceiver can intelligently detect which communication channels are in use and which are not, and instantly move into vacant channels while avoiding occupied ones. Traditional fixed spectrum allocation policies results in situations where some radio bands are overcrowded while other bands remain moderately or rarely occupied. So most of the licensed radio spectrum is poorly utilized [1].



Spectrum measurement across the 900 kHz –1 GHz band (Lawrence, KS, USA)

Fig. 1 Occupancy of Spectrum

Cognitive radio has been proposed as a potential wireless communication paradigm to improve radio spectrum utilization efficiency [2]. The main caution to take in the Cognitive radio is to prohibit the interference of the secondary user to the primary user. To address this challenge, several methods have been proposed. So spectrum sensing methodologies is important aspect of Cognitive Radio. The main problem of spectrum sensing is to determine the presence of the primary user exactly under low signal to noise ratio (SNR) under the multipath fading channel. In this paper we suggest an overview of Spectrum sensing techniques, the sensing requirements and the comparisons between different spectrum sensing techniques.

2. SPECTRUM SENSING STRUCTURE:

CR users necessitate a **periodic sensing** structure where sensing and transmission operations are performed in a periodic manner to have separate observation period and transmission period. In this structure, CR users should stop their transmissions during the sensing time to avoid false alarms triggered by unintended CR signals. This periodic sensing structure introduces the following design issues:

Interference avoidance: Interference in CR networks depends on the sensing accuracy, which is determined by the observation time. However, in periodic sensing, CR users cannot sense the spectrum bands during the transmission time, which leads to the increase in interference. Thus, for the interference avoidance, both the observation time and the transmission time need to be considered in the periodic spectrum sensing method.

Sensing efficiency: The main objective of CR networks is efficient spectrum utilization. Thus, the spectrum sensing functionality should provide more transmission opportunities to CR users. However, during the observation period, the transmission of CR users is not allowed, which inevitably decreases the transmission opportunities of CR users, leading to the so-called **sensing efficiency** issue. So there is a tradeoff between interference and sensing efficiency. For interference avoidance, the observation time needs to be long enough to achieve sufficient detection accuracy, i.e., longer observation time leads to higher sensing accuracy, and hence to less interference. But as the observation time becomes longer, the transmission time of CR users will be decreased. Conversely, while a longer transmission time enhances the sensing efficiency, it causes higher interference due to the lack of sensing information. Hence, **observation time** and **transmission time** are the sensing parameters that mainly influence both the spectrum efficiency and interference avoidance. Thus, the proper selection of these sensing parameters is the most critical factor influencing the performance of CR networks. [1]

Sensing objective is the other issue related to the sensing in cognitive radio networks. There are two quantities that related to the sensing performance. One is the probability of detection, which is the probability of the presence of the primary user being detected. Another is the probability of false alarm, which is the probability that the primary user is detected as presence, but actually it is absent. Most of CSS researches are under the Neyman-Pearson criterion to maximize the probability of detection while giving a constraint on probability of the false alarm. The sensing goal is to maximize the aggregated throughput of the secondary system, giving the constraints on the interference of the second users to the primary system. It is known that the ability to sense or capture information from the radio environment is a major element of CR. Many sophisticated techniques have been developed to capture and analyze the temporal and spatial variations in the wireless environment and to minimize the potential for interference to other users. In this paper, we focus on the challenge of spectrum sensing to enable SUs to use a PU spectrum when the PU is not active.[3]

Spectrum Sensing Techniques: One of the important features of cognitive radio is spectrum sensing. Spectrum sensing serves as the basic stimulus analysis tool that facilitates creation of awareness in CR. The objective is to find „holes“ in the spectrum so that they can be used by secondary users till reclaim by the primary users. CR can't adapt to environment before sensing it. Generally spectrum sensing techniques are classified as: transmitter detection, receiver detection and interference temperature detection. In transmitter detection, CR senses the waveform from primary transmitter transmitting at any given time.

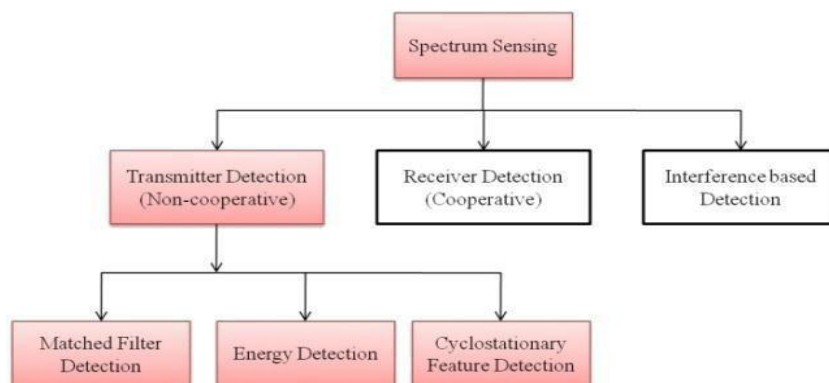


Fig.1.1 Classification of Spectrum Sensing Techniques

Recently, researchers have been working in two main streams of spectrum sensing: local and cooperative spectrum sensing. [4] For local spectrum sensing, the most common techniques are energy detection, matched filter and cyclostationary detection. Energy detection and cyclostationary detection are non-coherent detectors while matched filter requires coherency. Energy detection is the simplest technique and needs a short sensing time but it performs poorly under low SNR conditions. On the other hand, cyclostationary detection provides reliable detection but it is computationally complex.[2]

Regarding the local sensing strategy, three sensing methods are proposed, i.e., energy detection, matched filtering (coherent) detection, and cyclostationary feature detection. If the characteristics of the primary signals are unavailable to the secondary users, the energy detection is a natural candidate, because only the signal power can be sensed. When the cognitive radios have some knowledge about the primary signal characteristics such as preambles, pilots, and synchronization symbols, the matched filter detection can achieve the best performance. If the modulation schemes of the primary signals are known, the cyclostationary feature detector can differentiate the primary signals from the local noise by exploiting a certain periodicity, and the cyclostationary feature can be exhibited in the mean and autocorrelation of the corresponding modulated signals.

Energy Detector: The energy detector measures energy in every narrowband channel and determines the presence of a primary user if the energy detected in a narrowband channel is higher than a certain threshold. However, to achieve high receiver sensitivity, a low threshold can be used. In some cases, the threshold has to be lowered than the noise, in which case the detection fails. The problem is even more complicated due to the fact that the noise is most likely non-Gaussian because of the presence of CR user's interference.

One of the main limitations in spectrum sensing methods such as ED is that the SU transceiver should not transmit during spectrum sensing, because the spectrum sensing unit cannot differentiate between the SU and PU signals. This limitation forces the SU to be synchronized with the PU in order to sense the spectrum at the beginning of PU data frame. [2] If spectrum sensing indicates the absence of PU, then the SU can transmit its data in the rest of the data frame, and this limitation reduces the SUs' throughput. Thus these techniques require *a priori* knowledge about the primary transmitter to operate efficiently [3]. Energy detection utilizes implementation of a spectrum analyzer by averaging Fast Fourier Transform bins to measure power spectral density in sub-bands. This technique is not dependent on a comprehensive *a priori* knowledge base about the primary transmitter and can adapt to a large variety of primary transmitter classes.[4]

An energy detection approach is a common way of spectrum sensing to decide whether unknown signals exist or not. The receiver (sensing node) does not need any knowledge of the primary users' signal. The energy E of signal $x(t)$ can be measured by applying Rayleigh's energy theorem.

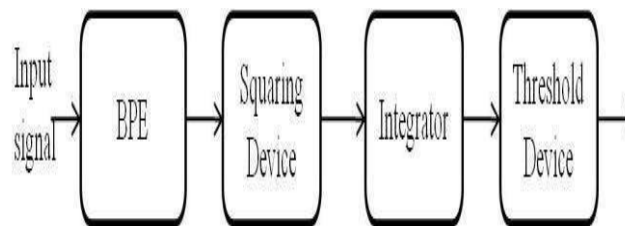


Fig 1.3 Energy detector block diagram

The proposed energy detector as shown in Fig.3. The input band pass filter selects the center frequency f_s and bandwidth of interest W . The filter is followed by a squaring device to measure the received energy then the integrator determines the observation interval, T . Finally the output of the integrator, Y is compared with a predefined threshold, λ to decide whether primary user is present or not. [2]

Matched filter Detector: Matched Filtering requires demodulation of primary user signal for effective detection.

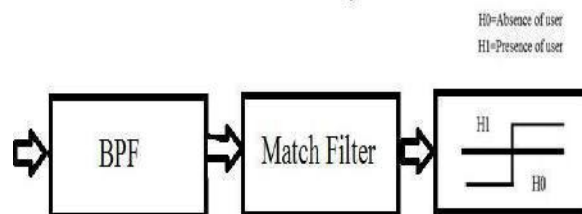


Fig 1.4 Block diagram of matched filter

A Matched filter is an optimal detector in an AWGN channel if the waveform of primary user is previously known by CR. It means that CR should have knowledge about the waveform of primary user such as modulation type and order, the pulse shape and the packet format. So if CR doesn't have this type of prior information then it's difficult to detect the primary user.

Cyclostationary Detection: Most of the signals encountered in wireless communications are cyclostationary, whereas the noise is stationary. The wireless communication signals loaded with sinusoidal carriers, pulse trains, repeating codes, hopping sequences, cyclic prefixes, and signals are because their mean value and autocorrelation

function exhibit periodicity. This periodicity trend is used to perform various signal processing tasks that includes detection, recognition and estimation of the received signals. As a result, the cyclostationarity of the primary signals can be used to detect their presence. [4]

The cyclostationarity of a signal is not reflected in the power spectral density (PSD); however it is reflected in the spectral correlation density (SCD) function which is obtained by taking the Fourier transform of the cyclic autocorrelation function. Therefore, spectral correlation analysis of the received data can be used to identify the signal. Higher order spectral statistics have also been used to identify weak users. Cyclic-stationary feature detection taps the cyclic characteristics of a modulated signal to identify its presence in a low signal-to-noise ratio regime. It, however, involves increased complexity for effective performance.

Cooperative spectrum sensing (CSS): The Cooperative spectrum sensing is an environment where two or more spectrum sensing nodes, that form part of a CR network, combine their spectrum sensing capabilities leading to centralized or decentralized decision fusion. CSS allows individual nodes to gain a more global degree of awareness about spectrum occupancy. It also has the inherent advantages of increased levels of agility as well as greater accuracy due to the ability to detect a primary user (PU) that is obscured to a sub-set of sensing nodes due to channel behavior. CSS has to be considered in the context of increased communication overhead [3]. If the inherent advantages of CSS are more important as compared to the cost of overhead then it is a viable trade-off.

Cooperative spectrum sensing (CSS) has been studied extensively as a promising alternative to improve the sensing performance. In CSS, local sensors individually sense the channels and then send information to the network center, and the network center will make the final decision. [4]

Other Sensing Techniques: There are various other spectrum sensing techniques such as wavelet detection, autocorrelation detection, Eigen value detection and covariance detection etc.

3. CONCLUSIONS:

Cognitive Radio is intended to use spectral resources opportunistically and spectrum sensing is one of the main parts in each CR system. The performance of the employed spectrum sensing method is very important. Performing spectrum sensing and transmitting data simultaneously can help us to improve the performance of CR systems. In this paper, we have discussed a spectrum sensing method for cognitive radio systems that could make the spectrum sensing technique more practical. The performance of the spectrum sensing method is compared to others. Thus the Comparison of different spectrum sensing techniques is presented in this paper.

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Resent Advances in Engineering & Technology (RAET-2018)

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Fast Image Processing using GPU

¹Ms Madhuri Ninawe, ²Ms Rasika Manapure,
¹Assistant Professor, ²Assistant Professor,
¹Electronics & Telecommunication Engineering,
¹Suryodaya College of Engineering & Technology, Nagpur, India
Email – ¹madhuri.snimje@gmail.com, ²rasikamanapure@gmail.com

Abstract: The Compute Unified Architecture (CUDA) is a new parallel processing technique used in most current Graphics Processing Units (GPU) from NVIDIA. NVIDIA develops CUDA FOR parallel operations which has the set of C and C++ instruction. Using GPU any image processing increases the operating speed and reduces the operating time also. In this paper an efficient GPU based implementation of NLM filtration is considered for filtering the medical ultrasound image. The NLM filtration method using GPU for medical ultrasound achieves the frame rate many more times faster than the CPU. The result for GPU get compared with CPU result in terms of visual quality and progressive runtime

Keywords: CUDA Software, GPU (GT 520, 48 core, 1.3Ghz each core , 2GB RAM), operation; NLM filter

1. INTRODUCTION:

Image processing is any type of signal processing for which i/p image is as photograph, the o/p of image processing may be either an image or set of character/parameter. Most image processing technique involves treating the image as two dimensional signal and applying standard signal processing technique to it. Image filtering does typically involve filtering an image using various types of filter . Different types of filters use for image filtering are bilateral filter, median filter, Gaussian filter etc. Here we use bilateral filter since it is non-linear, edge preserving , noise reducing and smooth filter..In bilateral filtering intensity values of each pixel in an image is replaced by a weighted average of intensity values from nearby pixels. Images are often corrupted by random variations in intensity, illumination, poor contrast.[1]

2. Bilateral Filtering

Conventional linear filter works well in smooth regions, however it substantially blurs the edges of an image. A bilateral filter proposed by Mr. C. Tomasi and Mr.R.Manduchi is an edge preserving and noise reducing filter. As most of others filters, this filter replaces the intensity values at each pixels in an image with a weighted average of intensity values from a pixels in some neighborhood. However, the weight depends not only on Euclidian distance, but also depends in the intensity range, that allows preserving sharp edges, while removing a noise on smooth Image areas[3]

3. NLM filtering:

In image processing, bilateral filter provides smooth image with preserving the edge, in place of bilateral filter if we will used NLM filter then the visual quality of o/p image is more clear. In this paper first the bilateral filtering and NLM filtering operations are carried on CPU and then the same operations are carried on CPU with GPU. The both operations carried out on CPU and on GPU are illustrated in following fig.

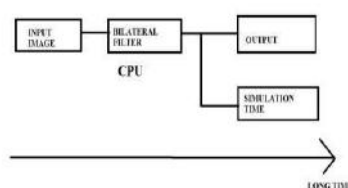


Fig1: bilateral/NLM filtering on CPU

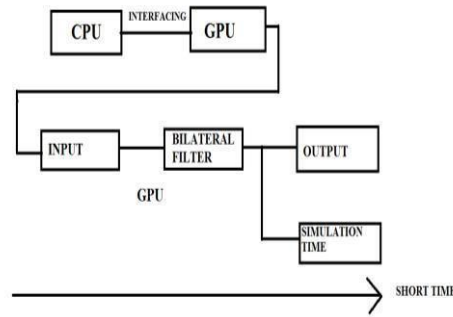


Fig2: bilateral/NLm filtering on CPU with GPU

4. Review over GPU

From the last 2-3 decades computer plays vital role in human life, we can say that for each commercial purpose we have a need of computers eg. .for storing data , data calculation, internet application, billing etc. As application gets increases there is need to increase the speed of operation perform by the computer. The modifications are carried out in computer by increasing the operating frequency basically but the operating speed is now limited to 3.2GHz. This is the one problem associated with CPU. Suppose there is one CPU (single processor) and we have to perform any operation eg. $a+b=c$ and $p+q=f$ then time required to perform this operation is same. But when there is a dual core processor, $a+b=c$, $p+q=f$ operations are independent then time required to perform operation is less than single processor. But if operations are dependent then time required to perform operation is same and equal as that of single processor. To remove the problem here a new technology CPU with GPU (Graphics Processing Unit) is introduce .As stated earlier CPU perform one function at a time, Dual processor takes half time for performing operation and quad processor takes less time than dual processor but as the processor quantity increased, the cost of CPU is also increased, and it is very costly. Here we introduce CPU with GPU, (Graphics Processing Unit) has more than one core which can be operated parallel GPU use NLm and bilateral filtering to remove the noise from the image. As GPU has more than one core, it can perform many operations in parallel .Moreover it's clock frequency is around 5GHz-6GHz.Here we take the algorithm first that is operated using CPU and then operated on CPU with GPU and observe the result, it shows that more than one operations are carried out in GPU in short time. While filtering the image on CPU with GPU,GPU get interface with CPU [2][5]

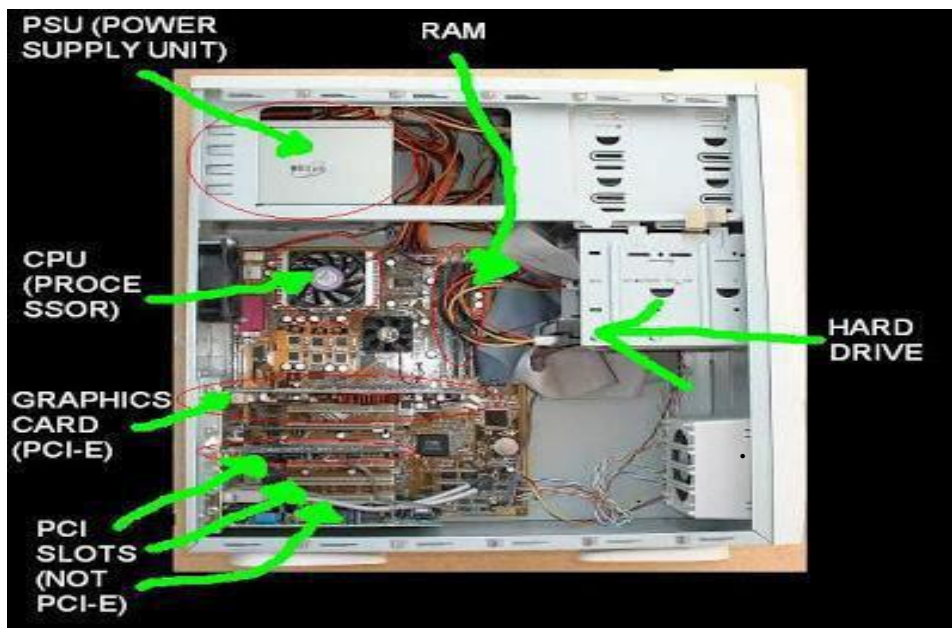


Fig.3:a) hardware structure of CPU & GPU



Fig.3b): Hardware structure of CPU & GPU

5. Proposed system

In this paper we review the performance of bilateral filter and NLM filter for filtering the real time medical ultrasound image with GPU on CPU. Here we are taking any medical image and perform the filtering operation on CPU and the same image get filtering on CPU with GPU and take the output in terms of visual quality and operating time.[5]

Graphics Processing Units (GPUs) are used rendering for and computer graphics acceleration. However, they are essentially a SIMD processing units consisting of parallel computational elements accessible with some effort for arbitrary, not necessary graphical computation. This approach of solving general-purpose problems on GPUs is known as general-purpose computing on graphics processing units (GPGPU). The model for GPU computing is to use a CPU and GPU together in a heterogeneous co-processing computing model where sequential part of the application runs on the CPU and the computationally-intensive part is accelerated by the GPU.[3]

6. Objective of present work

The main objective of present work is to design and develop the system which filters the medical image with efficient visual effects taking much less time than the CPU using NLM filter.

7. Work plan and methodology

The first step of my project is to take real time medical ultrasound image and filter it using bilateral filter on CPU.

After this the same image will be filter using NLM filter and compare the output result . In the next stage, the same image will be filtered using bilateral and NLM filter on CPU with GPU . At last the result obtained from first operation will be compared with second operation in terms of visual display and operating time.[1]

8. Conclusion:

The NLM filtration method using GPU for medical ultrasound achieves the frame rate many more times faster than the CPU .The result for GPU get compared with CPU result in terms of visual quality and progressive runtime

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A Review on MSW Stabilization for Leachate Management

¹Abhinav Sharma, ²Aboli Chavhan, ³Suraj Thawkar, ⁴Paras Sangole, ⁵SandipRaghuse
^{1,2,3,4,5}- Final Year Student, Civil Engineering Department, SCET, Nagpur.
Email – ¹abhinavsharma.7996@gmail.com

Abstract: The purpose of this study is to determine the effect of leachate recirculation on fixation of MSW. The study was carried out by using two lab- scale landfill bioreactors containing approximately 10 kg of waste each, in order to follow waste degradation over 16 weeks of time period. The main difference between anaerobic recirculated and without recirculation bioreactors options is determined in leachate quality. Leachate quality is regularly measured by the means of pH, electrical conductivity, calcium, magnesium, total kjeldahl nitrogen, phosphate and chemical oxygen demand (COD). It has been observed that leachate recirculation is more effective on anaerobic degradation of solid waste than non-recirculated degradation. The leachate recirculated bioreactor appears to be the more effective option in the ejection of COD by 89.93% and fixation of pH at 7.5. After 16 weeks of an aerobic degradation, waste stabilization seemed to have reached for the recirculated bioreactor. At the of the study to required the best result of the further study.

Key Words: Municipal solid waste, leachate, leachate recirculation, landfill bioreactor

1. INTRODUCTION:

Method for disposal of both MSW and industrial waste. Generally heavily polluted leachates presenting significant variations in both volumetric flow and chemical contribution, constitutes a major drawback. beside, landfill leachate normally contains high focusing of organic matter, nutrients, pathogens and heavy metals, which, if not properly collected and treated, can reason honest pollution of surface and groundwater sources. Landfill leachate treatment has been given significant attention in recent years, especially for municipal areas (Ahn et al., 2002; Bohdziewicz et al., Bohdziewicz et al., 2001; Geenens et al., 2001). Accurate treatment of the leachate has therefore been a challenging task (Neczaj et al., 2005).

2. LITERATURE REVIEW:

Sometime the strength of leachate decreases with time precipitation of soluble element such as heavy metal as the organic compound breakdown biologically. (Sawaittayothin and Polprasert, 2007). For deal with leachate new cheap technology/cheap solutions for small scale dealwith these leachate are desired in order to reduce their organic loads (Castillo et al, 2007). Landfills can produce a great amount of leachate containing highly concentrated organic matter. This is especially true for the initial leachate from landfilled municipal solid wastes (MSW) that generally has concentrations of COD_{Cr} and BOD₅ up to 80,000 and 50,000 mg/L, respectively. The leachate could be disposed by means of recirculating technique, which decomposes the organics through the action of proliferating microorganisms and thereby purifies the leachate, and simultaneously accelerates organic decomposition through water saturation control.

Data from experimental results indicated that leachate recirculating could reduce the organic concentration considerably, with a maximum reduction rate of COD over 95%; and, using a semi-aerobic process, NH₃-N concentration of treated leachate could be under 10 mg/L. In addition, the organic concentration in MSW decreased greatly. Anaerobic digestion of sewage from a MSW landfill leachate treatment plant are the COD values range from 15,000 and 19,400 mg O₂ dm⁻³. Start-up of the reactor was carried out in different steps, beginning with diluted sludge and the amount of sludge fed into the reactor. The study was carried out over a period of 7 months. Different amounts of methanol were added to the feed, ranging between 6.75 and 1 cm³ dm⁻³ of feed in order to favour the growth of methanogenic flora. anaerobic sewage Reactor was very high for an HRT of 9 days, obtaining decreases in COD of 84–87% by the end of the process. Purging of the digested sludge represented ≈16% of the volume of the treated sewage.

3. SCOPE AND OBJECTIVE OF WORK:

Following scope of work in the paper

1. Study of Municipal Solid Waste (MSW).
2. Study of changes in waste characteristic with respect to time.
3. Study of different types of additives or enzymes used in MSW for Quality respect to time.

4. OBJECTIVE:

To know the trends which occur in the composting process a regular monitoring of key role parameters, pH, temperature, moisture content, organic carbon nitrogen, phosphorous, odour, color etc. was done for 30 days period. Physicochemical analysis of finished compost will do for pH, conductivity, total nitrogen, organic carbon.

5. CONCLUSION:

Situ leachate treatment is feasible by leachate recirculation. Landfill leachate management shows that the leachate recirculation is a promising and challenging strategy. Dissemination strategy has a positive affected to COD removal, pH stabilization and other parameters. Maximum COD ejected observed was 80.30% in reactor R1 and 89.93% in reactor R2. All other parameters were also reported to be decreased with respect to time.

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National Seminar (TECHTRENDS-2018)
Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Partial Replacement of Waste Glass as Aggregate in Concrete

¹Aditya Chatap, ²PranayBawane, ³AkashRangari, ⁴Swati Kature, ⁵Pranali khandekar
^{1,2,3,4,5} Final Year Student, Civil Engineering Department, S.C.E.T
Email – ¹adityachatap600@gmail.com

Abstract: *The increasing waste of glass recycling speeds up inspections on the use of waste glass with different forms in various regions. One of its significant used is to the construction field where the waste glass was reused for value-added concrete production. The survey indicates that the use of waste glass as aggregates in concrete was first used over 50 years ago. The alkali-silica reaction (ASR) by using glass in concrete and its unique aesthetics properties have been discovered since then. However, no one complete solution to ASR has been found and the application of glass in concrete still needs improving. Laboratory experiments were conducted in the University further explore the use of waste glass as coarse and fine aggregates for both ASR alleviation as well as the ornamentally purpose in concrete. This paper presents mainly the latter aspect, in which study, both fresh and hardened properties of the concrete were tested. Result and conclusion that the use of waste glass as aggregate provided the development of concrete at high level and high performances.*

Key Words: *aesthetic properties, glass aggregate.*

1. INTRODUCTION:

Waste glass is a major component of the solid waste in many countries 1. It has various forms, like as container glass, flat glass, windows, bulb glass and cathode ray tube glass etc. Glass has been recycle and reused, a significant ratio, which is about 81% of the waste glass generated in world and is send to filling in the land. Glass is a totally recyclable material with high performance and unique properties which make it suitable for high level uses. The use of glass as partial replacement aggregates in concrete has great performance for future high quality concrete development. However, tThe quantity of waste glass is gradually increased over the years due to an growing use of glass products. There is huge potential for using waste glass in the concrete construction sector. Waste glass recycle in making concrete products. There is huge potential for using waste glass in the concrete construction sector. When waste glasses are reused in making concrete products, the production cost of concrete will go down In order to make concrete industry sustainable, the use of waste materials in place of natural resources is one of the best approaches. An enormous quantity of waste glass is generated all around the world. In India, 0.7% of total urban waste generated comprises of glass. 1. investigated ASR in concrete using certain suppressants; 2. To develop concrete using glass as a coarse aggregate replacement; and to obtain a high level by using glass as ornamental aggregates. The first stage ASR study confirms the effectiveness of certain suppressants in mitigating ASR of glass concrete. Based on this research finding, assumptions are made where the ASR effect has been reduced to a certain extent that could be outside the consideration in the second stage architectural study.

2. OBJECTIVES:

1. For sustainable development of structural engineering
2. To reduce or utilize the waste generated from structure
3. To use waste material in construction unit

To find the alternative for basic material which are used in construction from past many year.

3. EXPERIMENTAL WORK:

As above articles within the experiments, the glass concrete study is main concern in this paper, where, glass used both as coarse and fine aggregates with the purpose of giving a high performance and aesthetic level of concrete.

3.1 MATERIALS:

3.1.1. Cement

In the glass concrete study, ordinary Portland cement (OPC) was used. This cement has alkali content.

3.1.2. Coarse aggregate (CA)

Different types of glass of varying sizes and colors were used instead of the 5-10mm normal aggregate (NA) in. The specific gravity of glass is 2.50.

3.1.3. Fine aggregate (FA)

Dolomite, which has a pure white color, was widely used in the architectural concrete development. Its shape and size have potential benefit in obtaining a good particle size distribution in glass concrete. 1.0-3.0mm glass particles were also use as fine agg, in glass concrete to make a suitable color distribution in mix.

3.2TEST METHODS:

3.2.1. Fresh concrete property tests

Three tests were carried out to examine the fresh concrete workability, air content as well as the density. Among them, the workability of fresh concrete was examined by the slump test. The test set-up is conducted as recommended in IS code. In the density test, fresh concrete is compacted into a rigid and watertight container of known volume and known mass and is then weighed .

3.2.2. Hardened concrete property tests

The compressive strength test adopts the method specified in IS code 456-2000.Specimens were loaded to failure in a compression testing machine and the maximum load was recorded. The water absorption test at observe the capability of the concrete to absorb water.

4. RESULTS AND DISCUSSIONS:

A number of colored glass concretes using different colors and particle sizes of glass aggregates, cement with CRM materials and pigments were developed at laboratory and some of the samples were given in Fig. 1. These samples demonstrate the achievements of the use of colored glasses in improving aesthetic standard for concrete.

Table 4.1 - Fresh test results concrete

Slump (mm)	Air Content (%)	Density (kg/m3)
48.00	1.00	2.30
56.00	3.60	2.22
110.00	2.10	2.26
120.00	1.50	2.29

4.1. Air Content Test Results

As specified in IS code, the air content should be in the range of 0% to 10% . The test results in Table 1 shows that the results conform to the specified range and the test is satisfactory.

4.2. Density Test Results

The densities are approx 2300 kg/m3 and conform to the assumption of mix design.

4.3Hardened concrete tests

4.3.1. Compressive strength test

1) Failure mode The four exposed faces were cracked approximately equally, with little damage to faces in contact with the platens.

4.3.2 Compressive strength development

The sets of glass concrete block were use for each mix calculation, the mean compressive strength was measured and calculate at 14 and 28 days as fallows

Table 4.2 Compressive strength after 28 days

S.NO	Glass Percentage	GRADE	COMPRESSIVE STRENGTH (N / mm ²)	AVG. COMPRESSIVE STRENGTH (N / mm ²)
1	Replacing 10% of FINE AGG with glass.	M20	24.42	25.56
			26.72	
2	Replacing 20% of FINE AGG with glass.	M20	23.46	23.56
			23.76	

3	Replacing 10% of COARSE AGG with glass.	M20	20.59	21.36
			22.17	
4	Replacing 20% of COARSE AGG with glass.	M20	23.74	24.75
			25.76	

5. CONCLUSION:

The paper presents is describing utilization of waste glass as aggregates in a range of concretes and their properties tests. The result conduct in this experiment confirms that the properties of those special mixed concretes are satisfactory. The properties tested include workability, air content, density, compressive strength, water absorption. It is found that water absorption is related to the compressive strength of the concrete. Ultimately, glass is found to be a material as a decorative aggregate in concrete with its satisfactory performances and property improvement.

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Recycling of Demolished Concrete

¹Aishwarya Kadu, ²Ankita Tiwari, ³Pranali Fulzele, ⁴Priya Chaware, ⁵Roshan Meshram
^{1,2,3,4,5} Final Year Student, Civil Engineering Department, SCET, Nagpur.
Email- ¹aishkadu3@gmail.com

Abstract: In this industrial world, recycling construction material plays an important role to preserve natural resources. These studies seek to greener environment since it seeks to develop a recycle waste material for construction. The use of recycled aggregate has been started in a huge quantity in the various countries for big construction work. Recycle aggregates and solid wastes obtained from construction and demolition waste can be used as prospective application in construction industry as alternate of natural aggregate. It helps to secure natural resources. It occupies less space for landfill disposal. In the laboratory the crushed tile aggregate is used as substitute for partial replacement for natural coarse aggregate in concrete. The change in properties of natural and recycled aggregate is also noted and their effect on construction component it can be used for formation of cubes, cylinders, beams. Also the properties of concrete such as compressive strength, workability, etc. are compared. The concrete is made up of mixture of natural aggregate and recycled aggregate. Now-a-days, recycled aggregate have a future in construction work in India. The members cast and tested for compressive strength, split tensile for curing period of 7, 14, 21 and 28 days. This shows 60 to 80 % result without disturbing the design strength and gives effective result.

Key Words: Recycling of demolished concrete (concrete from construction site)

1. INTRODUCTION:

Building materials account for about half of all materials used and about half the solid waste generated worldwide. They have an environmental impact at every step of the building process extraction of raw materials is processing, manufacturing, transportation, construction, and disposal at the end of a building's useful life. All serious problems created by rapid industrial development across the world due to saturation of natural aggregates. It results into generation of enormous amount of waste material from construction and demolition activities. To overcome this problem, it is necessary to use wastes for eco-friendly environment[3]. The building rubbles collected from damaged structures contains waste concrete, tiles, brick, steel, wood etc., among these the ceramic tiles are used in this project. Due to disposal of ceramic wastes from building demolition in a landfill, the ceramics comes in contact with ground water, sand, and causes toxic effects. From global concern it is necessary to use alternative ingredients in construction material for achieving standard point of energy saving along with conservation of natural resources. Replacement of aggregate by using effective method reduces cost and environmental impact or both. The tiles are crushed to suitable size and used as coarse aggregate. Based on the trial mixes compressive strength of partial replacement of tiles with coarse aggregate is found to be higher than the compressive strength of conventional concrete[1,2].

2. MATERIALS: Demolished concrete from construction site, sand and cement.

3. METHOD: For carrying out our project work and to meet the objectives the following test were performed.

3.1. Characterization

3.1.1 Hand sorting

- a) Weight analysis
- b) Volume analysis

3.2. Test on recycled aggregate

1. Flakiness Index
2. Elongation index
3. Impact factor test
4. Fineness modulus test
5. Bulk density

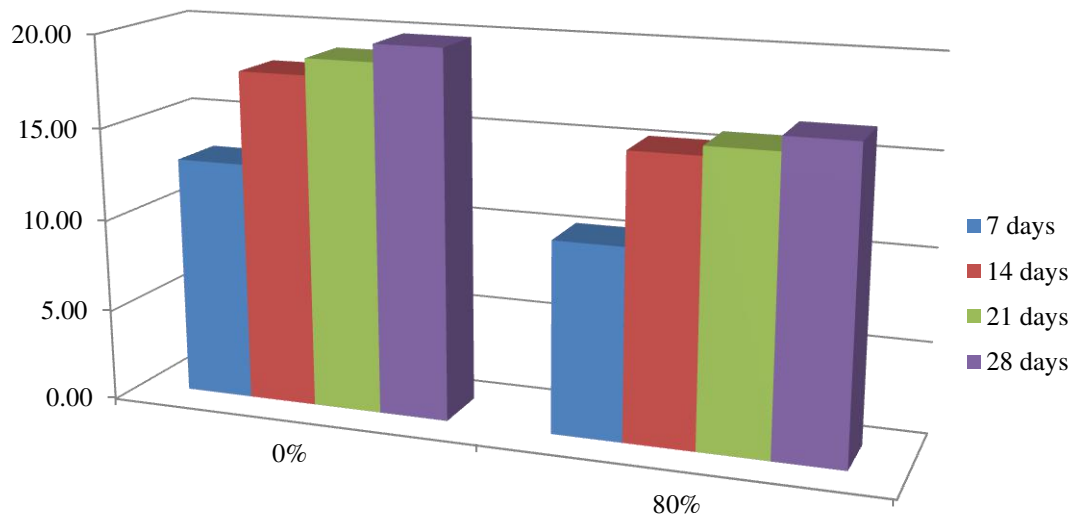
3.3. Test on concrete

1. Slump cone test
2. Compressive Strength test

4. RESULT AND DISCUSSION:

Table 4.1: Compressive strength

%	7 Days	14 Days	21 Days	28 Days
0%	13 N/MM2	18 N/MM2	18.9 N/MM2	19.85 N/MM2
80%	10.4 N/MM2	15.3 N/MM2	15.8 N/MM2	16.56 N/MM2



Bar chart 4.1: Compressive strength.

From bar chart no.1 it is observed that compressive strength of concrete for 7 days, 14 days, 21 days and 28 days with replacement of 0% and 80% will increase with increase in percentage of replacement increases. From bar chart no. 1 the maximum compressive strength is obtained at 28 days with 80% replacement with demolition waste.

5. CONCLUSION:

- 5.1. In characterization 67.11 % material is found to be divertible with concrete making 54% of the total divertible material.
- 5.2. Top three material we got in characterization of demolished concrete waste are
 1. Concrete - 36.38%
 2. Mortar – 27.21%
 3. Mixed residue – 15.14%
 (All above proportion is on the basis of weight analysis.)
- 5.3. Remainder materials in the characterization are found to be wood, plastic. Paper, cement waste etc, as their proportion is very small. And these proportions are given on the basis of weight analysis.
- 5.4. The process of characterization concluded that the weight analysis results are more accurate than the volume basis when compared with hand sorting results
- 5.5. The Percentage Voids found out to be 37.29% for Coarse aggregate. Since the percentage voids are greater than that of natural aggregate. Also, recycled aggregates are less resistant since, impact obtained in project work is 21.20% higher in case of course recycled aggregate than natural aggregate. Hence, overall compressive strength is less in the context of sizes it is found to be suitable for all purpose of Concreting.
- 5.6. Flakiness index of Coarse Recycled Aggregate (CRA) is approximately around the limit while elongation index of the CRA is satisfactory.

- 5.7. Bulk density is found out to be good as it is less than the required for the coarse and approximately same as that of the fine i.e. of 1.06 kg/liter for the coarse aggregate.
- 5.8. Fineness modulus is found out to be nearly perfect for CRA.
- 5.9. For physical properties it is satisfactory only for impact factor it is at boundary line of the value that can be used for wearing surface.
- 5.10. Workability of concrete in all ratios is found to be of “High Category”.
- 5.11. Maximum difference in strength we got as -16% in comparison with the normal concrete of 7 days it means that the strength of recycled aggregate concrete is 16% less in comparison with the normal concrete.
- 5.12. Minimum difference in strength we got -10% in comparison with the normal concrete of 28 days it means that the strength of recycled aggregate concrete is 10% less in comparison with the normal concrete.
- 5.13. “Two stage mixing process” has provided a good strength concrete and a concrete of “highworkability”.

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2. IS CODE:383-1970
3. IS CODE 516:1959 (Clause 2.3)
4. IS CODE 456:2000
5. IS CODE 10262:1982

National Seminar (TECHTRENDS-2018)

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Flat Slab – Study & Analysis

¹Ravindra Wakodikar, ²Suraj Mahajan, ³KarishmaBarde, ⁴Vaishnavi Pokale

^{1,2,3,4}Assistant Professor, Civil Engg. Department, GW CET,, Nagpur, India
¹ravindrakdk@gmail.com

Abstract: Architects demands free space for better illumination and avoidance of sharp corners which are generally in the form of beams. Proper use of space leads to the new ideas and concepts as RCC Concrete Flat Slabs. A RCC concrete slab without beam is said to be as FLAT SLAB. Even though their is rapid growth in field of flat slab construction, the study material and tools available for Engineers to design flat slabs in India has been limited in both Indian standards and Indian research papers. Also they need to seek help from other standards. Restrictions in the Indian codes IS 456:2000 are overcome by using ACI- 318 to maintain required integrity.

Key Words: ACI - 318, drop, panel, staggered

1. INTRODUCTION:

A RCC slab is also called as beamless slab, is a slab supported by columns alone. A part of slab lying on each of the four sides of column is called panel. The slab is little widened near the supporting columns so that it will provide strength in shear and to reduce -ve r/f in the support region. The widened section is enlarged, This increases the perimeter for the critical section of shear and also the capacity of the slab for resisting two-way shear. Slabs of uniform thickness which do not posses drop panels are referred to as Flat Plates. The strength of slab without drop as in flat plate structure is limited, because punching shear action around columns is high, and therefore they are frequently used for light loads and small spans.

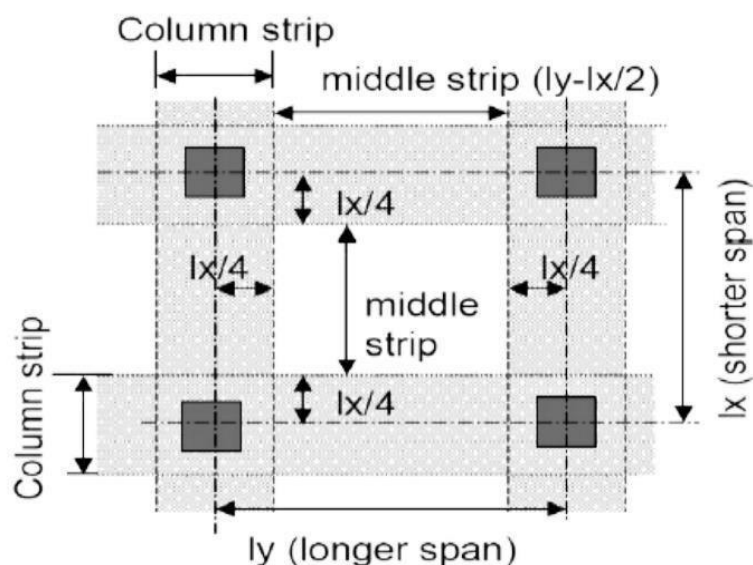


Fig. 1.1: Components of flat slab (Column strip, middle strip)

Countries where cast in situ work is used, this type of construction is popular over there flat slabs can be seen in offices & warehouses because of advantages like easy installation easy placement of concrete ,rapid work progress and aesthetically well looking structure.

2. SCOPE AND OBJECTIVES:

This study report is prepared to analyze the design of flat slab by IS 456-2000. Use of Flat Slab in construction is non objectional by both **IS Reinforced Concrete Code and Seismic Code** but specific criteria need to be followed in order to make such structures acceptable.

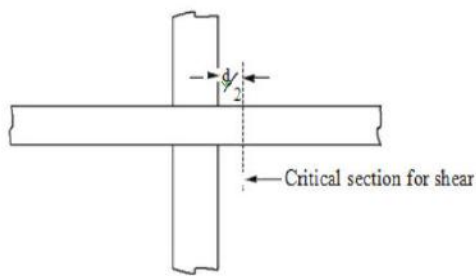


Fig. 2.1: A typical flat slab (without drop and column head)

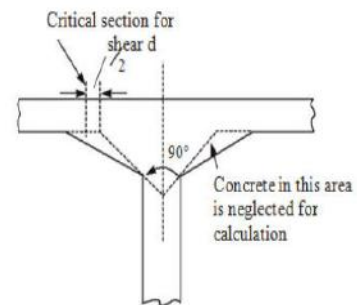


Fig. 2.2: Slab without drop and column with column head

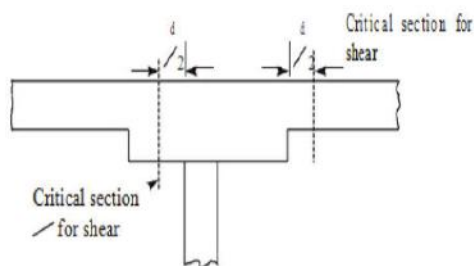


Fig. 2.3: Slab with drop and column without column head

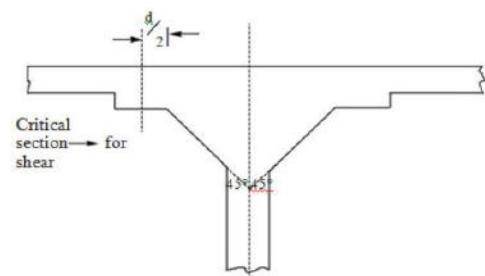


Fig. 2.4: Slab with drop and column with column head

The advantages of these systems are:

- The construction of formwork, placement of r/f
- Placement of flexural r/f is easy.
- Concrete can be casted easily.
- Free space for water, air pipes, etc between slab and ceiling is available.
- Walls in ground plan can be placed without any restrictions.

3. METHOD: Code of conducts suggests anytwoof methods as Direct Design Method and Equivalent Frame Method for analysis and design of Flat Slab. Design steps involved in construction of Flat slab by Direct Design Method has some limitations like:

- (a) There must be minimum three spans in each direction.
- (b) Staggered column orientation need to be avoided.

Hence, Equivalent Frame Method is generally adopted by engineers for the analysis of such structures practically.

4. DISCUSSION: Behavior of flat slab is identical to behaviour of two way slab. Slab bands in both directions along column lines are supposed to act as beams. Such bands of slabs are said to as column strips. The deflections are found to be minimum at supports and maximum at mid of spans. The deflected flat slab of panel may have saucer shape. Where δ_x and δ_y is the deflection in respective directions.

5. ANALYSIS:

The analysis of slabs is given in **Section 31, IS: 456 - 2000**, under "Flat Slabs". The analysis is applicable to flat slabs and two-way slabs with deflecting beams. The direct design method of analyzing a two-way slab is non recommendable for prestressed slabs. **American Concrete Institute ACI 318-02**, recommends use of Equivalent Frame Method. It is given in **Subsection 31.5 and IS: 456 - 2000**. This method is briefly covered in this section for Flat Slabs.

The slab system is given by a series of 2D equivalent frames. An equivalent frame along a column line of the building is bounded by the centre-lines of the bays adjacent to the column line.

The equivalent frame is divided into a column strip and middle strips. The column strip is the portion which is considered as central half of the equivalent frame. Middle strip (MS) consists of remaining portions of adjacent frames.

6. FINDINGS:

- 6.1. Flat slab construction is innovative and developing technology in India. However, due to some issues regular RCC should be the preferred choice for spans up to 10 meters.
- 6.2. The column heads can be provided with any angle for the point of architecture consideration but for the design, 45° angle on either side of vertical member is considered as effective for the design.
- 6.3. Number of shortcomings were found in design procedure for Flat Slab which have to be addressed and revised soon. Till then Indian engineers will have to continue with use of Indian codes in combination with other standards to design and analyze flat slabs.
- 6.4. The +ve mid span moment is increasing and -ve moment is decreasing when we analyze the slab with Equivalent Frame Method.
- 6.5. -ve & +ve moments at exterior support need to be increased for IS 456-2000 for Equivalent Frame Method.

7. CONCLUSION: After number of analysis, various problems were spotted such as:-

- 7.1. The stresses due to vertical structural elements as in shear walls are found to be unusually high. This fact is noticeable in the foundation requirements.
- 7.2. Moments in the slabs are more near the Column Area. Hence the slab is thickened near the columns by providing the Drops which are more resistive to Shear as well as Moment.
- 7.3. In most cases, the Seismic load combination is difficult where vertical elements are closely spaced to each other as well as in the case of slabs which are supported at the edge of shear wall sections.
- 7.4. Problems in slabs can be rectified by the use of more shear walls in the structural system. Shear walls reduces the displacements due to earthquake resulting in a reduced punching shear stress on slabs.
- 7.5. The use and application of flat-slab structures is restrained due to the belief that such structures are susceptible to seismic actions.

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Comparative Analysis of Different Lateral Load Resisting Systems for RCC Structure

Sharad Shrirame¹, Sanket Argelwar², Kunal Mutkure³, Varsha Dabale⁴
^{1,2,3,4} Final Year Student, Civil Engineering Department, SCET, Nagpur.
Email : sharadshrirame1@gmail.com

Abstract: *This research work focuses on comparison of seismic analysis of G+12 story building stiffened with shear wall at various locations. The performance of the building is analyzed in Zone II, for Mumbai city. This research paper includes understanding the main zone factor that tends the structure to perform poorly during lateral moments caused by earthquake in order to achieve their appropriate behaviour under future earthquakes. The analyzed structure is symmetrical, G+12, Ordinary RC moment-resisting frame (OMRF). Modelling of the structure is done by using staad pro. V8i software. The Time period used for the seismic calculations of the structure in both the direction is achieved from the software and as per IS 1893(part I):2016 seismic analysis has conducted. The Lateral seismic forces of RC frame is carried out using equivalent static method as per IS 1893(part I) : 2016 for various earthquake zones. The purpose of present work is to understand that the structures need to have suitable Earthquake resisting features to safely resist large lateral forces that are exerts on them during lateral movement of structure. Shear walls are efficient(model no.3), In terms of effectiveness in minimizing lateral movement and damage caused due to the earthquake in structure the conventional frame system also provides the resistance to structure but it is unable to minimise the damage caused by the earthquake in structure.. The results of the performance and the analysis of the models are then graphically represented and also in tabular form and is compared in order to achieve the best performance of building against lateral stiffness by arrangement of three different types of shear wall system in which the location of the shear wall varies . A comparative analysis is done in terms of Base shear, Displacement, Axial load, Moments in X and Z direction in columns and maximum bending moments in beams.*

Key Word: *Lateral Displacement ,Bending Moment ,Shear Wall, Axial Load, Torsion etc.*

1. INTRODUCTION:

Comparison is the selection of best structural systems for analysis of reinforced concrete (RC) Medium-rise commercial buildings. Shear wall in Medium rise building are used to resist and minimum lateral force due to the lateral movement in the structure.

Lateral loads can developed high stresses, produces sway movement or causes deflections in the structural member and it is very important for the structure to have sufficient strength against vertical loads together with adequate stiffness to resist lateral forces. There is moment resisting frame model and shear wall combining with column model are used. Reinforced concrete (RC) buildings often have vertical plate-like RC walls called Shear Walls in addition to slabs, beams and columns. The shear wall is one of the best lateral load resisting systems which is widely used in construction world.

2. METHOD: Equivalent Static Method.

3. ANALYSIS: Analysis have done by STAAD PRO.V8i

4. SCOPE AND OBJECTIVE:

1. Critical study on optimum size of shear wall in high rise building.
2. Critical study between earthquake and wind load case in shear wall model in zones 2.

5. RESULT:

- 1 We have been working on different position of shear wall and moment resisting frame of building G+12 and we found best result in model no. 3, This model reduced the lateral displacement, axial forces, torsion, moment in z direction of building as compared to others model.
- 2 The model no.3 has more effectiveness in minimizing lateral movement and damage caused due to the earthquake and wind have compared to the ordinary moment resisting frame system and shear wall on different position on building provides the resistance to structure but it is unable to minimise the damage caused by the earthquake and wind in other models (MODEL NO.1, MODEL NO.2, MODEL NO. 4).

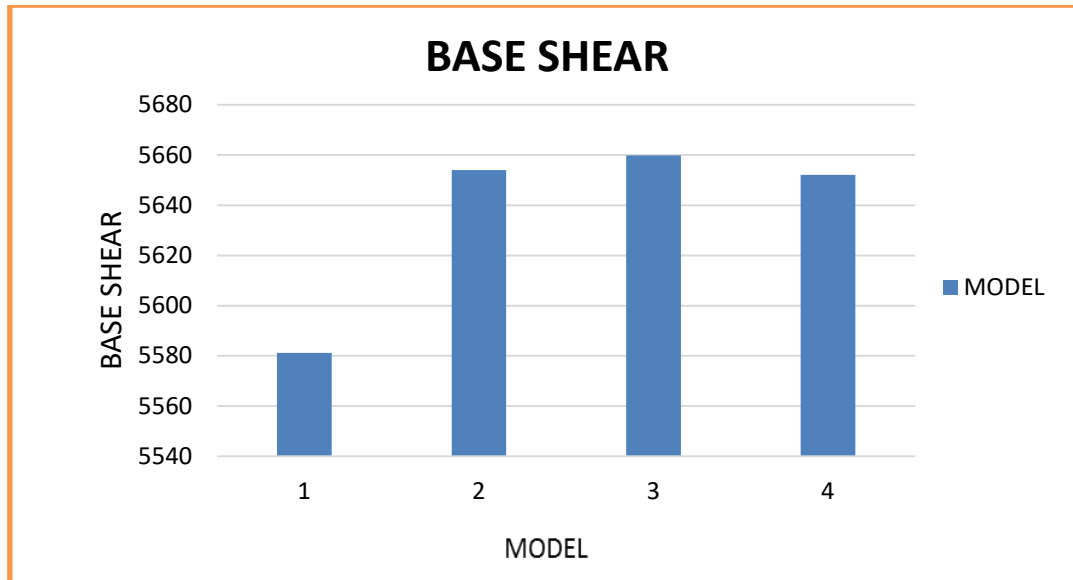


Fig.1 Minimizing Lateral Movement

6. CONCLUSION:

1. To study of Comparative Analysis of Different Lateral Load Resisting System in G+ 12 storied building subjected to applied Lateral Load on the structure.
2. The Absolute displacement, axial force, moment and storey shear in moment frame (Model-I) is the greatest among all lateral load resisting systems investigated. Amongst in dual frames, The effect of lateral forces on Model III (Shear wall provided at intermediate side) is maximum and it is resist maximum lateral forces on structure.
3. The concept of Shear wall is one of the advantageous concepts which can be used to strengthen structure and reduce the lateral deflection. Shear wall combining with column (Dual system) model are very effective in resisting lateral forces induced due to earthquake and wind. Hence shear wall combining with column can be considered as displacement and damage control structural element that may occur due to earthquake and wind forces.

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27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
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An Experimental Investigation of a Partial Replacement of Sugarcane Bagasse Ash With Cement

¹S.Sonone, ²S.Tekam, ³P.Sinha, ⁴R.Shivankar, ⁵P.Kokurde

1- Final Year Student, Civil Engineering Department, SCET, Nagpur.

2- Final Year Student, Civil Engineering Department, SCET, Nagpur.

3- Final Year Student, Civil Engineering Department, SCET, Nagpur.

4-Final Year Student, Civil Engineering Department, SCET, Nagpur.

5-Final Year Student, Civil Engineering Department, SCET, Nagpur.

¹sononeshardul@gmail.com, ²shwetatekam95@gmail.com

Abstract: Sugarcane bagasse ash is a byproduct of sugar factories found after burning sugarcane bagasse which itself is found after the extraction of all economical sugar from sugarcane. The disposal of this material is already causing environmental problems around sugar factories on the other side it creates an environmental issue. There are lots of environmental impacts of cement on our ecology. Cement industry creating environmental problem by emission of CO₂ during manufacturing of cement. Today researchers are more focusing towards the environment issue globally. And the other side is the Sugarcane bagasse ash generated in sugar mill creating environment issue as most of the part is used as a land fill. In this work sugar cane bagasse ash which is taken from one of the sugar mill of used in M20 grade of concrete by replacing cement 5%, 10%, 15% by weight and compare with normal M20 grade of concrete to check the strength of sugar cane bagasse ash in concrete.

Keywords: Ordinary Portland cement, Sugar cane bagasse ash, Compressive strength

1. INTRODUCTION:

Ordinary Portland Cement is recognized as a major construction material through out the world. Portland Cement is the conventional building material that actually is responsible for about 5%- 8% of global CO₂ emission. This environmental problem will most likely be increased due to exponential demand of portland cement. Sugarcane bagasse ash is disposed of in landfills and is now becoming an environmental burden. In this experimental Research work concrete cubes were casted and tested to examine various properties of concrete like workability. Compressive strength of grade M20. Sugar cane bagasse ash was partially replaced with cement at 5, 10, and 15 % by weight of cement in concrete. From this result we observed that the optimum amount of sugarcane bagasse ash can be replaced with cement is upto 10% by weight without adding any admixture.

2. MATERIALS:

Cement, Sand, Aggregate, and Sugarcane Bagasse Ash.

3. METHOD:

The materials used in this investigation are:

Cement: The most commonly used cement in concrete is Ordinary Portland Cement of Grade 53 is conforming IS 12600-1989(2009).

Fine Aggregate: The sand particles should also pack to give minimum void ratio, higher voids content leads to requirement of more mixing water. In the present study the sand conforms to zone I as per Indian standards. (IS: 10262, IS: 383). The specific gravity of sand is 2.62. The bulk density of fine aggregate is 1715 kg/m³.

Coarse Aggregates: The crushed aggregates used were 20mm and 10mm nominal maximum size and are tested as per Indian standards and results are within the permissible limit. (IS: 10262, IS: 383). The specific gravity and bulk density of 10mm and 20 mm aggregate are 2.74 and 2.79 and 1472 kg/m^3 and 1438 kg/m^3 respectively.

Water: Water available in the college campus conforming to the requirements of water for concreting and curing as per IS: 456-2009.

Sugarcane Bagasse Ash: In the sugarcane bagasse contains the consists of a 50% of cellulose, 25% of hemicellulose and 25% of lignin. Each ton of sugarcane generates approximately 26% of bagasse (at a moisture content of 50%) and 0.62% of residual ash. The residue after combustion presents a chemical composition dominates by silicon dioxide (SiO_2). In spite of being a material of hard degradation and that presents few nutrients, the ash is used on the farms as a fertilizer in the sugarcane harvests. In this experimental study sugarcane bagasse ash was collected from the Puri Sugar Mill, Bela.

4. RESULT:

The experimental result shows that the increase in the strength of concrete upto 10% with use of sugar cane bagasse ash.

5. RECOMMENDATIONS:

Specimen were tested for compressive strength at an interval of 7th day, 14th day, 28th day of curing in Compressive Testing machine.

6. CONCLUSION:

The experimental result shows that the increase in the strength of concrete with use of sugar cane bagasse ash. Therefore, with the use of sugar cane bagasse ash in partially replacement of cement in concrete, we can increase the strength of concrete with reducing the consumption of cement. And also it is a best use of sugar cane bagasse ash instead of land filling and make environment clean.

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A Review on MSW Stabilization by Additives

VaibhavRahangadale¹, TruptiRaut², NohilWankhede³, Assimuddin Ghazi⁴

^{1,2,3,4} Final Year Student, Civil Engineering Department, SCET, Nagpur.
Email – ¹ vaibhavrahangadale@gmail.com

Abstract: *The bottomless state of and challenges in municipal solid waste management (MSWM) in oppidanindia is the motivation of present study. Urbanization contributes extended municipal solid waste (MSW) generation and unscientific handling of MSW demeans the oppidan environment and causes danger. This paper examined the mutability which occurs in key parameters like ph, temperature, moisture content, organic carbon, nitrogen, phosphorous, odour, color etc. during the 30 days regular monitoring of composting process. 5 kg of municipal solid waste, old compost, straw and soil, was mixed with 5%, 10%, 15% of gomutra of 3 kg municipal solid waste for composting. Composting was done by using 16 th buckets model composter made up with proper aeration and drainage facility and was kept in semi sun rays condition. ph ranging 7.6 to 8.9 in the first phase, Temperature rise from the first day of process and become 55 C on 18 day. Moisture content in nourish was unstable throughout the process due to realignment microbial population. The nitrogen phosphorous and potassium (NPK) content of final compost are find out. after finding the results of NPK obtained from composting treatment given to MSW and Gomutra are indicate that combined composting are an attractive method for management of municipal solid waste.*

Key Words: *Municipal Solid Waste, Additives , Stabilization process.*

1. INTRODUCTION:

Due to increasing population as well as industrial and economic development, the output of the municipal solid wastes (MSW) has been increasing in India. On the other hand, sanitation landfill would surround a lot of lands and headship to two-step tool by less developed technology. Solid waste management is considered to be one of the most serious environmental problems face civic areas in developing countries. Composting of MSW reduces the volume of the wastes, germination of weeds in agricultural fields and destroys malodorous compounds. Inadequate collection and uncontrolled disposal of solid wastes results in a serious threat to the inhabitants as well as an environment. Municipal solid waste and its management is a big concern for India these days. Municipal Solid waste management is taken as one of the burning issue. Among solid waste, more than 80% is organic. Hereby effective Composting can be the best option for its management. Cow urine (Gomutra) has high nitrogenous fertilizer value than cow dung. Cordial value of urine can be trapped through organic composting. Urine applied compost accelerated the composting process as well as enhance the quality of the compost. Despite the fertilizer value of cow urine, it has several challenges to replace chemical fertilizer in the farmland. Urea in cow urine degrades rapidly to the gases NH₃ and CO₂. Cow urine is too strong to apply directly in the field and should be diluted in order to apply directly in the plants. Cow urine is in liquid form and thus is not easy to transport it as of chemical fertilizer. Waste recovery such as recycling and composting is an option of reducing the waste amount to be disposed. Composting MSW is seen as a method of engrossing organic waste materials from landfills, while creating a product, at relatively low-cost, that is suitable for agricultural purposes. Many studies have been carried out on appraise the effect of Gomutra in composting of Municipal solid waste. Composting satisfies the health and aesthetic aspects of waste disposal by destroying almost all pathogens. In addition, the product becomes having agricultural and horticultural benefits as a soil conditioner and fertilizer. Municipal solid waste management (MSWM), a critical element towards sustainable metropolitan development, includes segregation, storage, collection, relocation, carry-age, processing, and disposal of solid waste to minimize its adverse impact on environment. Unmanaged MSW becomes a factor for publicity of countless diseases. In the improved countries, solid waste management (SWM) belongs to important thrust areas for ensue research and economic and technological development have initiated irritability of stockholder to it. High population growth rates rapidly change waste depiction and evulsion stance, growing urbanization and

industrialization in developing countries are the important reasons for paying notice towards MSWM as more area is required to adapt waste. Waste is the outcome of human commotion which is produced since humans started living in smaller and larger societies. In hodiernal times, the size of the town and cities are increasing at a very fast rate and therefore solid waste generated daily has a very high magnitude and therefore its collection and disposal is necessary, to maintain good hygienic condition in the society. Waste, in general is a abusive term which signalize something unwanted, useless, offensive and dirty. The term waste is very complex to define, as concepts, approach towards waste are usually very subjective and often exceedingly distinctive and conflicting. Solid Waste Management (SWM) systems exist in most of the urban center's since last few decennary. However, these systems have yet to emerge as a well-organized practice. Although, the solid waste characteristics in different urban centers turn significantly, there is a sparing effort to tailor the system assortment to the waste characteristics.

2. LITERATURE REVIEW:

Experiments on combined composting were conducted at a campus of D. Y. Patil Educational Complex, situated at Sector 29, Nigdi, Pradhikaran, Pune, Maharashtra India, to study the effectiveness of municipal solid waste and cow urine. The amount of generation and composition of solid waste varies from place to place within the study. For the present study, sample of municipal solid waste was collected from The Moshi depot, which was earlier outside the jurisdiction of PCMC, is spread over 80 acre along Pune-Nashik highway Pune Maharashtra. Collection of cow urine was done from Tathawade village, situated in the Pimpri-Chinchwad south of Pune city, Maharashtra. Cow urine sample was in liquid form and collected in air tight plastic bins to enclose it from surrounding. 1.5 kg segregated vegetable waste, 1.5 old compost, 0.5 kg soils; 1.5 kg straw was mixed with 5%, 10%, and 15% of gomutra of 3 kg municipal solid waste for composting. The chemical parameters were determined at Aavanira Biotech (P) Ltd., Kinetic Innovation Park, D-1 Block, Plot No.-18/1, MIDC Chinchwad, Pune, Maharashtra, Pune, Maharashtra. To know the trends which occur in the composting process a regular monitoring of key role parameters, pH, temperature, moisture content, organic carbon nitrogen, phosphorous, odour, color etc. was done for 30 days period. Physicochemical analysis of finished compost will do for pH, conductivity, total nitrogen, organic carbon. Total Phosphorous will determined colorimetrically Potassium will determine by flame emission spectrophotometry, while heavy metal concentrations.

3. SCOPE AND OBJECTIVE OF WORK:

To define the effect of gomutra in composting process. To test the quality of compost with and without gomutra application. Determination of effects of different experimental parameters like Potassium, Nitrogen, Phosphorous, Moisture, pH, Total Carbon, C: N ratio on Compost after using Gomutra. Determination of thermodynamic parameters to establish the effect of temperature on Compost.

4. CONCLUSION:

The Conclusion showed that the combination of municipal solid waste and 10% of gomutra was effective and gomutra get to accelerate the composting process. Reduction of waste by recycling at an affordable cost with locally available resources was a practical arrival for waste management and environmental protection.

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Review on Low– Cost Domestic Wastewater Treatment by Aquaculture

¹Ashtashil Bhambulkar, ²Dr. Narendra Shinkar,

¹ Asst. Prof, ¹Civil engineering Department, SCET, Nagpur,

² Asst. Prof., GPN, Nagpur

Email - ¹Bhambulkar.ashu@gmail.com,

Abstract: Village pond is an integral part of rural India which is primarily constructed for harvesting rain water and bathing of domestic livestock. Through suitable scientific interventions these manmade water resources can be utilized for economic gains as well. But unfortunately, they are used only as dumping sites for disposing of human and animal waste which leads to pollution and 'Eutrophication' due to accumulation of excess nutrients (nitrates and phosphates). Although these ponds hold immense potential for producing high quality food through aquaculture for rural development in developing Wastewater-duckweed-aquaculture is a perfect eco-friendly integrated package for converting the waste water nutrients into high quality fish protein and augmenting rural economy through generating employment opportunities and additional food security.

Keyword: Duckweed, Fish, Nutrients, Pathogenic bacteria, Wastewater

1. INTRODUCTION:

Rapid population growth and increased urbanization over the years have led to quantum increase in generation of domestic sewage in India. The amount of sewage generated in most cities and towns of the country has exceeded the capacity of the available treatment systems. The pollutants present in urban wastewater and their concentrations are a function of the degree of urbanisation, water availability, etc., that largely comprise nutrients like nitrogen and phosphorus, dissolved and suspended solids, microbes and other organic matter. Several natural, innovative and alternate approaches of biological treatment of wastewater have been evaluated over the years for their economical viability, operational ease and system sustainability. Sewage-fed fisheries in Munich, Germany and in the bheries of West Bengal, India are models of such biological treatment systems, where raw sewage is directly fed into the fish ponds (Edwards, 1992; Jana and Dutta, 1996; Jana, 1998). Further, macrophytes are known to have high capacity of biological purification of organic wastewater (Gersberget al., 1986; Mann and Bavor, 1993). Oronet al. (1988) and Hammouda et al. (1995) suggested recycling systems using duckweeds to be a comprehensive solution for treatment of municipal wastewater. Duckweeds, (small free floating macrophytes) are promising for use in sustainable wastewater treatment due to their rapid growth to high biomass, high levels of nutrient removal (Alaertset al., 1996), ease of handling, harvesting and processing, tolerance to high nutrient levels of wastewater and low fibre content (Abdalla et al., 1987; Rodrigues and Oliveira, 1987; Santos et al., 1987). Direct conversion of ammonia into plant proteins in duckweed ponds is a relatively energy efficient process compared to other alternate methods (Oronet al., 1987; Zirschky and Reed, 1988). The present study attempts to evaluate the efficacy of a duckweed-cum-fish culture system in reduction of inorganic nutrients, biological oxygen demand (BOD), suspended and dissolved solids and pathogens in domestic sewage during the process of evaluation of biological treatment efficiency of the system.

2. Materials and Methods :

An aquaculture-based sewage treatment system integrating duckweed and fish as biological components was evaluated in an urban area Mandhal , Nagpur district , Maharashtra State, India. Duckweeds are small green plants belonging to family Lemnaceae and they grow densely on the water surface forming a mat like cover. Taxonomically

they belong to monocotyledons and have four genera- Lemna, Spirodela, Wolffia and Wolffia. Duckweeds as fish feed Prior to 1988, duckweeds had been used only in commercial applications to treat wastewater in North America. In 1989 staff of a non-governmental organization based in Columbia, Maryland, The PRISM Group initiated a pilot project in Bangladesh to develop farming systems for duckweed and to test its value as a feed for herbivorous/omnivorous fishes like carps and tilapia. The results of the pilot operations were extremely promising and dried duckweed meal provided an excellent substitute for expensive conventional feed ingredients like soybean and fish meal (Iqbal 1999). Fresh duckweed is converted efficiently to live weight by fish. Feed conversion ratio of 1.2 to 3.3 for *Spirodela* carps and 1.6 to 3.3 for *Lemna* tilapia has been recorded by Gijzen and Khondken (1997). Duckweed incorporated dry diets have also been found to support growth in not only herbivorous or omnivorous fishes like carps and tilapia but in high protein demanding carnivorous fishes like catfishes and snakeheads as well. In India carp poly-culture system contributes more than 80% of the total aquaculture production where Indian major carps (*Catla*, *Labeorohita* and *Cirrhinus mrigala*) and exotic carps (*Cyprinus carpio*, *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix*) are cultured together. Among these species grass carp (*Ctenopharyngodon idella*) is the primary consumer of aquatic plants (herbivorous) including duckweeds. Catla (*Catla*) and common carp (*Cyprinus carpio*) also compete aggressively for available duckweed feed and consume it directly. Incorporation of dried duckweed, *Lemna minor* at 40 % in the supplementary diet of common carp, *Cyprinus carpio* (Devaraj et al 1981) revealed higher specific growth rate besides lowering the feed cost significantly. In Bangladesh, higher fish yields have been recorded in a poly-culture system, comprising Indian major carps, Chinese carps and tilapia, when fed with diets containing 60% sewage-grown mixed duckweeds and 40% mustard oil cake (Iqbal 1999). Guru and Patra (2007) also reported higher specific growth rate in *Labeorohita* fingerlings fed with diets having 13.2% dried *Lemna* powder. Das et al (2007) recorded 205% higher weight gain and about 105% higher food conversion in *Labeorohita* fed with diets containing 20% dried *Lemna minor* powder and also saved about 20% of feed cost. Central Inland Fisheries Research Institute (CIFRI), India reported increased growth rate in grass carp when fed with diets containing 10% *Wolffia* (Verma 1989). Studies conducted at Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Punjab, India also revealed significantly higher weight gain in carps like *Labeorohita* (20.60%), *Cirrhinus mrigala* (26.80%) and *Cyprinus carpio* (70%) fed with diets containing 20% sundried *Spirodela* and saved up to 50% on feed cost (Ansal and Dhawan 2007, Ansal et al 2008) by 100% replacement of animal protein supplement in the traditional diets.

Vermicomposting of duckweeds

As fresh duckweed is characterized by high amounts of nitrogen and phosphorus, compost made from duckweeds is also expected to be rich in these macronutrients. Kostecka and Kaniuczak (2008) developed a high quality macronutrient rich (N, P & K) vermicompost from duckweed (*Lemna spp.*) biomass by using *Eisenia fetida* (SAV.) earthworms.

Hence, vermicomposting of harvested duckweed biomass further corroborates its potential for utilization in environmental reclamation including aquaculture as well as agriculture.

Production of value added products from duckweeds

Besides quality protein resource, duckweeds are also a good resource of starch. Hence, there is great scope of production of value added products like protein concentrate and ethanol from duckweeds. About 64.4 % crude protein content has been reported in leaf protein concentrates prepared from *Spirodela polyrrhiza* (Fasakin 1999), which can be used as feed supplement not only in animal feeds but also for human consumption. *Spirodela polyrrhiza* grown on anaerobically treated swine waste water has been found to have a starch content of 45.8% on DM basis and its enzymatic hydrolysis yielded a hydrolysate with a reducing sugar content corresponding to 50.9% of the original duckweed biomass. Further, fermentation of the sugar hydrolysate by yeast gave an ethanol yield of 25.8% of the original dry duckweed biomass which reflects an additional scope of harvested duckweed biomass in ethanol production (Cheng and Stomp 2009).

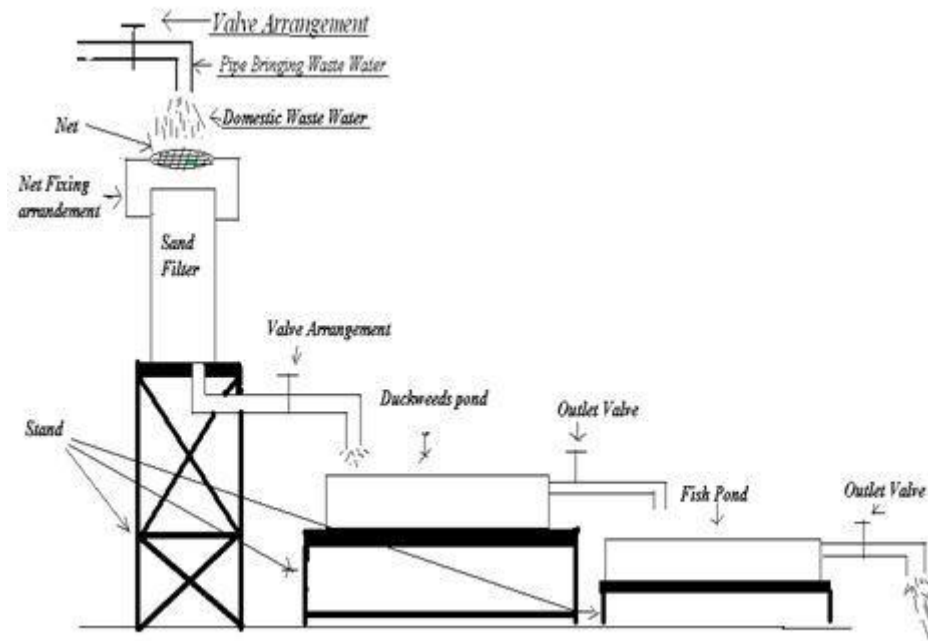


Fig 1 Typical pilot layout plan

3. CONCLUSION:

Although the use of microorganisms in wastewater treatment is commonplace, so far, there is no new technology to emerge from decades of research to intentionally use specific microorganisms. Several proposals, including immobilization of microorganisms in polysaccharide gels, including microalgae and combinations of Duckweed plant for simultaneous treatment of the wastewater, have the best potential for future commercial use. So far, in terms of wastewater treatment, it is difficult to differentiate between the role of microalgae and Duckweed plant.

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Rainwater Harvesting

Honey Gaur¹, Neha Khobragade², Diksha Menghare³,

^{1,2,3}Assistant Professor,

¹Department of Civil Engineering, Kallinga Univeristy ,Raipur , India

^{2,3}Department of Civil Engineering, SCET, Nagpur, India

Email - nehakhobragade13@gmail.com,

Abstract: At the rate in which India population is increasing, it is said that India will surely replace China from its number 1 position of most densely populated country of the world after 20-30. These will lead to high rate of consumption of most valuable natural resource „Water “resulting in augmentation of pressures on the permitted freshwater resources. Ancient method of damming river and transporting water to urban area has its own issues of eternal troubles of social and political. In order to conserve and meet our daily demand of water requirement, we need to think for alternative cost effective and relatively easier technological methods of conserving water. Rain water harvesting is one of the best methods fulfilling those requirements.

Key Words: Rainwater harvesting, first flush mechanism, Roof water system, Gutter for conveyance, Underground RCC tank, Methods of distribution of harvested rainwater.

1. INTRODUCTION:

Today due to rising population & economical growth rate, demands for the surface water is increasing exponentially. Rainwater harvesting is seems to be a perfect replacement for surface & ground water as later is concerned with the rising cost as well as ecological problems. Thus, rainwater harvesting is a cost effective and relatively lesser complex way of managing our limited resources ensuring sustained long-term supply of water to the community. In order to fight with the water scarcity, many countries started harvesting rain.

2. METHOD:

Rourkela is located at 21.28E longitude and 81.55N latitude at nandanvanin Raipurat Chhattisgarh at an elevation of about 420 meters above mean sea level. Raipur has a tropical climate and receives high rainfall during Southwest monsoon (June-September) and retreating Northeast monsoon (December-January). Average annual rainfall ranges between 120-160 cm. The average monthly rainfall data are being taken from the Chhattisgarh state. Again its followed that, „nandanvan“ is a small city and thus has a uniform average rainfall through out the city in all location. Thus yearly rainfall is 1442.1 mm per year. There are two methods.

3. THE RATIONING METHOD (RM):

It distributes stored rainwater to target public in such a way that the rainwater tank is able to service water requirement to maximum period of time. This can be done by limiting the amount of use of water demand per person. Suppose in this method, the amount of water supplied to student is limited which is equal to say, 100 lt/day per capita water demand Again, Number of Person at campus = 1789

Then, Total amount of water consumption per day = $1789 \times 0.1 = 178 \text{ m}^3/\text{day}$

Total no. of days we can utilize preserved water = $\text{stored water}/\text{water demand}$

Hence finally, no of days = $3600/30 = 120 \text{ days}$ (or 4 months)

For long term storage of preserved water in good condition, preserving chemical should be added.

4. RAPID DEPLETION METHOD (RDM):

In Rapid Depletion method, there is no restriction on the use of harvested rainwater by consumer. Consumer is allowed to use the preserved rain water up to their maximum requirement, resulting in less number of days of utilization of preserved water. The rainwater tank in this method is considered to be only source of water for the consumer, and alternate source of water has to be used till next rains, if it runs dries.

For example if we assume per capita water demand = 150 lt/day = 0.15 m³/day
 Total amount of water consumption per day = 1789 x 0.15= 268.35m³/day
 Total no. of days, preserved water can be utilize = stored water/water demand
 = 3600/45
 = 80 days (2.67 months)

Hence, finally it is observed that, if the amount of water stored is equal to 3600 m³, then applying

1. RDM, consumer can only utilize the preserved stored water for about 80 days (2.67 months),
2. Where as in RM, preserved stored water can be utilized for a period of 120 days (4 months).

5. RESULT:

Table No. 1: Calculation Of Rooftop Area & Runoff Of All Building

Serial no.	Hall Name	Rooftop area(m ²)	Runoff(m ³) (rooftop area x1.4m)
1.	Civil Department	3285.52	3199.728
2.	Mechanical Department	6604.63	3646.48
3.	Computer SC. Department	3252.95	3154.1
4.	Electronics Department	6732.76	2796.71

Detail monthly hydrological analysis of all building

Given below the table No 2 which gives the details monthly analysis of surface runoff produced from the catchment areas of various building .Where the serial no. denotes the building name as given in the table no.1

Table No.2: Detail Monthly Hydrological Analysis Of All Building

S. no.	Hall Name	Rooftop area(m ²)	Runoff(m ³) (rooftop area x1.4m)	Total RunOff
1.	Civil Department	3285.52	4599.73	4497
2.	Mechanical Department	6604.63	9246.49	7540
3.	Computer SC. Department	3252.95	4554.13	4470
4.	Electronics Department	6732.76	9425.87	7896

6. CONCLUSION:

This paper dealt with all aspect of improving the water scarcity problem in the Ringta Raipur campus by implementing ancient old technique of rainwater Harvesting. Two alternatives have been suggested for tank design, which takes separate approaches towards the consumption of harvested rainwater. These results are given clearly in the table No. 2. Hence from this table, we can draw out a conclusion that a huge amount of water got collected from the rooftop surfaces of all the entire buildings. And if, this project is being done seriously and implemented to the campus then has a huge harvesting potential. This reservoir should have to build for the storage of 24403 m³ of water. Hence this tank has huge capacity of getting rainwater and on proper storage, this tank can supply almost through out the year for about 1789 consumers having a consuming rate of 100liter/day as calculated by rational depletion method. The water has almost the potential amount of tank.

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Review on Wastewater Optimization Technique

¹Priyanka Nagdeve, ²Shalini Ghabhane,

^{1,2} Asst. Prof, Civil engineering Department, SCET, Nagpur, India
Email - priyanka.kalamkar984@gmail.com

Abstract: Waste-water is the combination of liquid or water-carried wastes originated from the sanitary conveniences of dwellings, commercial or industrial facilities and institutions, in addition to any ground water, surface water and storm water that may be present. Untreated wastewater generally contains high levels of organic material, numerous pathogenic microorganisms, as well as nutrients and toxic compounds. It thus entails environmental and health hazards and, consequently, must immediately be conveyed away from its generation sources and treated appropriately before final disposal. The ultimate goal of wastewater management is the protection of the environment in a manner commensurate with public health and socioeconomic concerns. Wastewater treatment is becoming even more critical due to diminishing water resources, increasing wastewater disposal costs. The municipal sector consumes significant volumes of water, and consequently generates considerable amounts of wastewater discharge. This review paper addresses the utilization of some eco-friendly and low cost technologies for sustainable development, with special reference to duckweed and algae technology. Studying the economics of different wastewater treatments is an essential prerequisite to the identification of cost-effective solutions.

Keyword: Waste water treatment, optimization option, Domestic.

1. INTRODUCTION:

Waste water is any water that has been adversely affected in quality by anthropogenic influence. Wastewater can originate from a combination of domestic, industrial, commercial or agricultural activities, surface runoff or storm water, and from sewer inflow or infiltration.

Wastewater treatment using ponds can be an economical way of treatment which produces effluent that is highly purified. The number and the type of ponds used are the determining factors as to the degree of treatment that is provided. Another name for wastewater treatment ponds is waste stabilization pond [3]. Stabilization ponds because these ponds help to stabilize the wastewater before it is passed on to receiving water. They can also be referred to as oxidation ponds or sewage lagoons. The waste stabilization pond is a biological treatment process, where bacteria use organic matter in the wastewater as food. The three types of bacteria at work in most ponds are the aerobic, anaerobic, and the facultative bacteria. Because of unpleasant conditions associated with the anaerobic decomposition, plant operators must make sure that there is enough dissolved oxygen (D.O.) in the pond to make sure that it will be the aerobic and facultative bacteria that will be predominant, rather than having anaerobic decomposition take place [6].

The biological treatment is made by means of solar energy and thus cost savings are achieved compared to systems that use more costly energy sources.

2. LITERATURE REVIEW:

Vikram M Pattarkine, Randall C Chann, Charles E Tharp ,“Advanced lagoon treatment technologies for wastewater treatment”, WEFTEC (2006)

Lagoon-based wastewater treatment systems have been used around the world for both municipal and industrial applications. These systems are attractive due to their low operating cost, in-situ solids storage capabilities, and low operator attention requirements. Where land availability and proper topography permit, lagoon-based systems

are the preferred process solution for secondary treatment, which reduces both biochemical oxygen demand (BOD) and total suspended solids (TSS) of the wastewater.

Leslie R. Kryder, "Microalgae for Wastewater Treatment and Reuse",11,(2007)

The presence of algae in the aerobic and facultative zones is essential to the successful performance of facultative ponds. In sunlight, the algal cells utilize CO₂ from the water and release O₂ produced from photosynthesis. On warm, sunny days, the oxygen concentration in the surface water can exceed saturation levels. Conversely, oxygen levels are decreased at night. In addition, the pH of the near surface water can exceed 10 due to the intense use of CO₂ by algae, creating conditions favorable for ammonia removal via volatilization. This photosynthetic activity occurs on a diurnal basis, causing both oxygen and pH levels to shift from a maximum in daylight hours to a minimum at night. The oxygen, produced by algae and surface re aeration, is used by aerobic and facultative bacteria to stabilize organic material in the upper layer of water. Anaerobic fermentation is the dominant activity in the bottom layer in the lagoon. In cold climates, oxygenation and fermentation reaction rates are significantly reduced during the winter and early spring and effluent quality may be reduced to the equivalent of primary effluent when an ice cover persists on the water surface. As a result, many states in the northern United States and Canada prohibit discharge from facultative lagoons during the winter.

Shengbing He, Gang Xue, "Algal-based immobilization process to treat the effluent from a secondary wastewater treatment plant (WWTP)", Journal of Hazardous Materials, 178, (2010).

In this paper it is well known that microalgae play an important role in the treatment of domestic wastewater with maturation ponds or municipal wastewater with small and middle-scale facultative or aerobic ponds. In this study, and the aim of the work was to study the feasibility of removing nitrogen and phosphorus by algal-based immobilization technology

3. MATERIAL

1. Algae
2. Duckweed plants

3.1ALGAE

Algae are photosynthetic organisms that occur in most habitats. They vary from small, single-celled forms to complex multicellular forms, such as the giant kelps that grow to 65 meters in length. There are five types of algae

1. Bacillariophyta
2. Chloropyta
3. Cyanoptya
4. Chrysophyta
5. Rhodophyta

Chlorophyta: division of the kingdom of protista consisting of the photosynthetic organism commonly known as *green algae*. The various species can be unicellular, multi-cellular, coenocytic (having more than one nucleus in a cell), or colonial. Chlorophyta are largely aquatic or marine, a few types are terrestrial, occurring on moist soil, on the trunks of trees, on moist rocks and in snow banks. Various species are highly specialized.

Cyanobacteria: phylum of prokaryotic aquatic bacteria that obtain their energy through photosynthesis. They are often referred to as *blue-green algae*, even though it is now known that they are not related to any of the other algal groups, which are all eukaryotes. Cyanobacteria may be single-celled or colonial. Depending upon the species and environmental conditions, colonies may form filaments, sheets or even hollow balls. Some filamentous colonies show the ability to differentiate into three different cell types. Despite their name, different species can be red, brown, or yellow; blooms (dense masses on the surface of a body of water) of a red species are said to have given the Red Sea its name. There are two main sorts of pigmentation. Most cyanobacteria contain chlorophyll *a*, together with various proteins called phycobilins, which give the cells a typical blue-green to grayish-brown colour. A few genera, however, lack phycobilins and have chlorophyll *b* as well as *a*, giving them a bright green colour. Unlike bacteria, which are heterotrophic decomposers of the wastes and bodies of other organisms, cyanobacteria contain the green pigment chlorophyll (as well as other pigments), which traps the energy of sunlight and enables these organisms to carry on photosynthesis. Cyanobacteria are thus autotrophic producers of their own food from simple raw materials. Nitrogen-fixing cyanobacteria need only nitrogen and carbon dioxide to live: they are able to *fix* nitrogen gas, which cannot be absorbed by plants, into ammonia (NH₃), nitrites (NO₂) or nitrates (NO₃), which can be absorbed by plants and converted to protein and nucleic acids. Cyanobacteria are found in almost every conceivable habitat, from oceans to fresh water to bare rock to soil. Cyanobacteria produce the compounds responsible for *earthy* odors we detect in

soil and some bodies of water. The greenish slime on the side of your damp flowerpot, the wall of your house or the trunk of that big tree is more likely to be cyanobacteria than anything else. Cyanobacteria have even been found on the fur of polar bears, to which they impart a greenish tinge. In short, Cyanobacteria have no one habitat because you can find them almost anywhere in the world.

3.2 DUCKWEED

Some duckweed is introduced into freshwater aquariums and ponds where they may spread rapidly [8]. This introduction may be deliberate or unintended and once established in a large pond, may be difficult to eradicate. The plant is carried on the feathers, shells, and coats of birds, turtles, reptiles, and aquatic mammals visiting multiple ponds, rivers, and lakes. In water bodies with constant currents or overflow, the plants are carried down the water channels and do not proliferate greatly [9].

4. CONCLUSIONS:

Treatment of waste water in oxidation ponds in the presence of algae is an efficient and economical way of treating waste water.

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Audit on Water Supply

¹Vinod Yerpude, ²Harshit Suchak

¹Assistant Professor, ²Assistant Professor,
Department of Civil Engineering,
SCET, Nagpur, India
Email - vsvinodyerpude@gmail.com

Abstract: *The world's water resources are finite but exist on a planet with a constantly growing population. The development of water resources to man's benefit has been a fundamental factor in the evolution of civilizations throughout history. But, as our populations continue to grow and shift, the availability of quality water resources is in decline. Pollution, climate change and construction of cities in dry regions are some of the factors exacerbating evolving supply/demand imbalances. To account this, it is essential that man utilize existing water resources in the most careful, efficient manner. Water audits provide a rational, scientific framework that categorizes all water use in your system. It is a tool to overcome drought related problem, shortage, leakage and losses. International Water Association (IWA) / American Water Work Association (AWWA) initiated a large scale effort to asses reduced above related problem with the help of audit.*

Key Words: IWA, Water Audit

1. INTRODUCTION:

Water audit and its analysis which can solve not only many water related problem but also saves precious resources and public money. Just as business routine, bank prepares statement of debits and credits for their customers and provides a statement of money, which is flowing into and out of accounts. The water audit display how quantity of water flows into and out of the distribution system and to the customer. Yet, as essential and commonplace as financial audit are to the world of commerce, water audit have been surprisingly uncommon in public water supply throughout most of the world. In place where the intrinsic value of water has not been recognized, little motivation has existed to promote requirement for auditing and sound assessments of water loss performance. As water is becoming a more valued commodity, however, this picture is beginning to change.

1.1 BENEFITS OF WATER AUDIT:

1. Water audits provide decision making tools to utility managers, directors, and operators. i.e., knowing where water is being used in your system allows you to make informed decisions about investing resources such as time, labor and money.
2. Water audits allow managers to efficiently reduce water losses in the system.
3. It less the cost incur for electricity, chemicals, and maintenance cause due to losses in the system.

2.1 METHODOLOGY:

The amount of water can be broken down into two categories, Authorized Use and Water Losses. Therefore, Authorized Use + Water Losses = System Input. This vertical height water measurement holds true across the entire standard water balance.

Following identify important relationships just by glancing at the standard water balance:-

- Water Losses = Apparent Losses + Real Losses.
- Nonrevenue Water = Water Losses + Unbilled Authorized Use.

Apparent Losses = Metering Inaccuracies + Unauthorized Use.

3. DISCUSSION:

Thus by following the five step process outlined below will able to complete these equations.

3.1 SOURCE EVALUATION

The first step in completing the standard water balance is determining System Input. The System Input category may be comprised of various sources. A system may own multiple wells, springs or surface water intakes. This is a very important step, because even though it is only one category, the amount of water input should be balanced. Remember, in any type of balance, outputs must equal inputs. If this number is inaccurate, all of the remaining calculations you perform will be in error. The amount of water input to the balance is determined by metering at the source. These meters are typically called master meters. Master meter readings are extremely important to all water systems.

3.2 CALCULATION OF AUTHORIZED CONSUMPTION:

This step should be fairly easy if system has been keeping good billing records. The first part involves calculating the category Revenue Water, which is made up of Billed Metered Consumption and Billed Unmetered Consumption. Since both of these categories are billed by the system, a review of the records should give you the information you need. Billed Metered Consumption includes residential, commercial and industrial customers. System may have different methods of billing these various customer classes.

3.3 EVALUATE APPARENT LOSSES:

Two categories i.e. Apparent Losses and Real Losses make up the components of Water Losses. The definition of these two terms is often confusing at first which are as follows,

Apparent Losses of water occur as inaccuracies in water flow measurement, errors in water accounting, and unauthorized usage. Real Losses are the physical escape of water from the distribution system, and include leakage and overflows prior to the point of end use.

Another way to think about Apparent Losses is that this category consists of water that is delivered to an end user – including unauthorized use – but is not properly measured or recorded. Sometimes apparent losses are called “paper losses” because they consist of water that is not properly recorded on paper. Apparent losses are more costly to the system than real losses.

3.4 EVALUATE REAL LOSSES:

Real Losses are the physical escape of water from the distribution system, and include leakage and overflows prior to the point of end use. The standard water balance method uses the information that the system is most likely to have to calculate real losses. By assessing the individual components of real losses using field techniques, cross-checking of calculations and estimations can be done.

3.5 PERFORMANCE MEASUREMENT:

One more step remains in the water audit process – interpreting the information that had been collected. Deciding on appropriate performance measures allows the system to track performance and improvement from one water audit to the next. Performance measures let the system’s customers understand the goals and progress made by the water auditing process.

4. CONCLUSION:

Water audit study shall be covered the holistic approach towards total water resource, distribution and its efficient use to reduce the capital and operating cost as an added advantage over the optimized use of water resource with environment protection.

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Adaptive PI Control of STATCOM for Voltage Regulation

¹ Abhijeet D. Naik, ² Suresh R. Tarfe, ³ Sanjay A. Parihar, ⁴ Miss. Shital Yende,

^{1, 2, 3} UG Scholar, ⁴ Assistant Professor, Department of Electrical Engineering
Suryodaya College of Engineering and Technology, Nagpur

Email - ¹abhijeetnaik362@gmail.com, ²sureshtarfe022@gmail.com, ³pariharsanjay26@gmail.com

Abstract: STATCOM can give quick and effective responsive power support to keep up control framework voltage solidness. This paper proposes a fluffy control show in light of versatile PI control, which can self-modify the control picks up amid an unsettling influence to such an extent that the execution dependably coordinates a coveted reaction, paying little mind to the difference in working condition. Since the alteration is self-governing, this gives the fitting and-play capacity for STATCOM activity. In the reproduction test, the versatile PI control demonstrates steady perfection under different working conditions, for example, extraordinary beginning control increases, distinctive load levels, change of transmission organize, continuous unsettling influences, and an extreme aggravation. Interestingly, the traditional STATCOM control with tuned, settled PI picks up for the most part perform fine in the first framework, yet may not execute as effective as the proposed control technique when there is a difference in framework conditions.

Key Words: Microcontroller, Transformer, Driver, SCR, Regulator, A to D converter, Optocoupler.

1. INTRODUCTION:

Voltage solidness is a basic thought in enhancing the security and unwavering quality of energy frameworks. The static compensator (STATCOM), a well-known gadget for responsive power control in view of door side road (GTO) thyristor, has increased much enthusiasm for the most recent decade for enhancing power framework solid. In the past, different control techniques have been proposed for STATCOM control. References predominantly center on the control plan instead of investigating how set relative indispensable (PI) control picks up. In numerous STATCOM models, the control rationale is executed with the PI controllers. The control parameters or increases play a key factor in STATCOM execution. By and by, few investigations have been completed in the control parameter settings. In the PI controller picks up are composed for a situation by-contextual analysis or experimentation approach with tradeoffs in execution and effectiveness. As a rule, it isn't plausible for utility architects to perform experimentation concentrates to discover reasonable parameters when another STATCOM is associated with a framework. Further, regardless of whether the control picks up have been tuned to fit the anticipated situations, execution might frustrate when an impressive difference in the framework conditions happens, for example, when a line is redesigned or resigns from. The circumstance can be surprisingly more dreadful if such transmission topology change is because of a possibility. In this manner, the STATCOM control framework may not perform well when generally required. This control relies upon the architect's involvement to get ideal parameters. In, another STATCOM state input configuration is presented in light of a zero set idea. Like the last picks up of the STATCOM state criticism controller still relies upon the fashioner's decision. In, a fluffy PI control techniques is proposed to tune PI controller picks up. In any case, it is still up to the architect to pick the real, deterministic additions. In the populace based inquiry method is connected to tune controller picks up. Be that as it may, this technique as a rule needs a long running time to compute the controller picks up. A tradeoff of execution and the assortment of task conditions still must be settled on amid the planner's basic leadership process. Along these lines, very productive outcomes may not be constantly achievable under a particular working condition. Fast and steady wanted reaction when the framework activity condition fluctuates.

2. LITERATURE REVIEW:

S. Dahal studied in transmission systems, Flexible AC Transmission System (FACTS) is a power electronic based innovation to improve controllability, strength and power exchange capacity of air conditioning transmission framework. Realities gadgets are observed to be exceptionally successful for dependability took after by an unsettling influence. Static Synchronous Compensator (STATCOM) which is a shunt gadget of FACTS family is productive in

controlling voltage either by engrossing or by creating receptive power. Contrasted with different FACTS gadgets, STATCOM can give quick and effective receptive power support to keep up control framework voltage strength. This paper proposes a PI control display that controls the voltage amid an aggravation.

To Maintain Voltage Regulation a STATCOM Provides the Fast and effective receptive power. So as to comprehend different STATCOM control strategies are examined in the writing. Be that as it may, in those strategies they utilize the trail and mistake approach techniques so the execution is exchange off. so at various working focuses the control parameters may not be compelling for the ideal execution. Keeping in mind the end goal to beat this issue a versatile control procedure came in to picture, in which the control picks up consequently self-balanced according to our coveted reaction even with the difference in working condition that is the reason we named as independent change.

In the writing, different STATCOM control techniques have been talked about including numerous utilizations of corresponding essential (PI) controllers. Thus, control parameters for the ideal execution at a given working point may not be viable at an alternate working point. This paper proposes another control display in view of versatile PI control, which can self-modify the control picks up amid an unsettling influence. Voltage direction is a basic thought for enhancing the security and unwavering quality of energy frameworks.

3. METHODOLOGY:

This work in PI controller is required for non-coordinating any procedure that in the long run come back to a similar yield given a similar set info and aggravation yield given a similar set information and unsettling influences PI controller is most appropriate to incorporating process.

That the versatile PI control gives reliably amazing execution under different working conditions, for Example, extraordinary introductory control increases, diverse load levels, changes of transmission organize, back to back unsettling influences and an extreme aggravation.

The PI control parameters can act naturally balanced consequently and powerfully under various unsettling influences in a power framework.

The STATCOM with settled PI control parameters may not come to the coveted and satisfactory reaction in a power framework when the power framework working condition (e.g., burdens or transmissions) changes.

A versatile PI control technique is exhibited in this area keeping in mind the end goal to acquire the coveted reaction and to abstain from performing experimentation concentrates to discover appropriate parameters for PI controllers when another STATCOM is introduced in a power framework control strategies.

4. DISCUSSION:

Operation of block diagram:

In the above block the main aim is to control and keep balance the voltage across load .Initially controller check the incoming voltage coming from line with the help of ADC (analog to digital converter) present inside the Microcontroller. Our aim is to control a positive as well as negative half cycle of incoming AC for that a Firing angle control method is used.

For controlling a firing angle of any AC voltage it is necessary to monitor every positive or negative half cycle, hence a Sine Wave Cycle Monitor (Zero Crossing Detector) block is used in our project, which informs controller about start point of every cycle. Once controller knows the voltage across the load and signals from sine wave cycle monitor, controller calculate the firing angle and gives firing pulse to the AC to AC converter in which a static switch formed by a SCR/TRIAC is used. Static switch can operated on high voltage and high frequency as compare to the mechanical switches like relay.

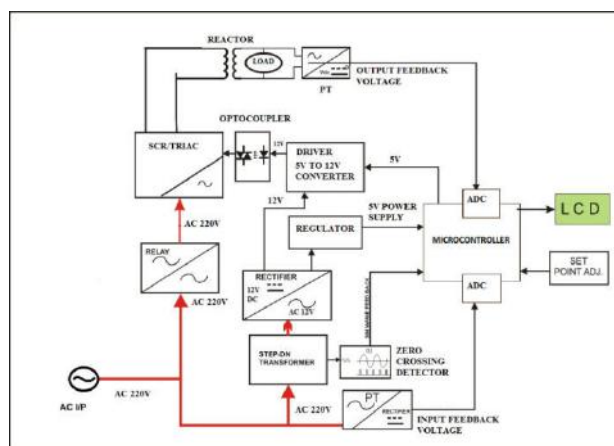


Fig.4.1 Block Diagram Adaptive PI control of STACOM for voltage regulation

Potential transformer is used to step down the voltage across the load to be measure and rectified to DC, because microcontroller can read a voltage upto 5vdc only. In our project we are using a **Relay** for tripping the input voltage in case of very high voltage and low voltage which is beyond control-able limits. The relay used in our project is of 12 volts and controller can give maximum of 5v.

It is necessary to amplify the 5v to 12v for which a Driver circuit is used. Microcontroller requires a 5v DC to work, and same will be generated with the help of Power Supply which comprises of a Step down transformer, rectifier, filter and regulator. Transformer step down the 220v AC to 12v AC, rectifier and filter converts this 12v AC to 12v DC, and regulator converts a 12v DC to a constant of 5v DC.

5. MATERIAL:

5.1 THE FULL WAVE RECTIFIER (12VAC TO 12VDC)

A Full Wave Rectifier is a circuit, which changes over an air conditioner voltage into a throbbing dc voltage utilizing both half cycles of the connected air conditioning voltage. It utilizes two diodes of which one behavior amid one half cycles while alternate behaviors amid the other half cycle of the connected.

5.2 VOLTAGE REGULATOR (12VDC TO 5VDC)

A voltage controller is intended to consequently keep up a consistent voltage level, where they settle the DC voltages utilized by the processor and different components.

5.3 SINE WAVE CYCLE MONITOR (ZERO CROSSING DETECTOR)

A zero intersection locator is a one sort of voltage comparator, used to distinguish a sine waveform progress from positive and negative, that concurs when the I/p crosses the zero voltage condition. In rotating current, the zero-intersection is the immediate time when there is no voltage exhibit. In a sine wave or other basic waveform, this regularly happens twice amid each cycle.

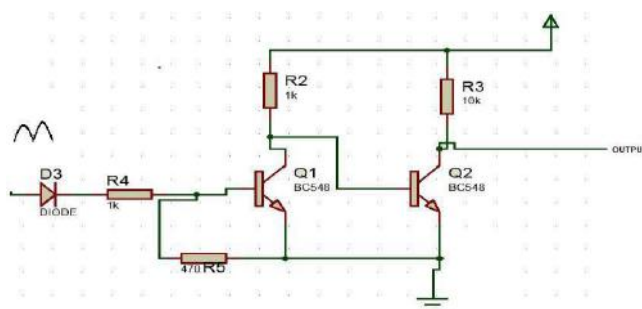


Fig.5.3.1 Zero crossing detector

5.4 DRIVER:

A Microcontroller advanced rationale yield stick supplies just 10mA of current. Outer gadgets, for example, high-control transfers can require >100mA and they require more voltages. With a specific end goal to control such gadgets which utilize high DC ebb and flow, a transistor-based driver circuit is utilized to enhance ebb and flow to the required levels. On the off chance that the voltage and current levels are in consummate range, the transistor demonstrations like a high-current switch controlled by the lower current computerized rationale flag.

5.5 OPTO-COUPLER AND DRIVER:

An opto-coupler are intended to give finish electrical confinement between an info low voltage side(controller side) and yield high voltage side (SCR/TRIAC side) circuits.

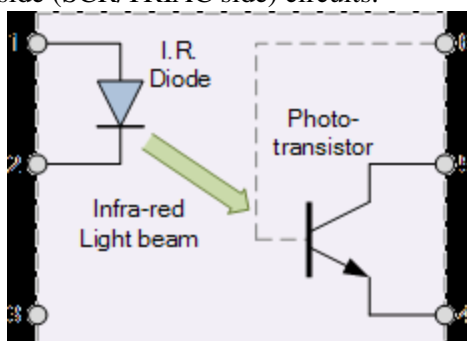


Fig.5.5.1 Opto-coupler

5.6 LCD: LCD (LIQUID CRYSTAL DISPLAY)

Screen is an electronic show module and locates an extensive variety of uses.

5.7 THYRISTOR/TRIAC:

These are Static gadgets used to switch. Static gadget is a sort of gadget which changes over one kind of vitality or vitality level in to another kind of vitality or vitality level individually without physical movement.

6. EXPERIMENTAL SETUP



Fig.6.1 Experimental setup

7. CONCLUSION:

In this new control model based adaptive PI control which can adjust the control gains during the disturbances. Hence it can provide fast and efficient voltage. By static synchronous compensator to control the reactive power to improve the voltage stability of power system.

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Protection of Transformer By Using Novel Differential Scheme

¹Shital S. Daph, ²Piyush N. Panchalwar, ³Pravinkumar Jangle,

¹UG Scholar, ²UG Scholar, ³Assistant Professor

¹Department of Electrical Engineering,

Suryodaya college of engineering and Technology, Nagpur, India

Email - daphshital8@gmail.com, ²piyushpanchalwar12@gmail.com,

Abstract: Protection of Transformers is a very challenging problem in power system relaying. Since it is very important to minimize the frequency and duration of unwanted outages, this is a high demand imposed on power transformer protective relays. Different relaying principles have been suggest and used to protect transformers against different types of faults. Relays that use over current, over flux and overheating principles protect the transformers against overloads and externally applied conditions. Differential relays protect the transformers against internal fault.

Key Words: Transformer, PIC Microcontroller, Relays, Driver, Current Transformer and Potential Transformer, temperature detector.

1. INTRODUCTION:

Power transformers are very expensive and vital components in electric Power systems. They occasionally experience faults resulting from insulation failures caused by atmospheric disturbances and switching surges. These transformer faults can be divided into two main classes .The first class is internal faults due to faults between adjacent turns or parts of coils and faults to ground on terminals or on parts of windings. The second class is overload and externally applied conditions include over current, over voltage, external short circuits and reduced system frequency

This study describes the design and implementation of the microcontroller-based system for protecting power transformer. The system includes facilities, including differential protection, over current protection, over voltage protection and under voltage protection, it provide facilities for discrimination between internal fault current and magnetizing inrush current. In this study software and hardware of microcontroller based system have been explained and designed. Electromechanical relays are able to perform signal processing functions which enable the relay designer to used the basic protection principles and enhance the relay performance, facilitating faster, more secure and dependable protection for power transformers have used inrush protection of power transformers, form second harmonic method.

Microcontroller based relay for power transformer protection has been implemented the major emphasis of this work is the description of hardware and software development of the relay. The percentage differential protections, over current protection and external faults, over and under voltage protection have been carried out. The method of rate of change of the primary current with respect to time (di/dt) in the first quarter of primary current wave method has been adopted to discriminate the internal faults current from inrush, this method depends on the fact that the magnetizing inrush current wave has high di/dt compared with di/dt of internal current wave.

2. LITERATURE REVIEW:

Protection of induction transformer plays an important role in its long life service. Many researchers have The done work in this area but their protection scheme is costly and unfeasible in our Indian condition. Three phase induction transformer can continue to run when one phase of the supply goes out of service due to any fuse blowing or opening of phase by protective device.

The heat produced by the transformer under single phasing condition needs to be taken care of in adequate time. When phase opens at distribution transformer or at feeder end, the stator and rotor losses increases to ten times and the shaft output power decreases to negligible. But if the single phasing occurs at transformer terminals the losses increases twice and the shaft power reduces to nearly 70%. Transformer life shortens as the temperature increases. To protect the transformer all the terminals should be open. On distribution feeders, majority of faults are single phase.

On an average single phase fault occurs 70%, double phase fault 20% and symmetrical fault 10%. Voltage at transformer terminals may be higher than nominal value in a complicated industrial system and can be quite below from nominal value in a heavily loaded industrial system.

IEEE, NEMA and other power communities have different definitions about voltage unbalance. These definitions only give an idea about the voltage unbalance. The complex algebra is avoided in these definitions to make paper calculations easy. Unbalance voltages have Negative impact on the performance of three phase induction transformers. Under voltage in all the three phases adversely effects the efficiency of the transformer as compared to three phase over voltage condition. Positive sequence voltage and negative sequence voltage effects the Transformer's power factor and its efficiency.

3. BLOCK DIAGRAM:

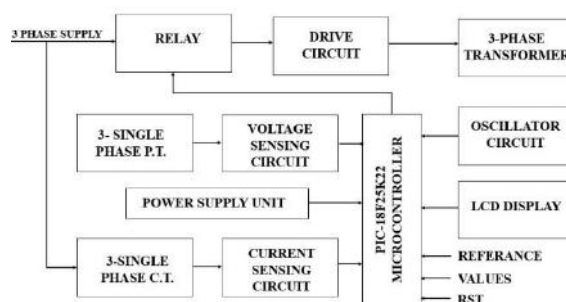


Fig.1 Block Diagram of Differential Protection of Transformer

C.T. – CURRENT TRANSFORMER
 P.T. – POTENTIAL TRANSFORMER

4. CIRCUIT DIAGRAM:

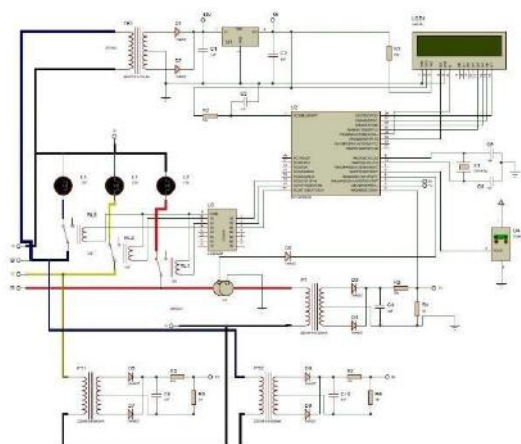


Fig.2 Circuit Diagram of Differential Protection of Transformer

The circuit diagram shown above is the differential protection of transformer. First of all to supply the power to the circuit there is center tapped transformer which step down voltage from 220 V to 12V. Then there is center tapped rectifier which converts AC into pulsating DC to remove the AC contain which presents in rectifier output there are used capacitor filter it gives DC in pure form. Microcontroller required constant 5v supply but rectifier output is not constant 5v it may vary with respect to input therefore to maintain constant 5v supply there are used voltage regulated IC 7805 and it is also supply constant 5v supply to LCD display. Crystal oscillator is connected to microcontroller. The crystal oscillator to generate the clock pulse 16 MHz.

The driver IC ULN 2003A connects directly to the microcontroller to operate the relay. As Relay is operate on 12V DC supply so there is a driver IC which amplifies the 5v voltage in to 12v. There is a LN35 temperature sensor which gives 10mV for every 1°C, this temperature sensor is connect to microcontroller at AN₀ pin. As the temperature increase above the limit the temperature sensor gives signals to the microcontroller then microcontroller gives command to relay to trip the circuit.

Current transformer in the circuit which is connected in series with each phase is used to measure current of each phase. There are three potential transformers and voltage divider circuits which are used to scale down the voltage from 0-300V to 0-3V and are also used to measure the voltage of each phase. LCD 16x2 alphanumeric Display is used to display different faults and all the parameters of the system.

5. EXPERIMENTAL SETUP:

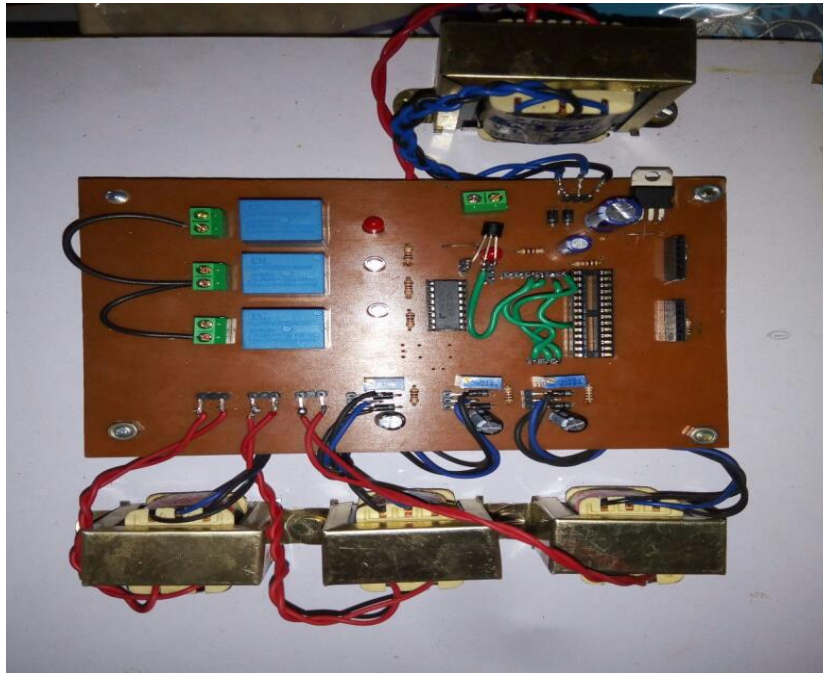


Fig.3 Block Diagram of Differential Protection of Transformer

Hardware presented in the experimental setup is to protect the transformer from any internal faults and provide protection to it. The base of setup was made up of microcontroller, C.T., P. T. Relays, etc provide protections against the over voltage, over current, under voltage, under current, over temperature, etc.

6. CONCLUSION:

This protection system is an improved method because it is a very low cost device as compared to other protective devices. The system is tested in the laboratory for many times on Three phase induction transformer under faulty condition and it gives desirable results. The system is reliable and rugged. It is designed in a manner that by changing CT and relay within the same circuit, it can be used for higher rating transformers. The MOSFET is preferred instead of IGBT because the current rating to control the relay is very small. This is a prototype for the protection of transformer for under voltage, over voltage, unbalance voltage, over current and single phasing

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Power Optimization to Reduce Energy Consumption

¹Suraj Raut, ²Mukund Daoo, ³Prashik Bhave, ⁴Rahul Dekate

^{1,2,3}UG scholars, ⁴Assistant Professor

^{1,2,3,4} Department of Electrical Engg

Suryodaya college of Engineering and Technology, Nagpur, India

Email:- ¹rautsuraj85@gmail.com , ²mukunddaoo1@gmail.com , ³prashik199271@gmail.com

Abstract: *The main purpose of this paper is to describe the process of reducing power consumption of the load. With the help of microcontroller, construct a control system which decides the minimum voltage across the load at which the load can operate normally without consuming excessive power. Prototype project model gradually decreases voltage to a level at which current through the load deflects and the point at which current tends to deflect, voltage at that point will be the minimum voltage that can be a given to the load. This minimum voltage will be the best optimized voltage. Further this reduced voltage in turns reduces the power flow through the load. Thus the power consumption which is main aim of this project is achieved. Hence the process of reducing the voltage across load terminals to reduce total power consumption and energy billing is described shortly in this paper.*

Keyword: *Microcontroller, Transformer, Sine Wave Cycle Monitor (Zero Crossing Detector), Driver, Relay.*

1. INTRODUCTION:-

The development of any country depends to a large extent on availability and usage of electricity. Conservation of electricity has now become a vital element of economic growth giving benefit to state and this conservation is more essential due to the concern for fast depletion of non-renewable sources of energy in the country. The main aim of this paper is to construct a control system that can manage (turn on/off and control speed) various common home appliances like Heater, Fan, Air Conditioner etc of domestic load at instantaneous time. The potential transformer is used to measure voltage and a current transducer is used to measure a current flow through load, further it communicates with microcontroller using one analog to digital converter. Microcontroller takes the V and I data from ADC. Based on this data it decides which device is to be operated and at what power it is to be operated. The outputs of the microcontroller are fed through the power electronics devices. It is a very versatile model and has applications in various fields. Its aim is to not only provide comfort to its user but also to conserve energy. It is an environmental friendly model which helps in saving more power. This model is an intelligent system which can control devices (namely heater, fan, A.C.) based on current and voltage variation.

2. LITERATURE REVIEW:-

2.1 In this paper, an electric power consumption analysis model and guidelines for power consumption reduction based on user activities for a home energy management service system are described. The activities are extracted from the time, identity, location, and power consumption of electric appliances with distributed power-strip-type smart sockets. The extracted activities are used for analysis of the power consumption habits of residents in order to promote alteration of their behaviour to reduce power consumption. The results from an evaluation experiment for the model and guidelines show better performance than results from previous studies by using simple feedback information to achieve a reduction in power consumption.

2.2 Improved feedback on electricity consumption may provide a tool for customers to better control their consumption and ultimately save energy. A psychological model is presented that illustrates how and why feedback works. Relevant features of feedback are identified that may determine its effectiveness: frequency, duration, content, breakdown, medium and way of presentation, comparisons, and combination with other instruments. The paper continues with an analysis of international experience in order to find empirical evidence for which kinds of feedback work best.

2.3 In this paper, a detail analysis of the motivation for this research, survey the previous work, describe a few on-going efforts, and discuss the challenges that lie ahead.

2.4 Voltage control in power distribution networks has been greatly challenged by the increasing penetration of volatile and intermittent devices. This devices can also provide limited reactive power resources that can be use to regulate the network-wide voltage. A decentralized voltage control strategy can be designed by minimizing a quadratic voltage mismatch error objective using gradient projection updates. This paper aims to analyze the performance of this decentralized gradient projection based voltage control design.

2.5 It has been investigate the problem of power optimization through gate sizing and voltage scaling. Several algorithms have been proposed in the literature to handle gate sizing and voltage scaling. In this paper, the problems as economic models that attempt to distribute the delay among gates of the circuit are formulated such that the power of the circuit is optimized.

3. BLOCK DIAGRAM:-

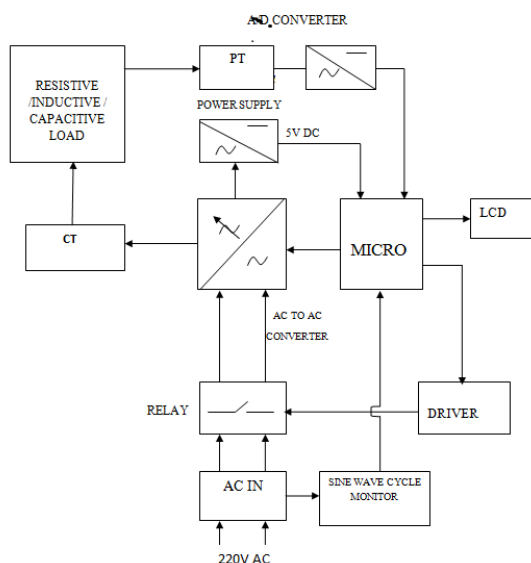


Fig.1 Block diagram of proposed system

The main aim of this project is to control and keep balance of the voltage across load. Initially controller checks the incoming voltage coming from line with the help of ADC (analog to digital converter) present inside the Microcontroller. Our aim is to control a positive as well as negative. Half cycle of incoming AC for that a firing angle controls method is used. For controlling a firing angle of any AC voltage it is necessary to monitor every positive/negative half cycles, hence a Sine wave Cycle Monitor (Zero Crossing Detector) block is used in our project, which informs a controller about start point of every cycle.

Once controller knows the voltage across the load and signals from sine wave cycle monitor, controller calculate the firing angle and gives firing pulse to the AC to AC converter in which a static switch formed by a TRIAC is used. Static switch can operated on high voltage and high frequency as compared to the mechanical switches like relay. The output of AC to AC converter is further give to Reactor which is nothing but a type of single core step-up transformer.(220V to 300V transformer), which gives a 220V output at140VAC input. The output of 220V is further used by various loads. The voltage across load is measured by the controller with the help of potential transformer. Potential transformer is used to step down the voltage across the load to be measured and rectified to DC, because microcontroller can read a voltage up to 5V DC only. In this we are using a Relay for tripping the input voltage in case of very high voltage and low voltage which is beyond controllable limits.

3. CIRCUIT DIAGRAM:-

This 5V DC is given to Micro-Controller, LCD, This 5V DC is given to Micro-Controller, LCD, Opto-coupler, Driver & Zero Crossing Detector. The IC 7805 is loaded and output of IC is reduced to 4V then Micro-Controller will reset or restart. So that in such condition the current will not work properly.

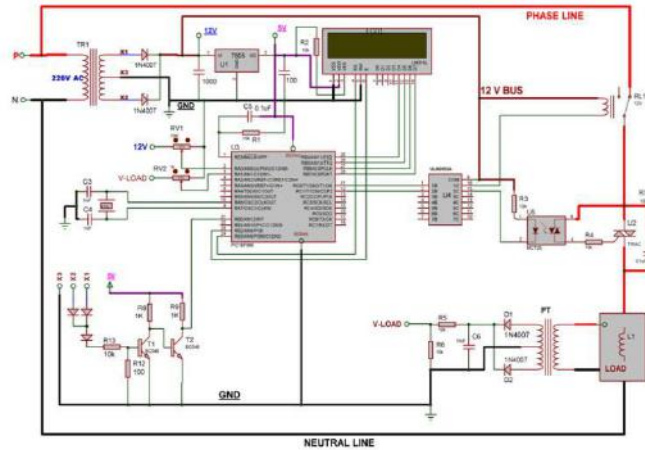


Fig. 2 Circuit diagram of proposed system

When capacitor is connected, it stores the charge, available across it. When output of regulator IC is less than 5V then capacitor provides then saved charge. This capacitor gives fractional output, i.e. for 200 to 300 microseconds. The capacitor is an electrolytic type and having polarity.

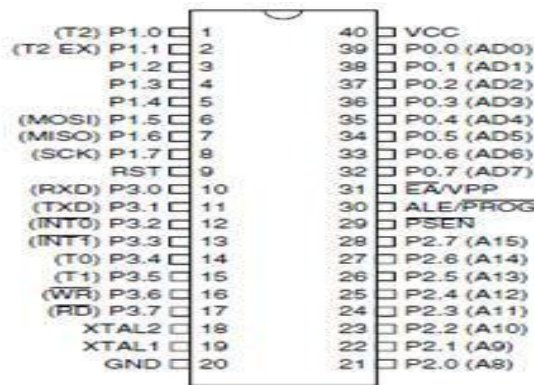


Fig.3 Pin diagram of microcontroller 89S52

Two suppressor capacitors (C₃& C₄) are connected to crystal oscillator which maintain 50% duty cycle of crystal oscillator. It means Ton time is equal to T off i.e. exactly 50% symmetrical output of frequency. The crystal oscillator is used to provide clock frequency to the microcontroller.

The microcontroller controls every positive and negative cycle of sine wave, hence zero crossing detector is used in our project. The zero crossing detectors consist of two NPN transistors and three diodes. The snubber circuit is used to suppress the rapid rise in voltage across the TRIAC.

4. EXPERIMENTAL SETUP:-



Hardware presented in the experimental setup is hard framed to protect it from any mechanical damage and provide robustness. The base of setup was made-up of hard wood to provide mechanical strength and upper layer with black sheet is used.

5. CONCLUSION:-

Thus the best optimized voltage is obtained here by minimizing voltage across the load terminals. At this voltage, the load is running properly without getting any disturbances in its working intensity. Current deflection is found when decreasing voltage but this deflection in current is negligible in value for some voltage levels. As the voltage gradually decreased further, high current deflection occurred. At the moment where current deflected with a large value, working intensity of load also affected. This moment was the last point for minimizing voltage across load terminals. Thus the minimum voltage (best optimized voltage) is found that can be applied to the load to reduce energy consumption.

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Energy Consumption By Voltage Control

¹Rohan A. Nagare, ²Chetan P. Matte, ³Nirish N. Deshmukh ⁴ Rahul Dekate.
¹ UG scholars, ² UG scholars, ³ UG scholars, ³ UG scholars, ⁴ Assistant Professor.
^{1,2,3} Department of Electrical Engg.

Suryodaya College of Engineering and Technology, Near Dighori Naka, Vihirgaon, Nagpur, MH, India
Email - ¹Rn80017@gmail.com, ²Chetanmatte123@gmail.com, ³Nirishdeshmukh0106@gmail.com.

Abstract: Existing power system across the country has many of losses, drops and excessive power consumption. Due to this considerable power get lost which cannot be neglected. But some researches are going on to reduce losses in the system. Power saving is also a main concern to reduce load on generation system. So in this paper power saving technique by reducing consumption is described. Mainly, power depends on voltage, current and power factor. For specific voltage band, the current through load remains constant. While power factor also maintain constant between 0.9 to 0.95 thus the only factor through which power consumption can be control that is "voltage". So the process of decreasing voltage at the load terminals in order to reduce energy consumption is discussed in this paper.

Key Words: Microcontroller, Power Transformer, Sin Wave Cycle Monitor (ZCD- Zero Crossing Detector), Driver, Relay.

1. INTRODUCTION:-

The development of any country depends to a large extent on availability and usage of electricity. Conservation of electricity has now become a vital element of economic growth giving benefit to state and this conservation is more essential due to the concern for fast depletion of non-renewable sources of energy in the country. The main aim of this paper is to construct a control system that can manage (turn on/off and control speed) various common home appliances like Heater, Fan, Air Conditioner etc. of domestic load at instantaneous time. The potential transformer is used to measure voltage and a current transducer is used to measure a current flow through load, further it communicates with microcontroller using one analog to digital converter. Microcontroller takes the V and I data from ADC. Based on this data it decides which device is to be operated and at what power it is to be operated. The outputs of the microcontroller are fed through the power electronics devices. It is a very versatile model and has applications in various fields. Its aim is to not only provide comfort to its user but also to conserve energy. It is an environmental friendly model which helps in saving more power. This model is an intelligent system which can control devices (namely heater, fan, A.C.) based on current and voltage variation.

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2.2 Improved feedback on electricity consumption may provide a tool for customers to better control their consumption and ultimately save energy. A psychological model is presented that illustrates how and why feedback works. Relevant features of feedback are identified that may determine its effectiveness: frequency, duration, content, breakdown,

medium and way of presentation, comparisons, and combination with other instruments. The paper continues with an analysis of international experience in order to find empirical evidence for which kinds of feedback work best. In spite of considerable data restraints and research gaps, there is some indication that the most successful feedback

2.3 In this paper, a detail analysis of the motivation for this research, survey the previous work, describe a few on-going efforts, and discuss the challenges that lie ahead.

2.4 Voltage control in power distribution networks has been greatly challenged by the increasing penetration of volatile and intermittent devices. This devices can also provide limited reactive power resources that can be used to regulate the network-wide voltage. A decentralized voltage control strategy can be designed by minimizing a quadratic voltage mismatch error objective using gradient projection updates. This paper aims to analyze the performance of this decentralized gradient projection based voltage control design.

2.5 It has been investigate the problem of power optimization through gate sizing and voltage scaling. Several algorithms have been proposed in the literature to handle gate sizing and voltage scaling. In this paper, the problems as economic models that attempt to distribute the delay among gates of the circuit are formulated such that the power of the circuit is optimized.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM:-

The main aim of this project is to control and keep balance of the voltage across load. Initially controller checks the incoming voltage coming from line with the help of ADC (analog to digital converter) present inside the Microcontroller. Our aim is to control a positive as well as negative. Half cycle of incoming AC for that a firing angle controls method is used. For controlling a firing angle of any AC voltage it is necessary to monitor every positive/negative half cycles, hence a Sine wave Cycle Monitor (Zero Crossing Detector) block is used in our project, which informs a controller about start point of every cycle. Once controller knows the voltage across the load and signals from sine wave cycle monitor, controller calculate the firing angle and gives firing pulse to the AC to AC converter in which a static switch formed by a TRIAC is used. Static switch can operated on high voltage and high frequency as compared to the mechanical switches like relay. The output of AC to AC converter is further give to Reactor which is nothing but a type of single core step-up transformer.(220V to 300V transformer), which gives a 220V output at140VAC input. The output of 220V is further used by various loads. The voltage across load is measured by the controller with the help of potential transformer .Potential transformer is used to step down the voltage across the load to be measured and rectified to DC, because microcontroller can read a voltage up to 5V DC only. In this we are using a Relay for tripping the input voltage in case of very high voltage and low voltage which is beyond controllable limits.

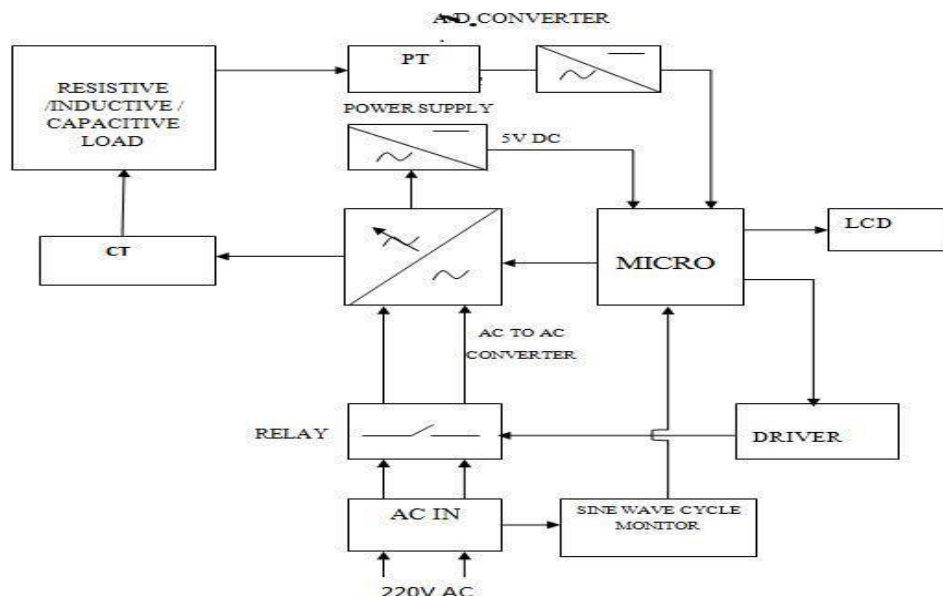


Fig.1 Block Diagram of Proposed System

4. CIRCUIT DIAGRAM OF PROPOSED SYSTEM:-

The 220V input supply is given to TRIAC through relay which is operated on 12V given to 5V DC. The load is connected to the Triac output terminal. The triac output is measured through P. T. The Micro-Controller requires 5V DC, hence input 230V AC is step down to 12V ac & 12V ac converted to DC with the help of full wave rectifier. Capacitor is used to get pure DC output. The Micro-Controller requires constant 5V DC. Hence this unregulated supply given to regulator IC 7805 which gives constant 5VDC to Micro-Controller. If input Voltage of IC is varied then output of IC 7805 is constant. This 5VDC is given to Micro-Controller, LCD, This 5VDC is given to Micro-Controller, LCD, Opto-coupler, Driver & Zero Crossing Detector. The IC 7805 is loaded and output of IC is reduced to 4V then Micro-Controller will reset or restart. So that in such condition the current will not work properly. When capacitor is connected, it stores the charge, available across it. When output of regulator IC is less than 5V then capacitor provides then saved charge. This capacitor gives fractional output, i.e. for 200 to 300 micro-seconds. The capacitor is an electrolytic type and having polarity.

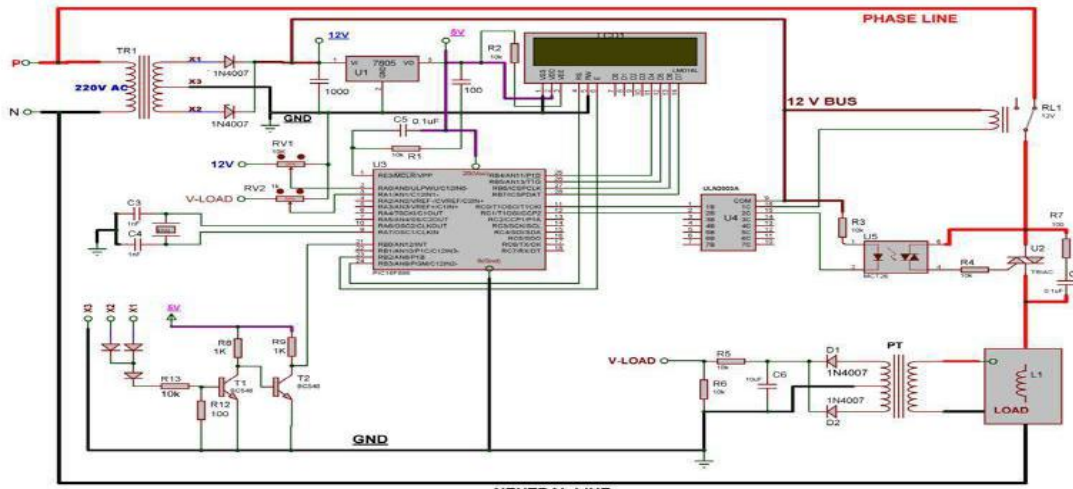


Fig. 2 Encoder Circuit Diagram

Two suppressor capacitors (C₃ & C₄) are connected to crystal oscillator which maintain 50% duty cycle of crystal oscillator. It means Ton time is equal to Toff, i.e. exactly 50% symmetrical output of frequency. The crystal oscillator is used to provide clock frequency to the microcontroller. The microcontroller controls every positive and negative cycle of sine wave, hence zero crossing detector is used in our project. The zero crossing detectors consist of two NPN transistors and three diodes. The snubber circuit is used to suppress the rapid rise in voltage across the TRIAC.

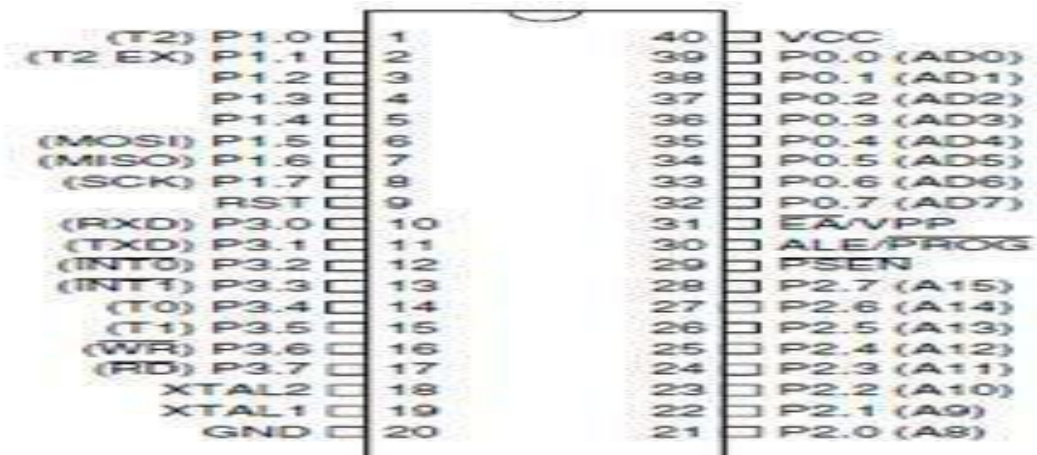


Figure3. Pin Diagram of Microcontroller 89S52

5. CONCLUSION:-

Thus the best optimized voltage is obtained here by minimizing voltage across the load terminals. At this voltage, the load is running properly without getting any disturbances in its working intensity. Current deflection is found when decreasing voltage but this deflection in current is in negligible value for some voltage levels. As the voltage gradually

decreased further, high current deflection occurred. At the moment where current deflected with a large value, working intensity of load also affected. This moment was the last point for minimizing voltage across load terminals. Thus the minimum voltage (best optimized voltage) is found that can be applied to the load to reduce energy consumption

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Renewable Power Generation System By using push-pull inverter

Dhiraj P. Mankar¹, Mayur S. Udapure², Rashtrapal N. Katkar³, Pravinkumar Jangle⁴

^{1,2,3}UG Scholar ,Assistant Professor⁴

Department of Electrical Engineering,
Suryodaya College of Engineering and Technology,
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

¹dhirajmankar13@gmail.com, ²mayur.udapure12@gmail.com, ³rashtrapalkatkar99@gmail.com,

⁴pravinkumarjangle@gmail.com

Abstract: This project implements an active power filter implemented with a push pull inverter using a predictive control scheme. The use of a push pull inverter allows the compensation of current ripple components. A detailed yet simple active power filter, including the buck boost conversion technique is used simple PWM. The performance of the proposed active power filter and the associated control scheme under steady state and transient operating conditions is demonstrated through simulations and experimental results.

Key Words: PIC microcontroller 18F886, Solar Panel 12V 10W, Battery 12V DC, Push-Pull inverter , relay, MOSFET

1. INTRODUCTION:

The utilization of solar energy is less at present, it is going to double in upcoming days, even though today's this type of energy is not widely used as other available resources like thermal, wind or hydroelectric. Solar power has many advantages over other non-renewable energy sources. It has even advantages over renewable energy sources like wind and water.

Photovoltaic system has recently attracted a special interest as a infinite and clean energy system. As a high rate efficiency and a low price of photovoltaic modules are realized, the studies of photovoltaic system are more increasing also increasing global energy consumption and noticeable environmental pollution are making renewable energy more important.

Today, a small percentage of total global energy comes from renewable sources mainly hydro and solar power. Energy conservation and the used of renewable source are the key paradigm. The need to integrate the renewable energy like wind energy/PV into power system it to make it possible to minimize the environmental impact on conventional plant.

2. LITERATURE REVIEW:

A method to improve the output voltage of DC-DC converters against source and load fluctuations is proposed in this paper. The proposed method is based on a new concept of virtual L and C filters that are connected on the output of DC-DC converters. Virtual L and C filters are used to minimize the effect of source voltage and load current fluctuations, respectively, on the output voltage of converter. Virtual L and C filters are additional control algorithms that emulate the effects of L and C filters on the output voltage of converters. The virtual L and C filters are designed to respond only against disturbances. Simulated results are included to verify the proposed method.

This paper shows the performance of Infineon's new SiC MOSFET power module operating in a buck-boost conversion system. The fast switching characteristics of the module will be illustrated with the help of single pulse measurements which show dv/dt levels above 50kV. A conversion efficiency of 99% has been measured at a switching frequency of 50 kHz.

In this paper it is presented a study on rectifiers used in radio frequency (RF) energy harvesting systems with transistors operating in weak inversion region, where the losses due to reverse current become comparable to the direct (or charge) current. The study compares three rectifier topologies and makes use of all transistors terminals to improve performance, increasing the direct current and reducing the reverse current. The results show that connecting an anti-phase signal to the transistor's gate and bulk terminals improves the rectifier's delivered power.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM

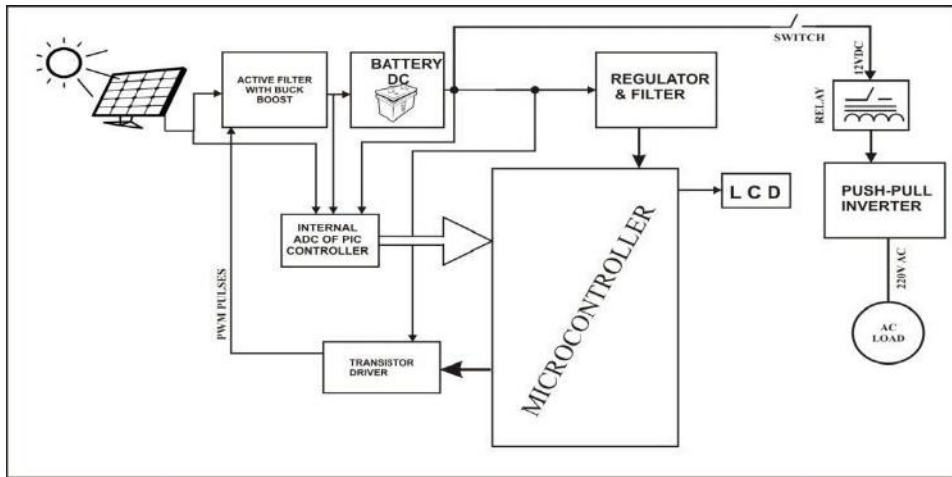


Fig. 1 Block Diagram

Fig. shows block diagram of an active power filter performance for renewable power generation system . In this project we are generate the power (electrical energy) from renewable energy source. The renewable energy source which we are used to generate power is solar energy. When the sun rays incidence on solar plate collecting that sun rays. After collecting this rays plate get heated and solar energy is converted into electrical energy. This solar panel is manufacturing by nano technology. The DC voltage is generated from solar plate, this DC voltage is not pure DC i.e. pulsating DC. This pulsating DC have some ripple to remove this ripple we are using an active power filter and synchronized the power .The DC voltage is transferred to battery and stored the energy. We used lead acid polymer battery and capacity is 12V. We are also using PIC microcontroller to sense the voltage across panel, battery and buck-boost converter. If the voltage across the panel is sufficient i.e. 12V then this voltage directly flows towards the battery and the battery get charged . If the voltage across panel is not sufficient to charged the battery microcontroller sense the voltage across the battery and give command to boost converter and boost converter gets on and increased the voltage as per the requirement battery i.e. 12V with the help of PWM technique. The over all data is transferred to PIC microcontroller this analog data is convert to digital by using A/D converter.

Active power filter is used to reduce the ripple contain form source and generate pure DC source after that the boost converter is work act as a boosting input voltage and supplying to Battery (12V) for charged and store the energy by using standby condition this boost output voltage is shows on microcontroller and ultimately it microcontroller is cheek out the supply and fed to buck boost converter. The regulator IC 7805 is used for regulate the supply and fed to microcontroller (it used + - 5V) input supply giving from battery (12V) for regulator IC 7805 and it convert 5V. Zener diode act as a voltage regulator, it is a negative breakdown region i.e., zener break down .

At another part the microcontroller is feeding the supply to SPDT relay, relay is operated is for operating cobalt SPDT switch, it is 5 pin min SPDT relay operated 12V /10 Amp 250Vmax switching voltage 110V DC/250V AC this is switching operation. In over current condition relay get trip for avoiding the inverter PCB damage. The inverter is used for DC / AC conversion, it contain push pull inverter is used i.e. 12V DC/240V A using up 23W load connect on inverter output and for measuring and controlling supply voltage by using feedback control circuit fed to microcontroller.

4. CIRCUIT DIAGRAM OF PROPOSED SYSTEM

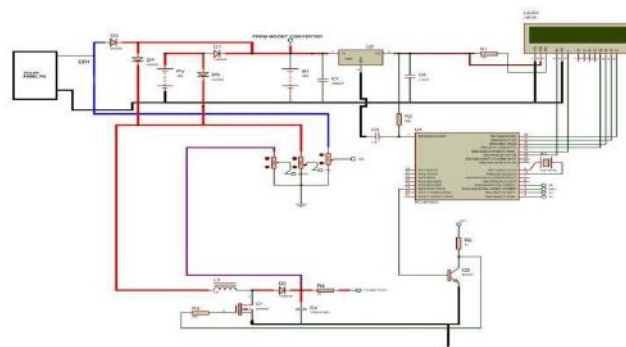


Fig.2 Circuit Diagram

In this circuit diagram solar panel (12V,10W) is used to obtain solar rendition, the solar energy is stored in battery (12V). The solar panel gives pulsating DC this pulsating dc convert into pure dc by using active power filter. The APF is LCL filter this is also known as π filter. This pure dc store in 12V battery. When above or below of 12V a battery is not stored voltage properly. To maintain the voltage according to 12V so used the buck boost converter technique. The buck boost converter technique made by inductor diode and MOSFET. The all parameter monitoring and controlling by 16F886 microcontroller like solar panel voltage, battery voltage and buck boost converter technique. The microcontroller operate in 5V. Data can be store or erase until we dose not given the clockwise pulses.

In microcontroller data can be store or erase by using clockwise pulses. Some pulses generated with the help of crystal oscillation. Oscillator circuit generated continuously clock pulses. Data stored and erase depends upon microcontroller. If sufficient of solar panel battery will be directly charge. Suppose solar panel due to the insufficient voltage battery does not charge. So we use buck boost converter technique. When battery voltage above the 12V then use the buck converter technique. Because battery became destroy. When battery voltage below the 12V then use the boost converter technique.

When MOSFET is on condition the voltage goes to ground and MOSFET is off condition the inductance create the potential difference and the inductor generated own charge. Due to creation every charge in inductance the voltage increase because of generated energy charge in inductance. We can switch off the MOSFET generated voltage is directly passes through the diode and store in the capacitor. Battery charge through the resistance. Suppose MOSFET is continuous switch on mode then value of voltage is zero. If the MOSFET on or off mode voltage continuously increase at the high frequency. Microcontroller due to constant 5V that 5V goes to transistor and transistor will be turn on. Collector circuit 12V goes to the ground. Suppose microcontroller give 0V transistor is turn off condition then collector voltage goes to the MOSFET.

Active Power Filter :

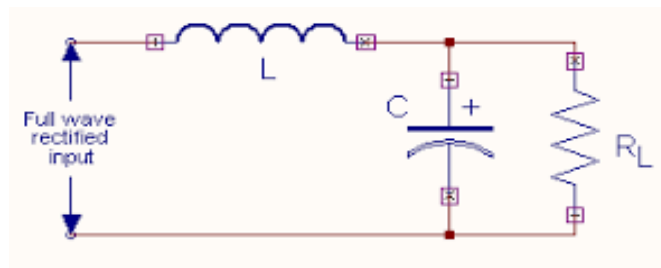


Fig.3 Circuit Diagram

The dc source is connected with a PV panel or a battery, the ripple power will reduce the efficiency of the PV generation or cause over-heating of the battery. A fluctuating dc bus voltage also acts on the ac side through the beat phenomenon. The frequencies of which are the sum and difference of the dc-link ripple frequency and the output frequency. Usually a large dc capacitor bank and/or an LC resonant circuit are installed in a dc link to absorb the ripple power. If only capacitors are used, they have to be aluminum electrolytic capacitors since the capacitance has to be very large. The short lifetime of aluminum electrolytic capacitors then becomes a bottleneck in terms of the reliability of a whole system. Adding an LC resonant branch can lower the requirements for the main capacitor by providing a short circuit for the ripple power. However, since the resonance frequency is low, the size and weight of the LC branch is considerable. Furthermore, an LC resonant circuit is sensitive to parameter drift and frequency deviation, thus necessitating a conservative design for the main capacitor. To overcome the shortcomings of passive filters, various active power filter (APF) schemes have been proposed. The basic idea is to divert the ripple power into another capacitor or an inductor, which can be much smaller since it permits heavy fluctuating of the voltage and/or current.

5. CONCLUSION

A method to improve the output voltage of buck - boost converters by using inductance and capacitance (power filter) concept. The Sic MOSFET power module operating in a buck – boost converter. The device demonstrates fast switching behavior of the module in the application without parasitic turn on. The unit has achieved an efficiency of up to 99% at a switching frequency of 100 kHz. The device and module design is targeting towards applications using switching frequencies up to 200 kHz. The inverter using DC input, control circuit, power circuit and step – up transformer. From the simulation result obtained, the output waveform of this inverter circuit is sinusoidal waveform. This inverter successfully converts the 12V DC into 220V AC and load connected up to 23W

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

**An Improved Active Power Filter Performance for Renewable Power
Generation System**

Karishma G. Madavi¹, Shital S. Bhimte², Abhilash R. Gaykee³, Pravinkumar Jangle⁴

^{1,2,3}UG Scholar, ⁴Assistant professor

¹Department of Electrical Engineering,

Suryodaya college of Engineering and Technology, Nagpur, India

Email - ¹kmadavi002@gmail.com, ²shitalbhimte@gmail.com, ³abhish0810@gmail.com

Abstract: This paper presents current control scheme base single phase inverter that improve power quality, the inverter improve power factor and reduce current harmonics. The compensation performance of the proposed active power filter and the associated control scheme under steady state and transient condition is demonstrated through simulations and experimental result. Unbalance current generated single phase non-linear load.

Keywords: Micro-controller (PIC), solar power plate, active power filter.

1. INTRODUCTION:

Energy is the primary requirement of human's capacity to do work. In the electric power industry, energy is more narrowly defined as electricity supplied overtime, expressed in KWH energy may be in the form of thermal, biomass, ocean, tidal, wave energy or electrical and mechanical energy is divided into two part. Non renewable energy source and renewable energy sources. Nonrenewable energy source: Sources of energy which may exhaust in the near future are called as Non-renewable energy sources. Ex. Coal, oil, gas, fuel.

- It is limited source.
- Generate in long time.
- Easily available.

Renewable energy source: Renewable energy are found in. the form of nature source. Ex. Solar, wind, biomass, thermal, tidal, wave energy. It is unlimited source of energy. It is easily available in the world. A photovoltaic system converts sunlight into electrical energy. The basic device of a photovoltaic system is the PV cell. Panels can be grouped to form large photovoltaic array. Several cell connected in series and parallel or a grouped of panel. The PV not a good choice for grid connection system mode has been chosen for this work to operate inverter as a current source because this minimize the effect of voltage harmonics on the output current and improve the power factor quality. The .the great number of domestic electronic base application have deteriorated. The quality of the power mains system. The non linear load generate current harmonics conventional solution like active filter for reducing the current harmonic. This strategies have been use mostly by considering fix harmonic compensation for balance or unbalance load. The proposed scheme are simplicity, modeling and implementation.

2. LITERATURE REVIEW:

Mr. PabloAcuna state that power generation distribution system with renewable power generation source consists of various type of the power generation unit and different types of load. Renewable source like solar energy issue to generate electricity for residential users and small industries. maximum energy possible from sun. Electrical energy consumption is random and unpredictable. Due to this it may be single. The voltage at which photovoltaic module can produces maximum power is called maximum power point. The efficiency photovoltaic cell is inverse by the mean of wiper to avoid dust & moisture stagnation over panel surface. It can be use in small industries and residential areas.

1. Flash program memory (32 Kbytes for PIC18F2520/4520 devices).
2. A/D channels (10 for 28-pin devices, 13 for 40/44-pin devices).
3. I/O ports (3 bidirectional ports on 28-pin devices, 5 bidirectional ports on 40/44-pin devices).

4. CCP and Enhanced CCP implementation (28-pin devices have 2 standard CCP modules; 40/44-pin devices have one standard CCP module and one ECCP module).
 5. Parallel Slave Port (present only on 40/44-pin devices).
- This scheme presents a fast and accurate signal tracking capability.
 This characteristic avoids voltage fluctuations performance.

Control of voltage within inverter using PWM technique:

One of the most promoting means of controlling the inverter output voltage is to incorporate time ration control within the inverter using a suitable scheme. This inverter is known as pulse with modulated invertors (PWM).

Advantages of PWM:

- It is possible to control the output voltage without significantly adding to the total number of power circuit component of the inverter .The output voltage can be changed by changing the width of the pulses.
- It is also possible to substantially reduce lower order harmonic frequencies.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM:

The block diagram of this system represents the solar energy generation system for residential load.

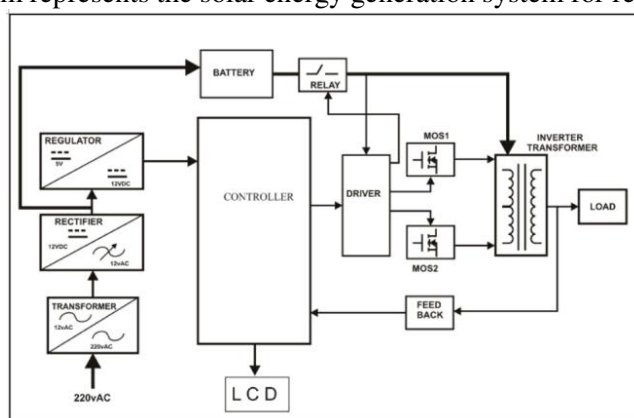


Fig1. Block Diagram of Proposed System

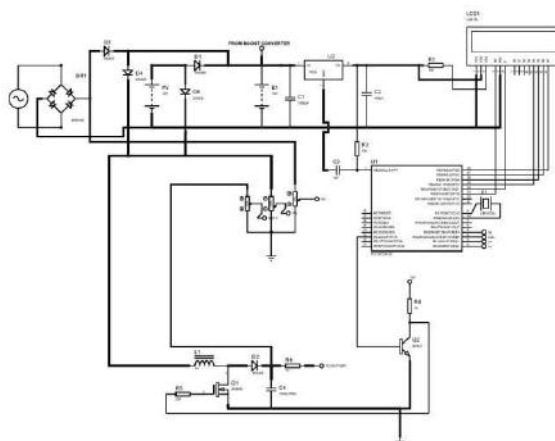


Fig 2. Circuit diagram of proposed system:

The renewable energy source like solar power plant give to variable DC supply converter gives variable DC output. Bridge diode is an electronic device. It an arrangement of four diode in a bridge circuit configuration that provide same polarity of output. When used in its most common application for conversion of an alternating current is an electric current which periodically reverse direction. When solar supply is high battery will be charge. If solar supply voltage low battery does not charge and direct goes to the buck boost converter. Two different topologies are called buck boost converter. Both of them can create a output voltage greater than the input voltage, down to almost zero. Buck boost converter increase the voltage and direct battery charge through the micro-controller. The micro-controller requires constant 5VDC.Hence unregulated supply given to regulator IC 7805 which give constant 5VDC to micro-controller. If input voltage of IC is varied then output of IC 7805 is constant. This 5VDC is given to micro-controller, LCD, Opto-coupler, driver and zero crossing detector.

4. EXPERIMENTAL SETUP



Fig. 3 Experimental Setup

5. CONCLUSION:

This characteristic avoid harmonic fluctuation performance. This scheme are represent to it's simplicity, modeling and implementation, improving transient response .Improved dynamic current harmonics and reactive power compensation scheme for power distribution system with generation from renewable sources has been proposed to improve the current quality of the distribution system. Simulated and experimental result has prove that the proposed predictive control algorithm is good alternative to classical linear control methods.

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DC to DC Converter Using Four Quadrant Operations for DC Motor

¹Sneha A. Shende, ²Megha R. Bante, ³Amol N. Bhagat, ⁴Shital Yende

¹UG Scholar, ²UG Scholar, ³UG Scholar, ⁴Assistent Professor

¹Department of Electrical Engineering,

Suryodaya college of Engineering and Technology, Nagpur, India

Email - ¹snehashende007@gmail.com, ²meghabante95@gmail.com, ³amolbhagat54@gmail.com

Abstract: In this paper a four quadrant speed control framework for DC engine has been composed, built and tried. The primary favourable position in utilizing a DC engine is that the Speed-Torque relationship can be changed to any valuable shape. To accomplish the speed control, an electronic system called Pulse Width Modulation is utilized which produces high and low pulses. These pulses change the speed in the engine. For the age of these heartbeats a microcontroller is utilized. As a microcontroller is utilized setting the speed goes according to the necessity is simple which is finished by changing the obligation cycles era in the program. Diverse speed grades and the heading are relied upon various catches. Analysis have demonstrated that this framework is of higher execution.

Key Words: PWM, Microcontroller.

1. INTRODUCTION:-

Four quadrant speed control framework for a DC engine is outlined in this paper. The engine is worked in four quadrants i.e. clockwise; counter clock-wise, forward brake and turn around brake. It likewise has a component of speed control. The four quadrant task of the dc engine is most appropriate for enterprises where engines are utilized and according to prerequisite as they can pivot in clockwise, counter-clockwise and furthermore apply brakes instantly in both the headings. If there should be an occurrence of a particular activity in mechanical condition, the engine should be halted instantly. In such situation, this proposed framework is extremely proper as forward brake and invert brake are its essential highlights. Immediate brake in both the headings occurs because of applying a turn around voltage over the running engine for a concise period and the speed control of the engine can be accomplished with the PWM pulses produced by the microcontroller.

The microcontroller is utilized from 8051 family. Push catches are accommodated the task of the engine which are interfaced to the microcontroller that gives an information flag to it and thusly controls the speed of the motor through an engine driver IC. Speed control include by push catch task is likewise accessible. This paper can be improved by utilizing higher power electronic gadgets to work high limit DC engines. Regenerative braking for enhancing the power utilization can likewise be joined. [1]

2. METHODOLOGY:-

Conventional strategy for speed control was that the protection is hung in the rotor circuit or alter the voltage of electrical hardware circuit. This two techniques are simple, however they exist a few inadequacies. The engine speed is difficult to get a low when the heap is light. The bigger the protection, the more noteworthy is misfortunes. Subsequently, another sort of speed control strategy is utilized known as PWM (Pulse Width Modulation) innovation. By utilizing the PWM innovation, it is anything but difficult to build the effectiveness of framework and also prerequisite of energy to the framework. This paper uses the planning of the microcontroller clock work, yields simple PWM flag to change the obligation cycle as indicated by the quantity of various heartbeats.

In an independently energized DC engine, the unflinching state speed is controlled at any coveted speed by applying the proper extent of voltage, additionally in either bearing just by giving suitable extremity of the voltage. The torque of the engine is straightforwardly relative to the armature current, which thusly relies upon the distinction between the connected voltage V and back emf, E, i.e., $I = (V - E)/R$

In this manner, it is conceivable to create positive or negative torque by controlling voltage, which is not exactly or more than the back emf. Subsequently the independently energized DC engine innately display four quadrant activity.

Pulse Width Modulation:

Pulse width modulation (PWM) is a normally utilized procedure for controlling force to an electrical gadget, made functional by present day electronic power switches. The normal estimation of voltage (and current) encouraged to the heap is controlled by turning the switch amongst supply and load on what's more, off at a quick pace. The more extended the switch is on contrasted with the off periods, the higher the power provided to the heap is. The term obligation cycle depicts the extent of on time to the consistent interim or timeframe; a low obligation cycle relates to low power, on the grounds that the power is off for more often than not. Obligation cycle is communicated in percent, 100% being completely on.

The primary preferred standpoint of PWM is that control misfortune in the exchanging gadgets is low. At the point when a turn is off there is basically no current, and when it is on, there is no voltage drop over the switch. Power misfortune, being the result of voltage and current, is subsequently in the two cases near zero. PWM works too well with computerized controls, which, due to their on/off nature, can without much of a stretch set the required obligation cycle.

PWM has likewise been utilized as a part of certain correspondence frameworks where its obligation cycle has been utilized to pass on data over interchanges channel. The obligation cycle decides the speed of the engine. The coveted speed can be gotten by changing the obligation cycle. The PWM in microcontroller is utilized to control the obligation cycle of DC engine.

3. BLOCK DIAGRAM:

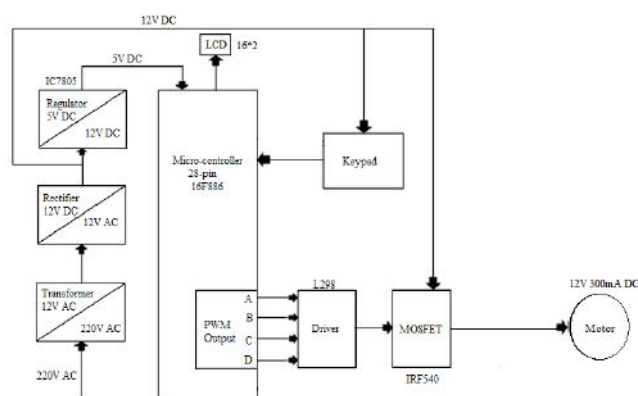


Fig.1 Block Diagram of DC to DC Converter Using Four Quadrant Operation for DC Motor

From the above block diagram it is seen that 220V AC supply is given to the transformer, the transformer step down 220V AC into 12V AC. But we required 12V DC supply so that's why rectifier is connected in the circuit to convert 12V AC into 12V DC. Single supply of 12V DC is directly given to the MOSFET and another supply is given to the regulator to regulate into 5V DC and this 5V DC supply is given to the microcontroller because microcontroller can work on 5V only. Voltage divider network is used in the system to measure the voltage in the system. Microcontroller give signal to the driver, driver send signal to the MOSFET, MOSFET send signal to the current transformer. Current transformer send signal back to the microcontroller and also send towards the motor to start the system. Finally the output is display on LCD.

3. COMPLETE DRIVE SYSTEM:

The general square of the framework is actualized in the proteous programming and the reaction task of the engine is seen. The reaction of the engine associated can be seen outwardly as per the program nourished into the microcontroller and the tasks are conveyed in like manner. It is the most effortless approach to check whether the equipment will get the coveted yield. The progressions can be made to get the coveted yield and the task can be completed in like manner.

4. HARDWARE DESCRIPTION:

The accompanying methods are done for the four quadrant DC engine speed control activity utilizing microcontroller. Here seven changes are interfaced to MC to control the speed of engine in four quadrants. At the point when begin switch is squeezed the engine begins turning in full speed being driven by an engine driver IC L293D that gets control flag persistently from the microcontroller. At the point when clockwise switch is squeezed the

engine turns forward way according to the rationale gave by the program from the microcontroller to the engine driver IC. While forward brake is squeezed a turn around voltage is connected to the engine by the engine driver IC by detecting reverse rationale sent by the microcontroller for a brief span period due to and invert brake switch is squeezed the microcontroller conveys a rationale to the engine driver IC that creates for little time an invert voltage over the running engine because of which quick brake circumstance happens to the motor. PWM change is utilized to pivot the engine at different speed by conveying from the microcontroller a shifting obligation cycle to the empower stick of the engine driver IC. It begins from 100% obligation cycle and diminishes in ventures of 10% when it is squeezed again lastly reaches to 10% obligation cycle and the procedure rehashes. Stop catch is utilized to turn OFF the engine by driving the empower stick to ground from the microcontroller.

5. EXPERIMENTAL SETUP:

The useful execution of the four quadrant control of the DC motor is appeared in figure 2. The equipment is planned and the activity has been done in light of the program written in the microcontroller for the four quadrant task of the DC motor and the speed is additionally controlled by utilizing PWM method.

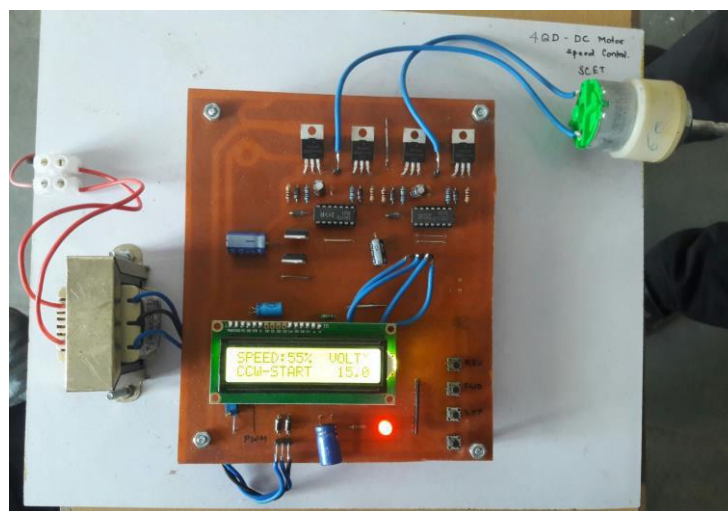


Fig.2 Experimental Setup of DC to DC Converter Using Four Quadrant Operation for Dc Motor

6. CONCLUSION:

The equipment for four quadrant dc motor speed control utilizing microcontroller is planned. It is turned out to be worked so straight forward. It is down to earth and profoundly conceivable in monetary perspective and has leverage of running engines of higher evaluations. It gives a tough, solid, proficient and precise method for speed control of a DC motor. The program is observed to be productive and the outcomes with the planned equipment are dependable. The created control and power circuit works appropriately and fulfils the application necessities. The motor can work in all the four quadrants effectively.

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Load Monitoring With Control and Data Transmission Using PLC

Ajinkya Yelore¹, Abhishek Mate², Sameer Khan³

^{1,2,3}UG scholars

Department of Electrical Engineering
Suryodaya College of Engineering and Technology, Nagpur.

Email - ¹mailme.ajinkyayelore@gmail.com, ²abhimateb4u@gmail.com, ³sk7917809@gmail.com.

Abstract: *Wireless communication is the way of communication between any two electronic devices without any physical connection. Power line communication is transfer of digital data over existing low voltage electrical lines. Digital data is modulated and transmitted over electrical power lines. This paper presents a power line communication based system for data transmission and electrical equipment monitoring and control. Data transmission is achieved over a power line in which digital data of temperature sensor is sent over power lines by transmitter and receiver and displayed by receiver. Electrical equipment are monitored and are turned on or off by a power line module at a distant place. This Paper eliminate' s extra wiring of data transmission and provide automation to remotely control electrical equipment. In present generation, there is a increased demand of wireless transmission of data through line of sight. Therefore there is a urgent need to satisfy this problem in many industries and public sector.*

Keywords: *Microprocessor, power line module, IC7805, LCD, Driver Max 232.*

1. INTRODUCTION:

Power line communication (PLC) is the use of existing electrical cables to transport data, and it has been around for a very long time. Power utilities have been using this technology for many years to send or receive data on the power grid using the existing infrastructure. The biggest advantage of PLC system is there is no need to rebuild the network again as long as there are existing power lines on which data transmission can be performed. PLC system is analogous to the broadband system where existing telephone lines are used to provide internet services. This Paper is about data transmission on these existing power line electric equipment control Equipments can be turned on or off remotely. In Industries, remote control by wireless control is very difficult due the presence of high Electromagnetic interference. Control by Optical means needs line of sight communication, which will not be possible all the time. Under circumstances, control by data transmission over power lines will be the best option. This concept will have applications in process control industries and in places where the equipment to be controlled are many and are widely spaced. Moreover, this concept uses existing power lines for transmission of data and thus does not involve any expenditure for the transmission medium this Paper aims at implementation of a Microcontroller based remote control system by transmission of control data over the power lines. FSK line carrier modems are used for transmission of data over the power line. The digital data to be transmitted modulates an FSK generator for onward transmission over the power lines. This technology can be extensively used in centralized electric meter reading, remote monitoring of electrical equipment, building automation and security control, stage lighting and street lighting control applications, information displays and it can also play a role in the final leg of interconnection in special circumstances. Power line communication modems transmit digital data on the live and neutral cables of the building power distribution network. Data is typically transmitted at carrier frequencies in the range from 50 kHz to 500 kHz using a variety of modulation techniques, including amplitude shift keying, frequency-shift keying (FSK), binary phase shift Keying (BPSK), and direct-sequence spread spectrum (DSSS). All power line communications systems operate by impressing a modulated carrier signal on the Wiring system. Different types of power line communications use different frequency bands.

2. LITERATURE SURVEY:

Power Line Communication (PLC) technology refers to a data transmission method using the distribution power grid. It is not a technology that would be predetermined for “Smart Grid” systems. The use of PLC technology is at the moment obviously in the field of “the last mile”. Nowadays, this technology has some problematic parts. It is therefore appropriate to focus on theoretical analysis and to research on improvements on the basis of suitable mathematical models. Two approaches to modelling are presented, the first model with multi-path signal transmission and the second model with two-port described by cascade parameter.

Nowadays applications of PLC (Power-Line Communication) are mainly in Advanced Metering Infrastructure (AMI) for smart energy metering in smart grid systems. There is also the use of systems for automation. Example of PLC in home automation is system for voice communication over power line.

This paper aims to introduce to a concept of smart-home based on PLC. The concept includes intelligent features. The popular intelligent systems are based on wireless protocols and technologies for example ZigBee.

The future expansion mainly focused upon reducing the delay between pressing of switch and switching of load. Also on the transmission of audio and video over power lines. Increasing the range of communication with minimum distortion. To monitor the lightning system in industries and educational sectors on large scale. Stable and more secure communication.

3. BLOCK DIAGRAM:

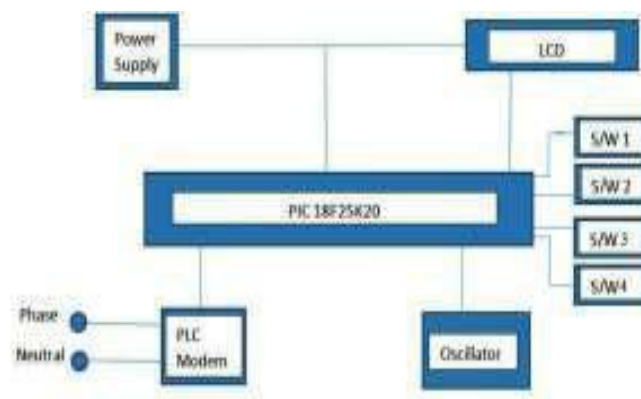


Fig. 1 Block Diagram of Transmitter:

The above block diagram of transmitter shows how the different components of our Paper are connected. First the 12 V power supply is provided by 12-0-12 step down transformer. Then output is fed to rectifier circuit which is filtered by using electrolytic capacitor to remove ripples which is followed by LM7805 to provide 5V regulated voltage. This regulated output is given to microcontroller and LCD. LCD is used to show the status of switches connected and temperature reading sent by receiver module. PIC 18F25K20 is used control all the components and their functions. In Load monitoring and control mode, microcontroller acknowledges the switch pressing and sends respective signals for ON and OFF to the PLC modem which works on the principle of Frequency Shift Keying (FSK). It provides the high frequency carriers for logic 0 (68-72 kHz) and logic 1 (128-136 kHz) which is transmitted over power line. Crystal oscillator is used to provide continuous clock pulses as timing signals for internal execution of microcontroller. Switches are SPDT type switches. Switches are used to toggle the load between ON and OFF.

The working of receiver is same as that of transmitter except the PLC modem. It separates the 50Hz power line frequency and high frequency carriers of logic 1 and logic 0. PLC modem demodulates the FSK modulated signal and provides original baseband signal to microcontroller. In Load control and monitoring mode, microcontroller sends out signals through driver IC for switching the particular load ON or OFF according to signals received from transmitter. When mode is changed to Data transmission, the temperature sensor sends digital temperature readings which is displayed on LCD of transmitter, thus performing load monitoring as well as data transmission. Temperature sensor is used to sense temperature and send it to microcontroller. Driver IC is used for changing voltage current levels from 5V, 24mA to 12V, 500mA as required by relay to switch over. Relay acts as electromagnetic switch which is used for switching the 220V load.

4. WORKING:

The 230V AC power line supply is given to the 12-0-12 V, 1A step down transformer. This 230V AC is converted to 12V AC by transformer and this signal is fed to the diodes. Diodes act as a full wave rectifier and converts 12V AC Sinusoidal to pulsating DC, then the output of Rectifier is given to the Capacitor which act as a filter. Capacitor bypasses high frequency signal and low ripple DC signal is fed to the 7805 Regulator IC which regulates the signal and gives 5V regulated DC voltage. Microcontroller and LCD requires 5V DC supply hence we use 5V DC from Regulator IC. The 12V is given to the PLC modem for its operation.

In transmitter side, we have given four switches for controlling a relays. If switch 1 is toggled ON then load 1 is turned ON. Microcontroller converts that signal into code and feeds it to the PLC modem. We use KQ-130F PLC Modems. This is a transceiver system. PLC modem modulates that signal using FSK technique such that bit 0 is converted into the 68-72 KHz frequency range and bit 1 converted into 128-132 KHz frequency range and this data is transmitted over single phase AC line. When we press switch 1 LCD displays load 1 is ON and When we press Switch 2 LCD displays load 2 is ON similarly switches 3 and 4 As we have used SPDT switches, to turn OFF the Load we have to again press the corresponding Load switches to toggle corresponding loads. As PLC Modem is a half-duplex transceiver.

5. EXPERIMENTAL SETUP:

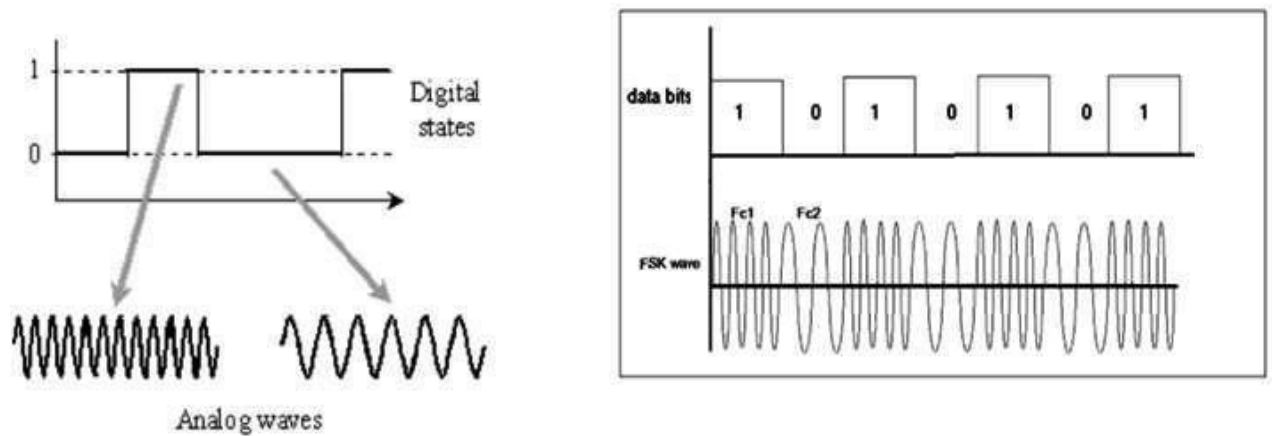


Fig. 2 EXPERIMENTAL SETUP

6. RESULT:

Hence, we have successfully performed load Monitoring With Control and Data Transmission Using Power Line Communication.



Fig. 3 Output

7. FUTURE SCOPE:

Power line communication technology is definitely an exciting alternative to connect internet via phone and modem. Moreover, its high speed will provide internet access, local phone, and long distance service.

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STATCOM Control for Power System Voltage Regulation by PI Controller

Amit B. Bante¹, Anita R. Prajapati², Shital Yende³

^{1,2}UG Scholar, ³Assistant Professor, Department of Electrical Engineering,
Suryodaya college of Engineering and Technology Nagpur, India
Email - ¹amitbante05@gmail.com, ²anitaprajapati691@gmail.com,

Abstract: *Static Synchronous Compensator (STATCOM) can give quick and effective responsive control support to manage framework voltage. In the writing, different STATCOM control techniques have been talked about, including numerous uses of proportional– basic (PI) controllers. In any case, these past works acquire the PI picks up by means of an experimentation approach or broad examinations with a tradeoff of execution and materialness. Subsequently, control parameters for the ideal execution at a given working point may not be viable at an alternate working point. To enhance the controller's execution, this work proposes another control show in view of versatile PI control, which can self-change the control picks up amid unsettling influence, with the end goal that the execution dependably coordinates a coveted reaction in connection to working condition changes. For STATCOM is additionally proposed. By this technique, the nonlinear STATCOM factors can without much of a stretch and precisely be controlled by controlling the level yield without tackling differential conditions. Further, the control additions can be powerfully tuned to fulfill the time-fluctuating activity condition prerequisite.*

Key Words: *Microcontroller, Transformer, Driver, SCR, Regulator, A to D converter.*

1. INTRODUCTION:

In the PI controller picks up are composed for a situation by-contextual analysis or experimentation approach with tradeoffs in execution and productivity. As a rule, it isn't attainable for utility architects to perform experimentation concentrates to discover appropriate parameters when another STATCOM is associated with a framework. Further, regardless of whether the control picks up have been tuned to fit the anticipated situations, execution might disillusion when a significant difference in the framework conditions happens, the STATCOM control framework may not perform well when generally required. A couple, however restricted past works in the writing talked about the STATCOM PI controller picks up so as to better upgrade voltage solidness and to dodge tedious tuning. For example, in direct ideal controls in view of the straight quadratic consistent control are proposed. This control relies upon the fashioner's involvement to get ideal parameters. In another STATCOM state input configuration is presented in light of a zero set idea. Like the last picks up of the STATCOM state criticism controller still relies upon the planner's decision. In, a fluffy PI control technique is proposed to tune PI controller picks up. It is still up to the planner to pick the real, deterministic increases. In the populace based inquiry system is connected to tune controller picks up. Be that as it may, this strategy for the most part needs a long running time to compute the controller picks up. A tradeoff of execution and the assortment of activity conditions still must be settled on amid the originator's basic leadership process. In this manner, exceedingly productive outcomes may not be constantly achievable under a particular working condition. Not the same as these past works, the inspiration of this paper is to propose a control technique that can guarantee a brisk and predictable wanted reaction when the framework activity condition shifts.

2. LITERATURE REVIEW:

A.H.M.A. Rahim, STATCOM Control Strategies for Power System Stabilization, to enhance the solidness and unwavering quality of electrical power frameworks voltage security is of prime concern. Responsive power pay helps in improving the execution of AC frameworks to control receptive power stream to and from the power framework a mainstream gadget named STATCOM from FACTS group of gadgets has picked up part of enthusiasm for a decade ago.

STATCOM control for control framework voltage control applications, STATCOM can give quick and proficient responsive power support to keep up control framework voltage security. This paper proposes a PI control show that controls the voltage amid an aggravation. The proposed controller is executed under MATLAB/SIMULNK

condition. In the reenactment test, the PI control demonstrates predictable magnificence under different working conditions, for example, extraordinary introductory control increases, diverse load levels, and change of transmission organize, continuous unsettling influences, and a serious aggravation.

Maria Hanley, Recurrence Instability Problems in North American Interconnections, In the writing, different STATCOM control techniques have been talked about including numerous uses of relative essential (PI) controllers. Consequently, control parameters for the ideal execution at a given working point may not be compelling at an alternate working point. This paper proposes another control demonstrate in view of versatile PI control, which can self-modify the control picks up amid an unsettling influence. Voltage control is a basic thought for enhancing the security and unwavering quality of energy frameworks.

3. METHODOLOGY:

That the adaptable PI control gives dependably astonishing execution under various working conditions, for instance, uncommon starting control increments, differing load levels, changes of transmission compose, consecutive disrupting impacts and an outrageous disturbance.

This work in PI control is required for non-planning any method that over the long haul return to a comparable yield given a comparative set data and disturbance yield given a comparable set data and agitating impacts PI controller is most suitable to consolidating process.

The PI control parameters can act normally adjusted thus and capably under different disrupting impacts in a power structure.

When the voltage of the lattice is lower than needed, the (capacitive STATCOM) to manufacture voltage on the other hand when structure voltage is higher than excepted. It absorbs the most ideal measure of responsive power (Inductive STATCOM) to lessen the voltage.

4. DESCRIPTION:

OPERATION OF BLOCK DIAGRAM:

In the above block the primary point is to control and keep adjust the voltage crosswise over load. Initially controller checks the approaching voltage originating from line with the assistance of ADC (simple to computerized converter) exhibit inside the Microcontroller. Our point is to control a positive and additionally negative half cycle of approaching AC for that a Firing edge control technique is utilized.

For controlling a terminating edge of any AC voltage it is important to screen each positive or negative half cycles, subsequently a Sine Wave Cycle Monitor(Zero Crossing Detector) piece is utilized as a part of our task, which educates a controller about begin purpose of each cycle. When controller knows the voltage over the heap and flags from sine wave cycle screen, controller figure the terminating point and gives terminating heartbeat to the AC to AC converter in which a static switch shaped by a SCR/TRIAC is utilized. Static switch can worked on high voltage and high recurrence as contrast with the mechanical switches like hand-off.

Potential transformer is utilized to venture down the voltage over the heap to be measure and amended to DC, in light of the fact that microcontroller can read a voltage upto 5vdc as it were. In our undertaking we are utilizing a Relay for stumbling the information voltage if there should be an occurrence of high voltage and low voltage which is out of hand capable points of confinement. The hand-off utilized as a part of our venture is of 12 volts and controller can give most extreme of 5v, thus it is important to intensify the 5v to 12v for which a Driver circuit is utilized. Microcontroller requires a 5vDC to work, and same will be created with the assistance of Power Supply which includes a Step down transformer rectifier, channel and controller.

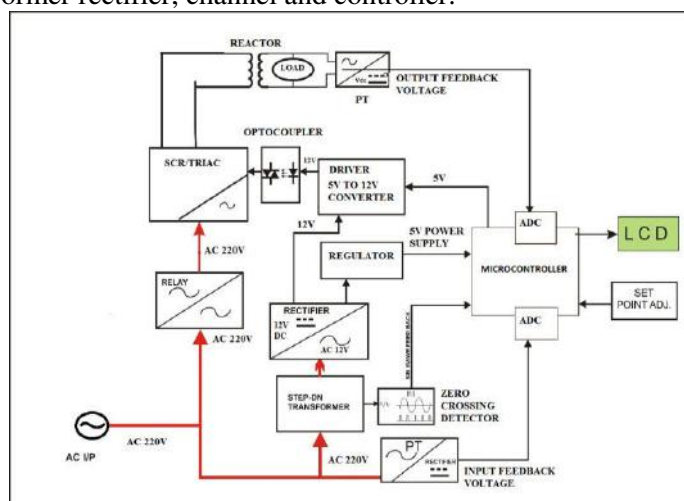


Fig.4.1 Block Diagram Adaptive PI control of STATCOM for voltage regulation

5. MATERIAL:

5.1 THE FULL WAVE RECTIFIER (12V AC TO 12V DC) A Full Wave Rectifier is a circuit, which changes over an aeration and cooling system voltage into a throbbing dc voltage using both half cycles of the associated ventilating voltage. It uses two diodes of which one practices in the midst of one half cycle while interchange practices in the midst of the other half cycle of the associated.

5.2 VOLTAGE REGULATOR (12V DC TO 5V DC) A voltage controller is expected to subsequently keep up a reliable voltage level, where they settle the DC voltages used by the processor and distinctive parts.

5.3 SINE WAVE CYCLE SCREEN (ZERO CROSSING DETECTOR)

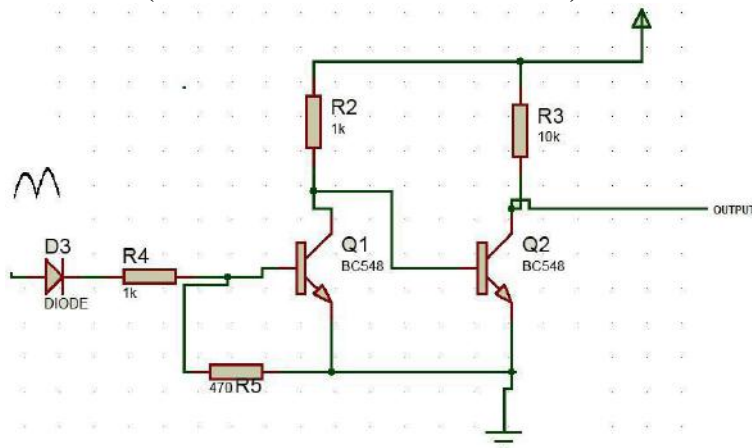


Fig.5.3.1 Zero crossing detector

A zero convergence locator is a one kind of voltage comparator, used to recognize a sine waveform advance from positive and negative, that agrees when the I/p crosses the zero voltage condition. In pivoting current, the zero-convergence is the quick time when there is no voltage display. In a sine wave or other essential waveform, this consistently happens twice in the midst of each cycle.

5.4 DRIVER:

A Microcontroller propelled reason yield stick supplies only 10mA of current. External devices, for instance, high-control exchanges can require >100mA and they require more voltages. With a particular ultimate objective to control such devices which use high DC back and forth movement, a transistor-based driver circuit is used to improve recurring pattern to the required levels. If the voltage and current levels are in perfect range, the transistor showings like a high-current switch controlled by the lower current electronic basis signal.

5.5 OPTO-COUPLER AND DRIVER:

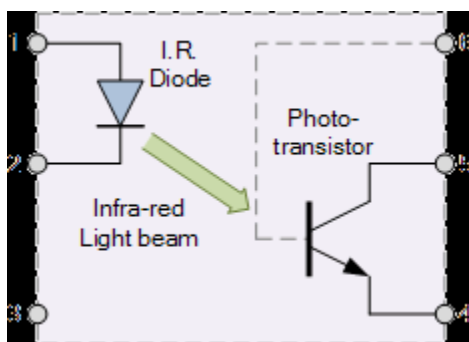


Fig 5.5.1 Opto-coupler

An opto-coupler are proposed to give complete electrical imprisonment between a data low voltage side(controller side) and yield high voltage side (SCR/TRIAC side) circuits.

5.6 LCD (LIQUID CRYSTAL DISPLAY):

Screen is an electronic show module and finds a broad assortment of employments.

5.7 THYRISTOR/TRIAC:

A zero intersection identifier is a one kind of voltage comparator, used to identify a sine waveform change from positive and negative, that concurs when the I/p crosses the zero voltage condition. In exchanging current, the

zero-intersection is the prompt time when there is no voltage display. In a sine wave or other straightforward waveform, this typically happens twice amid each cycle.

6. EXPERIMENTAL SETUP:

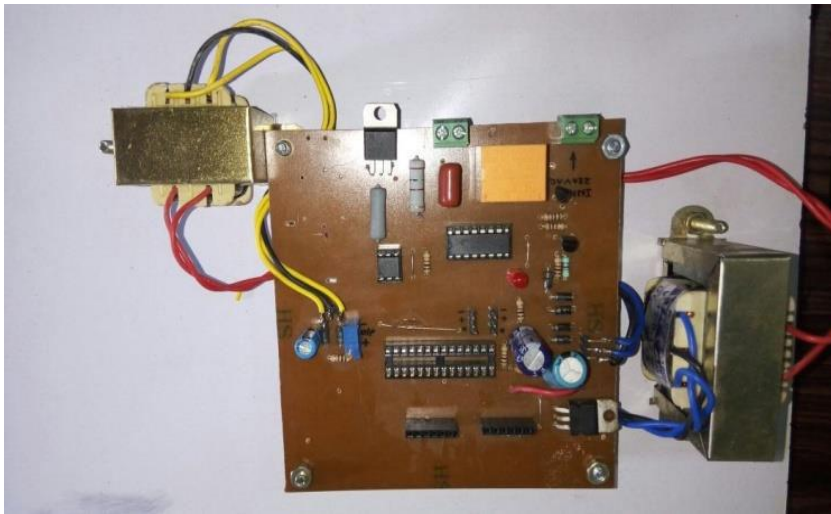


Fig 6.1 Experimental setup

7. CONCLUSION:

Different STATCOM control techniques have been evaluated including numerous utilizations of PI controllers. Be that as it may, these past works get the PI picks up through an experimentation approach or broad examinations with a tradeoff of execution and appropriateness. Consequently, control parameters for the ideal execution at a given working point may not be powerful at an alternate working point.

This work proposes another control show in view of versatile PI control, which can self-modify the control picks up progressively amid an unsettling influence with the end goal that the execution dependably coordinates a coveted reaction, paying little respect to the difference in the working condition. Since the alteration is self-governing, this gives the "fitting and-play" capacity for STATCOM activity. In the recreation contemplate, the proposed versatile PI control for STATCOM is contrasted and the ordinary STATCOM control with pre-tuned settled PI increases to confirm the upsides of the proposed technique. The outcomes demonstrate that the versatile PI control gives reliably great execution under different working conditions, for example, unique beginning control increases, distinctive load levels, changes of transmission arrange, back to back aggravations and an extreme unsettling influence.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

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Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Design and Fabrication of Advance Four Wheel Steering System

¹Akash Thakre, ²Prashant Meshram, ³Rahul Bhange

B.E. Scholar Department of mechanical Engineering,
Suryodaya college of Engineering and Technology, Nagpur, India¹²³

Abstract: *The aim of this project is to decrease the turning radius of the vehicle using Four wheels symmetric steering system. The system being analysed here is a mechanical linkage between the front and the rear. The conventional steering involves the Ackerman steering system which has major disadvantage is it can't take minimum radius turn. To overcome problem like vehicle manoeuvring on narrow roads and during parking this system has been proposed. Four wheel steering give much better manoeuvrability and control on the car. We have developed an innovative idea about four wheel steering design to implement a mechanism that can take minimum radius turn about its gravitational axis. Four wheel stringing is done by turning drive wheels at the same in opposite direction. By steering the rear wheels in the direction opposite the front wheels at low speeds, the vehicles turning circle radius is greatly reduced. Four wheel steering system is used in jeep hurricane, in that the wheel positioning system was directly connected to the steering system, due to that reason steering system was more complicated. This problem can be solved using new concept of four wheel steering vehicle by using a pneumatic operating system. This is achieve by using compressor. The project deals with having a separate pneumatic system to driving the four wheel.*

Key Words: *Frame, Rack and Pinion ,Front and Rear tie rod ,Centre rod, Universal joint ,steering.*

1. INTRODUCTION:

Steering is the term applied to the collection of components, linkages, which will allow for a vessel or vehicle to follow the desired course. The most conventional steering arrangement is to turn the front wheels using a hand operated steering wheel which is positioned in front of the driver, through the steering column, which may contain universal joints to allow it to deviate somewhat from a straight line. Other arrangements are sometimes found on different types of vehicles, for example, a tiller or rear wheel steering. Tracked vehicles such as tank usually employ differential steering that is, the tracks are made to move at different speeds or even in opposite directions to bring about a change of course. The steering system is to achieve angular motion of the front wheels to negotiate a turn. This is done through linkage and steering gear which convert the rotary motion of the steering wheel into angular motion of the front road wheels. Till recently all vehicles were steered by turning the front wheels in the desired direction, with the rear wheels following. Four wheel steering is a method developed in automobile industry for the effective turning of the vehicle and to increase the maneuverability. In a typical front wheel steering system the rear wheels do not turn in the direction of the curve and thus curb on the efficiency of the steering. In four wheel steering the rear wheels turn with the front wheels thus increasing the efficiency of the vehicle. The direction of steering the rear wheels relative to the front wheels depends on the operating conditions. At low speed wheel movement is pronounced, so that rear wheels are steered in the opposite direction to that of front wheels. At high speed, when steering adjustments are subtle, the front wheels and the rear wheels turn in the same direction. By changing the direction of the rear wheels there is reduction in turning radius of the vehicle which is efficient in parking, low speed cornering and high speed lane change. In city driving conditions the vehicle with higher wheelbase and track width face problems of turning as the space is confined, the same problem is faced in low speed cornering. Usually customers pick the vehicle with higher wheelbase and track width for their comfort and face these problems, so to overcome this problem a concept of four wheel steering can be adopted in the vehicle. Four wheel steering reduces the turning radius of the vehicle which is effective in confined space, in this project four wheel steering is adopted for the existing vehicle and turning radius is reduced without changing the dimension of the vehicle. Steering is the term

applied to the collection of components, linkages, etc. which will allow a vessel (ship, boat) or vehicle (car, motorcycle, and bicycle) to follow the desired course. An exception is the case of rail transport by which rail tracks combined together with railroad switches provide the steering function. The most conventional steering arrangement is to turn the front wheels using a hand-operated steering wheel which is positioned in front of the driver, via the steering column, which may contain universal joints, to allow it to deviate somewhat from a straight line. Other arrangements are sometimes found on different types of vehicles, for example, a tiller or rear-wheel steering. Tracked vehicles such as bulldozers and tanks usually employ differential steering that is, the tracks are made to move at different speeds or even in opposite directions, using clutches and brakes, to bring about a change of course or direction.

2. MATERIALS:

• Rack and Pinion

A rack is a toothed bar or rod that can be thought of as a sector gear with an infinitely large radius of curvature. Torque can be converted to linear force by meshing a rack with a pinion, the pinion turns the rack moves in a straight line. Such a mechanism is used in automobile to convert the rotation of steering wheel into left-to-right motion of the tie rod. Rack also features in the theory of gear geometry, where the tooth shape of an interchangeable set of gears may be specified for the rack (infinity radius), and the tooth shapes for gears of particular actual radii then derived from that. The rack and pinion gear type is employed in a rack railways. The pinion is in mesh with a rack. The circular motion of the pinion is transferred into the linear rack movement.

• Bevel Gear

Three bevel gears are used in this project to transmit the motion given to steering wheel by driver to front as well as rear wheels. Steering wheels is 19 connected to vertical bevel gear by the means of connecting rod. This vertical bevel gear transmits motion to two horizontal bevel gear of which one will be connected to front pinion and other one to rear pinion. Depending on gear ratio front pinion will receive input front the gear and this will give the front wheels its respective motion.

- The vehicle cornering behavior becomes more stable and controllable at high speed as well as on wet slippery road surfaces
- The vehicle response to steering input becomes quicker and more precise throughout the vehicle speed range.
- By steering the rear wheels in the duration opposite the front wheels at low speed, the vehicle's turning circle is greatly reduced. Therefore, vehicle maneuvering on narrow roads and during parking become easier.
- Tie rod.
- Ball joint,
- Wheels and tyre.

3. METHOD:

A. STUDY OF EXISTING FOUR WHEEL STEERING MECHANISM

When turning, the driver is putting into motion a complex series of forces. Each of these must be balanced against the others. The tires are subjected to road grip and slip angle. Grip holds the cars wheels to the road, and momentum moves the car straight ahead. Steering input causes the front wheels to turn. The car momentarily resists the turning motion, causing attitude slip angle to form. Once the vehicle begins to respond to the steering input, cornering forces are generated. The vehicle sways as the rear wheels attempt to keep up with the cornering forces already generated by the front tires. This is referred to as rear end lag, because there is a time delay between steering input and vehicle reaction. When the front wheels are turned back to a straight-ahead position, the vehicle must again try to adjust by reversing the same forces developed by the turn. As the steering is turned, the vehicle body sways as the rear wheels again try to keep up with the cornering forces generated by the front wheels.

B. Types of steering mechanism:

1. Ackerman's Steering Mechanism
2. Davis Steering Mechanism

C. Design of Frame

The designed model is considered along with that a frame built to support the steering, engine & seat. The frame is designed considering the wheelbase and track width of MAHINDRA E2O+, seat is also welded to the frame, the support structure for steering column and rack body is welded to the frame. The frame also takes the road load of the driver, so considering all the factors the frame is designed and developed.

4. LITERATURE REVIEW:

K. Lohith, Dr. S. R. Shankapal, M. H. Monish Gowda [1], Shows that the Four-wheel steering is a serious effort on the part of automotive design engineers to provide near-neutral steering. In certain cases, like low speed cornering, vehicle parking and driving in city conditions with heavy traffic in tight spaces, driving would be very difficult due to vehicle's larger wheelbase and track width. Hence the requirement of a mechanism which results in less turning radius arises and it will be achieved by implementing four-wheel steering mechanism instead of regular two-wheel steering. The rear wheels were drawn out of phase to the front wheels. In order to achieve this, a mechanism which consists of two bevel gears and intermediate shaft which transmit 100% torque as well turns rear wheels in out of phase was developed.

Dilip S. Choudhari [2], Explains that a Four-Wheel steering (4WS) System is also known as "Quadra Steering System". So, both front as well as rear wheels can be steered according to speed of the vehicle and space available for turning. Quadra steer system will give full size vehicles greater ease while driving at low speed, and improves stability, handling and control at higher speed. Quadra steering system works in following three phases Negative phase, Neutral phase, Positive phase. It enables the car to be steered into tighter parking spaces and makes the car more stable at speed (less body roll). It makes the car more efficient and stable on cornering, easier and safer lanes change when on motorways. The steering system allows the driver to guide the moving vehicle on the road and turn it right or left as required. The main concept is that when turning the vehicle, there should not require greater efforts on the part of the driver..

WoongsangJeong, Jinhee Jang, Changsoo Han [3], Describes the vehicle modeling and dynamic analysis of four-wheel steering system. The rear steering mechanism for the four-wheel steering system vehicle was modeled and rear suspension was changed to McPherson-type forming a four-wheel independent suspension system. Three different four-wheel steering Systems were analyzed. The first system serves a mechanical linkage between the front and rear steering mechanisms. The second and third systems used simple control logic based on the speed and yaw rate of the vehicle performance. Four-wheel steering system vehicles proved dynamic results through double lane change test in a perfect way

Dr. P. Sathyabalan, R. Sivaprakasam, A. VijinPrabhu, G. Sundaram [4], Shows that the fabricated the four wheel steering can operate three mode operation. The project is to steer the vehicle according to the requirement. The four-wheel steering is more required in critical roads and in desert roads. In this implementing three steering modes in a single vehicle and the modes can be changed as needed.

Chih-Hsien Yu, Chyuan-Yow Tseng, Chih-Ming Chang [5], Focused on design of a power train for two-axle four-wheel-drive (4WD) electric vehicle (EV). The purpose is to improve the energy efficiency, driving stability for a Utility Vehicle (UV) that is original equipped with a 500cc internal combustion engine. The designed power train is consisted of two 5kw brushless DC motors (BLDC) with the associated motor drivers, automatic manual transmission (AMT), AMT controllers, and 288V16AH Lithium-ion battery pack. The works include power train specification design, mechanism and controller design for the clutch less AMT, optimal transmissions gear-shifting strategy design, and finally, power split strategy design for the 4WD in terms of wheel slip ratio control. To guarantee AMT gear-shifting quality, the gear-shifting maps was applied in gear change process. The power split strategy design for the 4WD EV was based on sliding mode algorithm, it was shown through numerical simulation that slip ratio on each wheel can be controlled within an optimal value in ECE40 drive pattern.

ZhenhaiGao, Jun Wang, Deping Wang [6], shows the kinematic models of planetary gear set and steering gear are established, based on the analysis of the transmission mechanism of angle superposition with Active Front Steering system (AFS). A controller of variable steering ratio for Active Front Steering system is designed, and virtual road tests are made in Car Maker driver vehicle- road simulation environment. The results of simulation tests validate the controller performance and the advantage of variable steering ratio function, also show that the driving comfort is improved at low speed especially, due to the Active Front Steering system alters the steering ratio according to the driving situation.

5. CONCLUSION:

PROBLEM IDENTIFICATION

Nowadays all vehicles use two-wheel steering system, but the efficiency of the two-wheel steering (2WS) vehicle is proven that it is still low compared to the 4-wheel steering (4WS) system car. So, this project is based on how to prove that the 4WS is better than 2WS in terms of turning radius and maneuver stability. A vehicle with higher turning radius face difficulty in parking and low speed cornering due to its higher wheel base and track width, but the passenger prefers the vehicle to be higher wheel base and track width as it gives good comfort while travelling. In this scenario, four-wheel steering will be effective as the turning radius will be decreased for the same vehicle for the higher wheel base.

In this project, the bench mark vehicle is considered and four-wheel steering is implemented without change in dimension of the vehicle and reduction in turning radius is achieved. For achieving reduction, a mechanism is built which turn the rear wheels opposite to the front wheels. This project focuses on mechanically feasible and innovative design involving a double rack and pinion system for rear wheels and front wheels, connected to the steering column by a combination of a bevel gear assembly and center shaft. The movement of the rear wheels is done by the movement of the rear pinions which is turn move to achieve the required movement of the rear wheels.

As per the focus of the project we have created an innovative 4-wheel active steering mechanism which is feasible to manufacture, easy to install and highly efficient in achieving in-phase and counter-phase rear steering with respect to the front wheel. This system assists in high speed lane changing and better cornering. IT combats the problems faced in shape in sharp turning. It reduces the turning circle radius of the car and gives better maneuverability and control while driving at high speeds, thus attaining neutral steering. Moreover, components used in this system are easy to manufacture, material used is feasible, reliable and easily available in market. The system assembly is easy to install and light in weight and can be implemented in all section of cars efficiently.

The project carried out by us made an impressing task in the field of automobile industries. It is very usefully for driver while driving the vehicle. Project has been designed to perform the entire requirement task which has also been provided. By experiment the reduction in turning radius with four-wheel steering when compared to two-wheel steering is less than 50%.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Design and Fabrication of Double Pass Solar Air Dryer With vee-Corrugated Absorber Plate for Drying Purpose

¹Manjeet Gabhiye, ²Gaurav Raut, ³Atul Tarane, ⁴Akash Kalamkar

¹Assistant Professor Department of Mechanical Engineering, Suryodaya College of Engineering and Technology.

^{2,3,4}B.E. Scholar, Mechanical Engineering, Suryodaya College of Engineering and Technology, Nagpur India.

¹Department of Mechanical Engineering,

Suryodaya College of Engineering and Technology, Vihirgaon, Nagpur, India

Email - ¹manjeet.gajbhiye@gmail.com, ²graut3222@gmail.com,

Abstract: *The unpredictable rise and frequent lack of fossil fuel accelerated the continuous search for an alternative power source. Solar is one of the continual and bearable sources of power that connected a large society of researchers from all over the world. This is largely due to its abundant in indirect form. As such the development of effectual and economical equipment, thereby developing the quality of the products as well as improving the quality of life, for the drying of agricultural and marine products using solar power evolved. The use of solar dryers in the drying of agricultural products can significantly shorten or eliminate product exhaustion, food poisoning and at the sometime enhance productivity of the farmers towards better evened derived. A solar grain drying system does not solely depend on solar energy to function; it relate fuel burning with the energy of the sun, thus reducing fossil fuel consumption. In this paper a review of the solar dryer is presented. The various design of the solar dryer is reported in the literature thus far is presented. Potato is one food product which can be used as taste maker for variety of food products like potato flavored chips. so we also decided to fabricate our own solar dryer for drying potato chips.*

Key Words: *flat-plate collector, glass cover, blower, GI sheet, thermocouple etc.*

1. INTRODUCTION:

Drying is defined as a process of moisture removal due to simultaneous heat and mass transfer. It is a classical method of food preservation, which provides longer shelf-lighter weight for transportation and small space for storage [1]. However, being unprotected from infestation by insects, rain, wind-borne dust and dirt, rodents and other animal, products may be seriously degraded to the extent that sometimes become inedible and the resulted loss of food quality in the dried Products may have adverse economic effects on domestics and international markets. Through the use of a solar dryer which comprises of collector, a drying chamber and a chimney the problems associated with open-air sun drying can be figure out. To dry materials a supply of heat energy is essential to evaporate the water and supply of air to carry away the water vapor produced. For control drying of food we use fuels like electricity, natural gas or coal etc. Due to scarcity of fossil fuels and many environmental problems associated with these uses energy engineers are searching of alternating sources of energy. Solar energy is best solution or appropriate alternative sources of energy. Solar energy is clean, safe and abruptly available. An improved technology in utilizing solar energy is the use of 'solar dryers' where the air heated in a flat plate solar collector and then heated air is pass through drying chamber/cabinet.

In the recent years, use of solar energy has been reached to a remarkable edge. The continuous research for an alternative power source due to the perceived scarcity of fuel fossils is its driving force. It had become even more popular as the cost of fossil fuel continues to rise. Of all the renewable sources of energy available, solar energy is the most abundant one and is available in both direct as well as indirect forms. Solar energy applications is divided mainly into two categories: the first is the direct conversion to electricity using solar cells (electrical applications). The second is the thermal applications. The latter include solar heating, solar cooling, solar drying, solar cooking, solar ponds, solar distillation, solar furnaces, solar thermal power generation, solar water heating, solar air heating, etc. previous work performed and brief description on solar dryers and solar air heaters, as the critical element for the indirect and mixed modes of solar dryers [2]

2. LITERATURE REVIEW:

Wen-Shing Lee.et.al [3] studied the thermal performance of latent heat storage in two phase thermosiphon solar water heater which utilized superior characteristics and eliminates drawbacks found in convectional solar water heater. M. MOHANRAJ, P.CHANDRASHEKHAR [4].The chili was dried from initial moisture content 72.8% to the final moisture contain about 9.2- 9.7% D. J. Close[5], "Solar air heater for low and moderate temperature application" states that, solar air heaters, of simple construction and employing cheap material, can be produce to supply air at temperature above 150 deg F, and with good efficiency. H. C. Hottel and T. A. Unger[6], "The property of Copper Oxide-Aluminum selective black surface absorber of solar energy*" states that, Calculation of solar collector performance by established method[7] leads to the conclusion that the efficiency of a one-glass plate collector with a selectively black receiving surface lies between the values for non selective black systems containing two and three glass plates, and nearer the latter. This is based on a selective surface with low-temperature emissivity of 10 percent and absorptive for sunlight of 92 per cent, a combination which is achievable with a coating prepared under optimum conditions of spray size and concentration, amount of deposited and backing temperature described herein.

3. DESIGN AND DEVLOPEMENT:

The components of solar air dryer is

1. Solar air heater
2. Drying chamber

Solar air heater :

A conventional solar air heater consists of an absorber plate with a parallel plate below forming a small passage through which the air to be heated during flows. As in the case of the liquid flat-plate collector a transparent cover system is provided above the absorber plate while in a wooden container filled with insulation is on the bottom and the sides. However, the value of the heat transfer coefficient between the absorber plate and the air is low and this result in lower efficiency. For this reason, the surfaces are sometimes roughened and longitudinally fins are provided in air flow passage. Another variation is to use a V-shaped absorber plate. In this SAH the face areas range from 1-2 m². Materials of construction and size are similar to that used to the liquid flat plate collectors. The absorber plate is a metal sheet about 1 mm in thickness usually made of GI or steel. Glass of thickness 4-5 mm is the most commonly used material. Mineral wool or thermocol sheet thickness 5-8 cm is used for the bottom and side insulation. The whole assembly is contained in a sheet metal box or wooden box and inclined at a suitable angle. SAH is a type of energy collector in which the energy from the sun is captured by an absorbing medium and used to heat air. Solar air heating is a renewable energy heating technology used to heat or condition air for buildings or process heat applications. A conventional SAH generally consists of an absorber plate with a parallel plate below forming a small passage through which the air to be heated flows. As in the case of the liquid plat-plate collector, transparent cover system is provided on the bottom and sides.

Material Use :

1. Plywood
2. GI sheet
3. Thermacol
4. Transparent Glass cover
5. AC fan

Dimension of solar air Collector:

1. Height :- 20mm
2. Length :- 1200mm
3. Width :-750mm

Absorber Plate:

It absorbs the incoming solar radiations and transfers the heat energy to the incoming low temperature air to raise its temperature to an optimum level. It has been painted black with selective coating to reduce reflective losses and for absorption of maximum incoming solar radiation. The Vee corrugated sheet is sandwiched between two flat plate absorbers and this assembly being 0.07m in height is held at a height of 0.05m from the bottom. The absorber plate is being corrugated with the help of hydraulic press.

Glass Cover:

Two glass covers of 3 mm thickness is applied on the top of the solar air heater. The space between two glass is 10 mm. More covers are used if higher temperature is required. The covers of high transmissivity and low refractivity are desired to keep the amount of reflected and absorbed radiation low.

Duct:

A partitioned duct is provided for the inlet and outlet of air. It prevents heat loss to the surrounding and low

temperature incoming air.

DRYING CHAMBER:

The drying chamber made up of 12 mm plywood sheet. In this chamber there are three trays. The trays are perforated with spacing between trays is 150 mm. the hot air coming from the bottom and get evaporated from the chimney. As the hot air passes through the mesh, in forced convection driers, turbulence is created. A solar drier without either heat storage or air recycling is considered with a solar collector containing offset plate fins.

Material Use:

1. Plywood
2. Wire mesh tray
3. Thermocol insulation etc

Dimension of Drying Chamber:

1. Height :- 1260 mm
2. Length :- 500mm
3. Width :- 750mm

4. EXPERIMENTATION:

The testing of solar air dryer is performed on 22nd May. The orientation of the solar air collector is zero deg. South-south facing so that it can come for maximum in contact with sun rays. The experiment was performed from 9 am to 4 pm. In this interval we noted some readings for different interval of time. For different interval of time, we got different temperature. Fig. 1 shows the experimental setup of our experiment which is situated at latitude 21.1458° N, 79.0882° E.

The air at mass flow rate of 2.3 m³/min at constant velocity pumped by blower in the air collector. This air passes in two pass the first pass is from the upper depth which is formed by glass covered and the absorber plate and the second pass is from lower depth which is formed between absorber plate and bottom insulation. The insulation of thermacol 15mm thickness is applied on side and bottom side of the collector.

The initial moisture content of potato chips 83.07% (wet basis) is reduced to 9% (wet basis). The efficiency of collector is varies from 34% to 60% . the maximum hot air outlet is obtain at 2.30 pm which is 64⁰C at that time the absorber plate temperature is 70⁰C. at the same temperature the maximum efficiency is obtained.



Figure 1: Solar Air Dryer Assembly



Figure 2: Drying Chamber

time \ parameter	9am	10am	11am	12pm	01pm	02pm	3pm	4 pm
Ambient (T ₁) °c	32	33	34	35	37	36	34	33
Absorber plate(T ₂)	62	64	65	70	73	72	70	68
Collector outlet(T ₃)	53	55	60	62	65	64	60	60
Lower tray(T ₄)	40	43	47	48	50	47	43	43
Drying chamber exhaust(T ₅)	34	38	43	45	47	44	41	41
Blower air temp(T ₆)	34	38	38	40	40	39	38	38

Table 1: Performance Study on Solar Air Dryer

Variation of the Temperatures in the Solar Collector and the Drying Cabinet Compared to the Ambient Temperature:

Figure 3 shows a typical day results of the hourly variation of the temperatures in the solar collector and the drying cabinet compared to the ambient temperature. The dryer is hottest about mid-day when the sun is usually overhead. The temperatures inside the dryer and the solar collector were much higher than the ambient temperature during most hours of the daylight. The temperature rise inside drying cabinet was up to 24oC (74%) for about three hours immediately after 12.00h (noon). This indicates prospect for better performance than open-air sun drying.

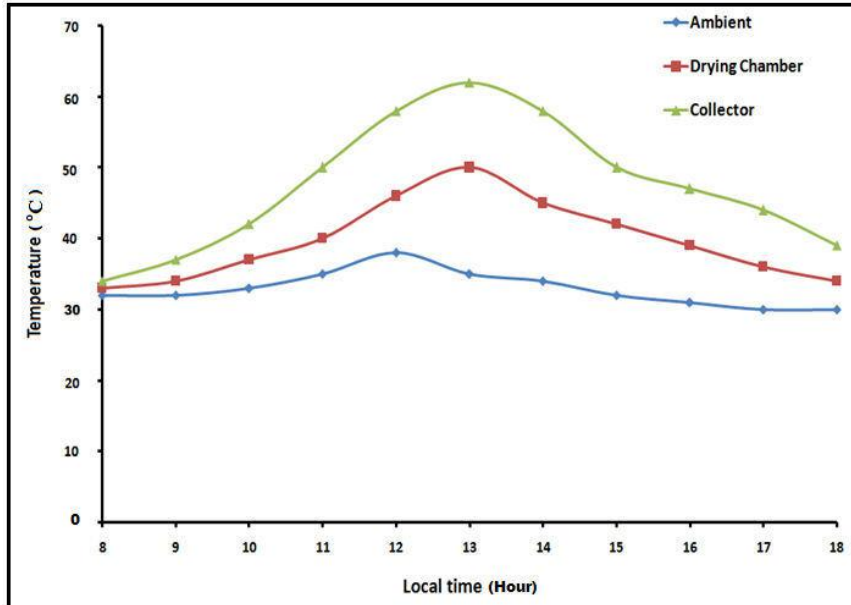


Figure. 3: A typical day results of the diurnal variation of temperatures in the solar dryer

Variation Of The Relative Humidity of the Ambient Air and Drying Chamber

Figure 4 shows the diurnal variation of the relative humidity of the ambient air and drying chamber. Comparison of this figure with Fig. 3 shows that the drying processes were enhanced by the heated air at very low humidity.

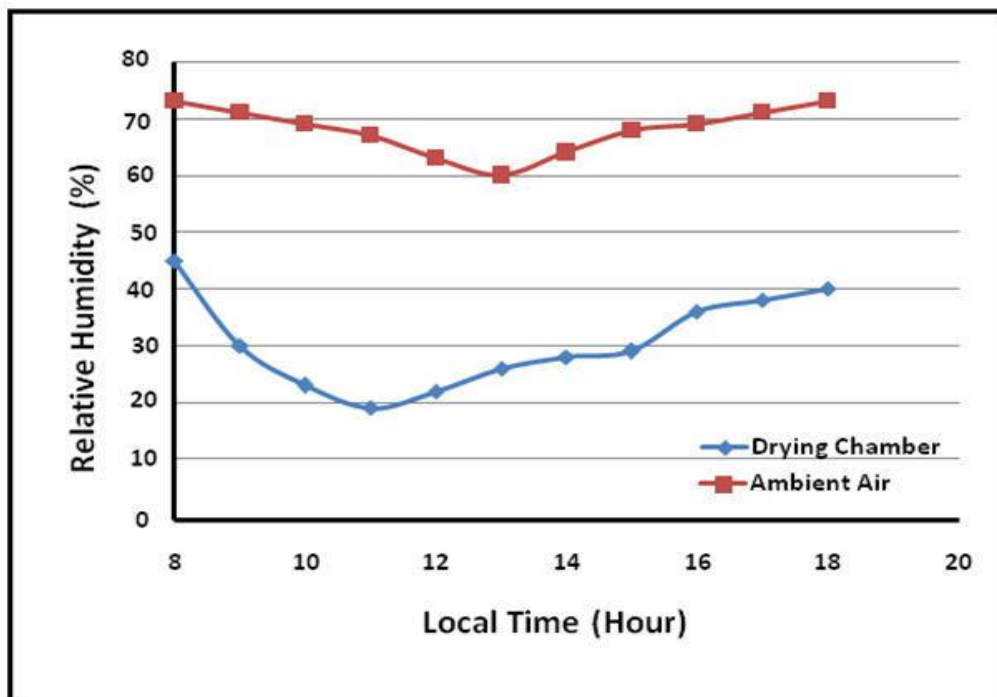


Figure 4: A typical day results of the diurnal variation of relative humidity in the dryer

5. RESULTS AND DISCUSSION:

This project presents the design, construction and performance of a double pass solar air dryer with vee corrugated absorber plate solar dryer for food preservation. In the dryer, the heated air from a separate solar collector

is passed through a perforated trays and remove the moisture from the loaded products. The results obtained during the test period revealed that the temperatures inside the dryer and solar collector were much higher than the ambient temperature during most hours of the day-light. The temperature rise inside the drying cabinet was up to 74% for about three hours immediately after 12.00h (noon). The dryer exhibited sufficient ability to dry food items reasonably rapidly to a safe moisture level and simultaneously it ensures a superior quality of the dried product.

6. CONCLUSION:

From the test carried out, the following conclusions were made. The solar dryer can raise the ambient air temperature to a considerable high value for increasing the drying rate of agricultural products. The product inside the dryer requires less attentions, like attack of the product by rain or pest (both human and animals), compared with those in the open sun drying. Although the dryer was used to dry Potato, it can be used to dry other crops like yams, cassava, maize and plantain etc. There is ease in monitoring when compared to the natural sun drying technique. The capital cost involved in the construction of a solar dryer is much lower to that of a mechanical dryer. Also from the test carried out, the simple and inexpensive double pass solar air dryer with vee-corrugated absorber plate solar dryer was designed and constructed using locally sourced materials. The hourly variation of the temperatures inside the cabinet and air-heater are much higher than the ambient temperature during the most hours of the day-light. The temperature rise inside the drying cabinet was up to 32oC (74%) for about three hours immediately after 12.00h (noon). The dryer exhibited sufficient ability to dry food items reasonably rapidly to a safe moisture level and simultaneously it ensures a superior quality of the dried product.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Analysis of Cam in Chilly Crusher Mechanism Using FEM

Jeetendra Gautam¹, Abhishek Kawle², Kaustubh Chimurkar³, Manoj Baseshankar²,

^{1,2,3}BE Student, Assistant Professor²

Department of Mechanical Engineering,

Suryodaya College of Engineering and Technology, Nagpur, Maharashtra, India.

Email: - jeetendragautamjg@gmail.com, manoj.baseshankar@gmail.com.

Abstract: The problem in the design of a cam is the analyzing of the photo elasticity and dynamic forces that effect on the family of parametric polynomials for describing the fringes. In present method, two ways have been taken for optimization of the cam size, first the high dynamic loading which translate by the roller follower to the cam surface and varies with time causes large contact loads and second it must include the factors of kinematics features including the acceleration, velocity, boundary condition and the unsymmetrical curvature of the cam profile for the motion curve. In the theoretical solution the formula for impact load have been used for analytical solution and a numerical solution have been solved using F.E.M (ANSYS 14.0) for stress analysis in a cam surface at condition of rise-dwell-return (R-D-R) motion of the follower, also to compare the analytical and numerical results that have been used different radius in unsymmetrical cam profile for optimum design.

Keywords : Cam and follower, Kinematics, Dynamics, ANSYS.:

1. INTRODUCTION:

A cam may be defined as a machine element having a curved outline or a curved groove, which, by its oscillation, rotation or reciprocating motion, gives a predetermined specified motion to another element called the follower. The cam and the follower have a line contact and constitute a higher pair. The cams are usually rotated at uniform speed by a shaft, but the follower motion is predetermined and will be according to the shape of the cam. The cam and follower is one of the simplest as well as one of the most important mechanisms found in modern machinery today. The cams are widely used for operating the inlet and exhaust valves of internal combustion engines, automatic attachment of machineries, paper cutting machines, spinning and weaving textile machineries, feed mechanism of automatic lathes etc.

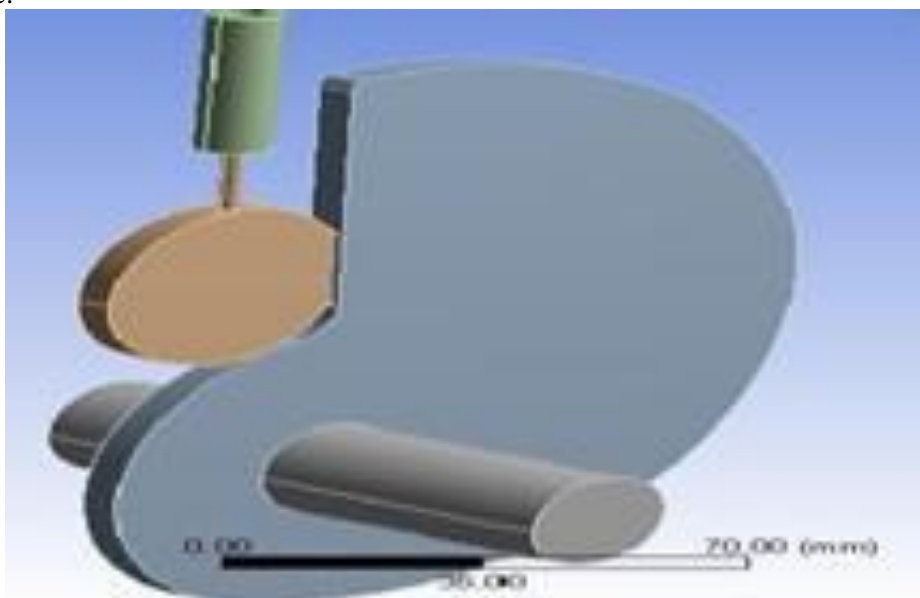


Figure 1 : Cam and Follower

2. MATERIALS:

Making of mould for cam profile we use Araldite CY-230 and Hardener HY-951. Ratio of mixing for resin and hardener is 100:10.5. We are purchased this material from Mumbai.

3. METHOD:

Finite Element Method is the micro mechanical analysis which is now-a-days used as a powerful and efficient tool for understanding the stress-strain behavior of the structure. The basic idea in the Finite Element Method is to find the solution of complicated problem by replacing it by the number of smaller region. Thus, the solution of each region is considered as built up of many small inter-connected sub-regions called Finite Elements.

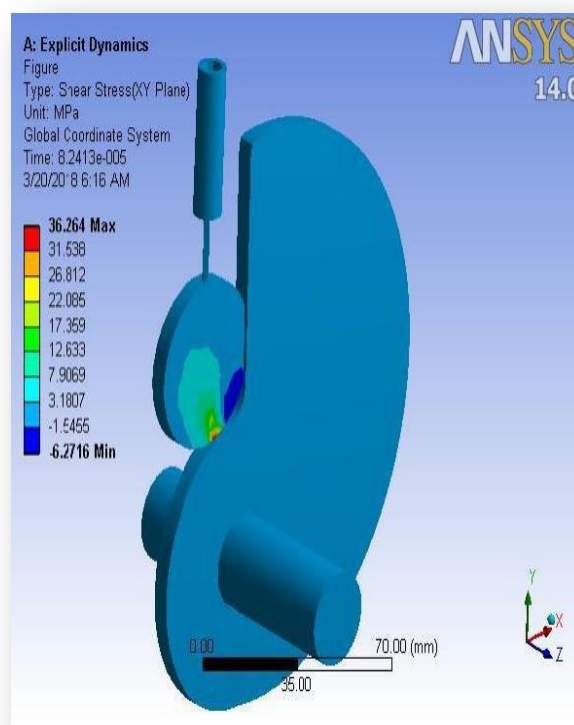
Finite Element Method tells, with sufficient accuracy, the stresses induced everywhere within the structure. Actually Finite Element analysis is a digital equivalent to continuous mechanics. It can be applied to many types of field problems such as heat transfer, electronic potential distribution, fluid flow etc.

Basically there are six steps in F.E.M. which are as follows:

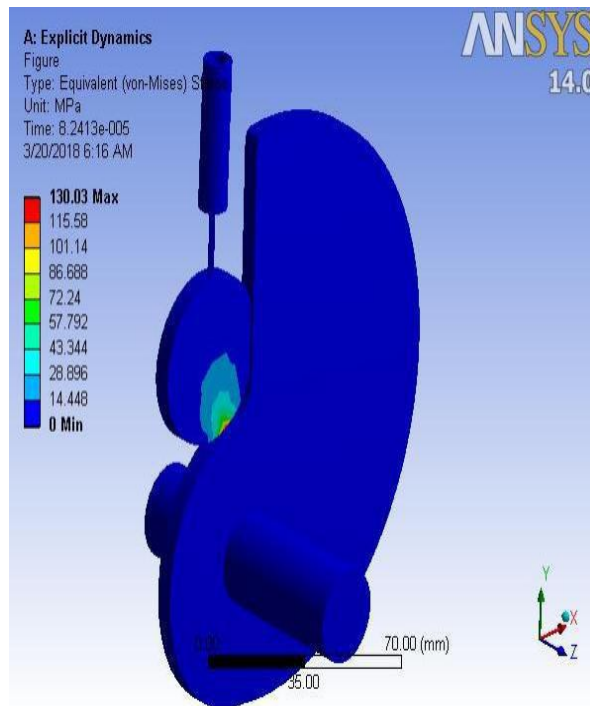
- Discretization (Mesh generation)
- Selecting the displacement function
- Develop the element matrices equations
- Assemble element matrices
- To find the unknowns
- Interpretation of the result

ANSYS is a finite element modeling that allows us to perform engineering analysis quickly and confidently. ANSYS is complete FEA software package by engineers worldwide in virtually all fields of engineering; ANSYS provide the capability to develop sophisticated analysis of stress, temperature and dynamic performance directly on the desktop, with easy access to CAD and office automation tools, the productivity is drastically improved compared to traditional approaches.

ANSYS automatically provide the integration that is necessary to link all aspects of analysis. ANSYS can be used to create geometry or to import CAD geometry. ANSYS then provides powerful tools for meshing geometry, as well as applying loads and boundary conditions. ANSYS can then read results from the solver program. One the result is obtained in ANSYS a wide variety of tools are available for visualizing and reporting the results.



(A)



(B)

Figure 2 (A) and (B):- Maximum shear stress or Equivalent stress

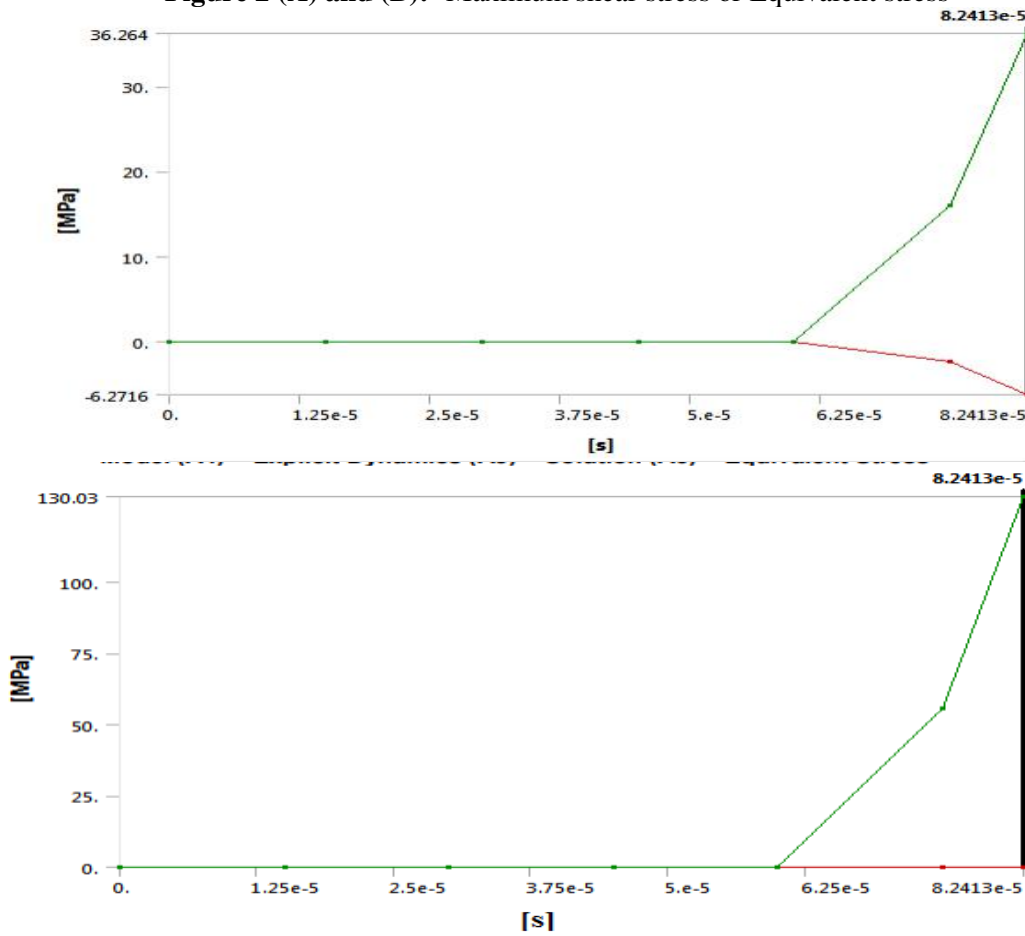


Figure 3(A) and (S):- Maximum shear stress or Equivalent stress

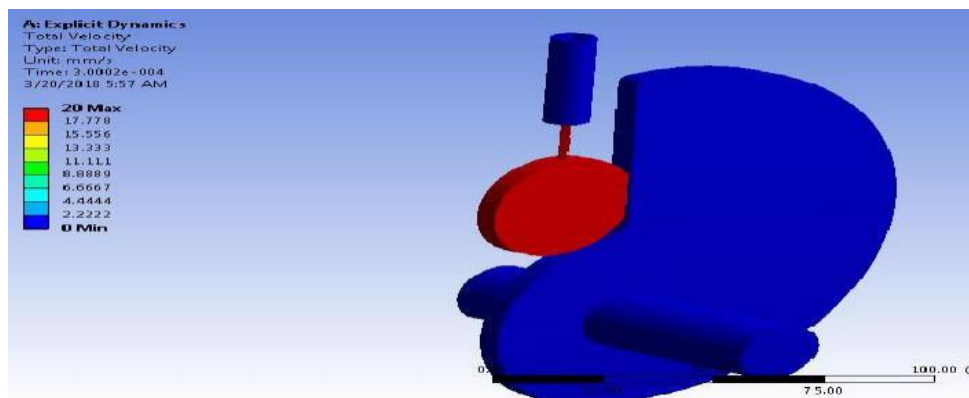


Figure 3: Maximum velocity stresses

Time [s]	Minimum [mm/s]	Maximum [mm/s]
1.1755e-038		
1.5017e-005		
3.0005e-005		550.
4.5016e-005	0.	
6.0004e-005		
7.5016e-005		593.91
8.2413e-005		550.

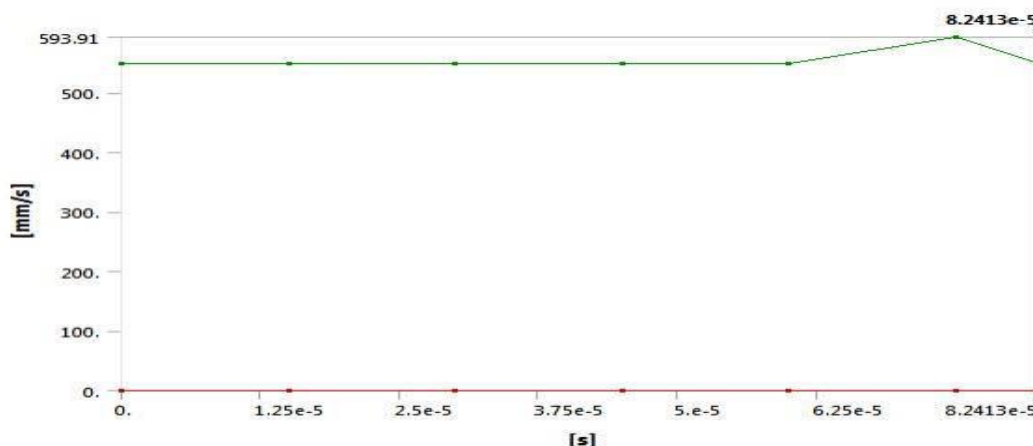


Figure 4:- Maximum velocity

4. DISCUSSION:

We are discussing over here the problem area of cam. The main problem is the where maximum stresses are act. Here our cam in chilly crusher mechanism on that cam impact load is act so stresses are acts on curved surface of cam. And also we are calculating circumferential or radial stress and other different forces.

5. FINDINGS :

Thèse are the values of circumferential stress and radial at diffèrent radius calculating by using analytical method. By using Finite Element Method also we are calculate other stresses or velocity etc.

Sr.no.	Radius (m)	Circumferential stress (σ_c) MN/m ²	Radius (m)	Radial stress (σ_r) MN/m ²
1.	0.0125	2.05	0.0125	2.05
2.	0.013	1.97	0.02236	3.80
3.	0.014	1.85	0.023	1.33
4.	0.015	1.75	0.024	1.30
5.	0.016	1.66	0.025	1.28

6. RESULT:

Our main aim is to find out the stresses acts on cam by using finite element method. By using analytical method we are calculate circumferential stresses and radial stresses.

7. CONCLUSION:

The conclusion of this project is to reduce the stresses in between cam and follower mechanisms. Because of impact loading maximum stresses are act on cam by using of roller follower. By using finite element method we analyzed the different stresses.

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Performance Evaluation of Automatic Guided Vehicle by Forklift

¹Kartik Vyas, ²Manthan Chopde, ³Shoeb Raza, ⁴Niraj Deshmukh, ⁵Shashank Warhade, ⁶Sachin Chintalwar

B.E. Scholar Department of mechanical Engineering,
Suryodaya college of Engineering and Technology, Nagpur, India^{1, 2, 3, 4, 5, 6}
Email - ¹pkartikv@gmail.com, ²manthanchopde31@gmail.com

Abstract: The Advance AGV System is designed to give complete design information about the system. It is also designed to less the manpower and human risk. As we all know that the AGV is an Automatic Guided Vehicle which does the transportation automatically by following the existing outlines which has dissimilar types of color and broadly used by many firms or industries. The AGV has some special types of joined circuits (ICs) and power systems that runs the vehicle. At last the AGV is used the bring rightness and lessen the overall time required in the work field.

Keywords: IR Sensor, Ultrasonic Sensor, Microcontroller, LCD, Motor Driver.

1. INTRODUCTION:

In the world of technology where everything is going online and automatic .One who wanted to be in the market must walk with the current crowd otherwise he will leave behind in the ocean of people who were not agreed to adapt themselves with technology. “AUTOMATED GUIDED VEHICLE SYSTEM WITH FORKLIFT” is the need of current small scale industries to reduce their material handling cost though they cannot appoint more too many workers for every stage of production line or material handling area.” AUTOMATED GUIDED VEHICLE SYSTEM WITH FORKLIFT” offers them to handle the material from one station to other within the least possible time whenever it is required. It is out the human limitations like fatigue, stress, laziness, overload of work etc.

2. COMPONENTS DESCRIPTION:

In nowadays AGV has a greater effect in the production field. Why we prefer this system is mainly because of its accuracy to transport goods, avoiding accidents at industrial zone, decreasing production overall cost etc. Following are the materials used for constructing AGVS;

2.1 Metal Frame

All the parts of the machine are mounted on a very strong and rigid part called frame. Frame is made by welding Mild steel square flange of thickness 14 gauge having sides 20mm x 20mm. The frame is the main supporting structure upon which other components of this machine were mounted. The frame is a welded structure construction with dimensions of 600 mm length, 300 mm width.



Figure No. 1.1

2.2 Actuator

The actuator we have used here works on the electric source. This actuator runs with the help of DC motor which requires a control signal and a source of energy. The control signal is comparatively low and may be electric voltage or current, pneumatic or hydraulic pressure, or even human power. Its main energy source is an electric current.



Figure No. 2.1

2.3 Printed Circuit Board

A (PCB) mechanically supports and electrically joins electronic devices or electrical component using conductive paths, pads and other structures etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate. Components are generally soldered onto the PCB to both electrically join and mechanically fasten them to it.



Figure No. 3.1

2.4 Microcontroller

A microcontroller is a small computer on a single joined circuit holding a processor core, memory, and programmable input/output peripherals. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications. We have used ATmega16 in our AGV. The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By performing powerful instructions in a single clock cycle, the ATmega16 achieves quantities approaching 1MIPS per MHz, allowing the system designed to improve power consumption versus processing speed.

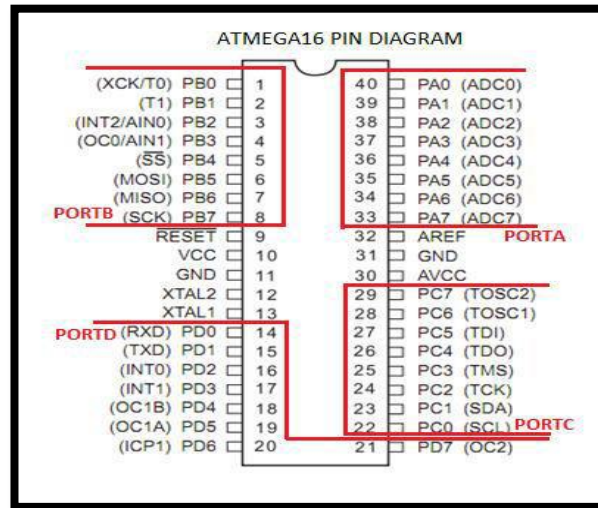


Figure No. 4.1

2.5 Motor Driver

It is a well specified IC which enables the voltage to be applied across a load in either direction. It allows a circuit full switch over a standard electric DC motor. Therefore, with a H-bridge, a microcontroller, logic chip, or remote control can electronically grasp the motor to go onward, reverse, brake, and coast.

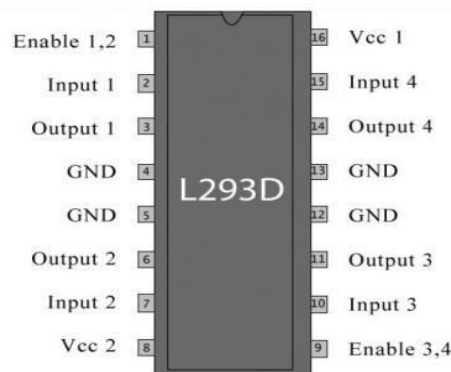


Figure No. 5.1

2.6 Main Wheels

A wheel is a circular component that is planned to rotate on an axle bearing. The wheel is one of the main components of the wheel and axle which is one of the six simple machines. Wheels, in grouping with axles that allows heavy objects to be stimulated easily allowing the movement or transportation while giving a support to a load, or performing labor in machines.



Figure No. 6.1

3. METHOD:

First of all we decided to make AGVS, then we searched about the complete working of AGVS and about previous studies on AGVS, then we find out the problems areas and then solve these problems. After this we go out in the market for the material requirements with the cost estimations. The necessary design analysis is made for further process and then we fabricate the model. There after we carries out the experimental calculations and result.

4. DISCUSSION:

This project mainly focuses on reducing man power. As other manufacturing companies uses AGVS having RFUS system to stop at the desirable position and the RFUS system is also very costly, so in this the system used to drive the model is quite different in a way that it is cheaper than RFUS. Productivity is also increased. As the project is light in weight and toughness is high it reduces the product damage, it maintain better control of material management. It is also suitable for transfer of frames. It can lift weight up to 6000N approximately 200Kg. during the production we had faced many problems, much of them were solved during the assembling.

5. ANALYSIS:

Theoretical & Logical Calculation,

$$\begin{aligned} \text{Torque of DC motor used, } T &= 12\text{Kg-cm} \\ &= 1.1772 \text{ N-m} \\ \text{Speed of motor, } N &= 100 \text{ RPM} \\ \text{Angular Velocity, } \omega &= 2\pi N / 60 \\ &= (2 \times \pi \times 100) / 60 \\ &= 10.47 \text{ rad/sec} \end{aligned}$$

∴ Power is the rate of doing work. For linear motion, power is the product of force multiplied by the distance per unit time. In the case revolving motion, the equivalent calculation for power is the product of Torque multiplied by the rotational distance per unit time.

$$\begin{aligned} \text{Rotational Power, } P &= T \times \omega \\ &= 1.1772 \times 10.42 \\ &= 12.33 \text{ W} \\ \text{No. of motors available for driving mechanism} &= 2 \text{ motors} \\ \text{So, Total power available for driving} &= 2 \times 12.33 \\ &= 24.66 \text{ W} \end{aligned}$$

$$\begin{aligned} \text{∴ There is only one Actuator is used for the lifting purposes,} \\ \text{So, maximum power available at lifting mechanism} &= 51.6 \text{ W} \end{aligned}$$

We have relation, $v = d / t$
Where, v = Linear velocity
 d = Distance travelled
 t = time

$$\begin{aligned} \text{Distance travelled by shaft, } d &= 0.3\text{cm} \\ \text{Time required to travel the distance, } t &= 1\text{sec} \end{aligned}$$

$$\begin{aligned} \text{∴ Linear velocity, } v &= (0.3 \times 10^{-2}) / 1 \\ &= 0.003 \text{ m/s} \\ &= 0.3 \text{ cm/s} \end{aligned}$$

6. FINDINGS:

While discussing we found some parameters in which AGVS is taking some more time to complete the work and it is more costly to run the AGVS on its track. So we have made some changes in its track, before it was taking a curved turn so we modified this turn taking pattern of AGVS and made it to take a sharp turn. Then for stopping the AGVS there was a TAG having some magnetic construction, so we removed the TAG and made AGVS to stop at required position by just applying the crossed junction, AGVS will detect it and perform the operation according to the installed programming.

After completion of given work the AGVS was commanded to go to its starting point and it was utilizing the battery power, so we update the programming and then after completing the work the AGVS will stop at the spot where it has placed the material.

In this way we have made AGVS more time efficient and also power saving at some portions.

7. RESULT:

After fabricating the model we have found following advantages while comparing it with the existing model of this kind. The analyzing of this project helps to motivate the fabrication of AGV in the manufacturing industries. After fabricating we found certain advantages of this project which are given below.

- Reduce manpower
- Increase in productivity
- Reduce product damage
- Maintain better control of material management.

8. CONCLUSION:

The AGV is productivity increasing feature in the factory. During the built-up of this project we had found many of intelligence that can be given to it. We provide basic functions like line following and collision avoiding with the help of IR and ultrasonic sensors and the main function, transportation of goods from station to station. Following are the main feature of the prototype which we fabricated.

- Speed of delivery
- Adjustment of vehicle speed
- Flexibility of path
- Avoid crash with objects
- Decrease in running cost related to conveyer system
- Ability to add sensors to detect the payload conditions
- Incessant cycle of working
- Conditions for line following can be changed easily

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An Analysis of Improving the Performance of Train Brake Shoes-review

¹Nikhil Ghonmode, ²Nitin Girsawale, ³Krunal Kardbhajane, ⁴Prof. Prashant Wanjari

^{1,2,3} B.E. Scholar

⁴ Professor

Department of Mechanical Engineering

Suryodaya College of Engineering and Technology, Nagpur, India

Email - ¹nikhilghonmode93@gmail.com, ²nitingirsawale12@gmail.com, ³krunalkardbhajane94@gmail.com,
⁴Prashanta13@gmail.com.

Abstract: A running train contains energy known as kinetic energy. The simplest ways of energy dissipation is converts the kinetic energy into heat. This conversion will do by applying a contact material to the rotating wheels. This material creates friction and it converts into heat. The wheels slow down and eventually the train stops. The material used for braking is generally in the form of a pad. . The currently air brake system of Railway coach has the drawbacks due to excessive brake force on the brake pad, thermal cracks at brake pad and reduced life of brake block. The aim of this project is to minimize the thermal stress, deformation and increase the life of brake shoes.

Keywords: Train Brake Pad, Non Asbestos Material, ceramic material brake pad, Composite Material, FEM Analysis, CAD software.

1. INTRODUCTION:

A brake is a mechanical device which is used for stopping a moving object or preventing its motion. Generally brakes use friction between two surface pressed together to convert the kinetic energy of the running object into heat.

1.1. BRAKE SHOES : In railway, air braking systems is used to force the brake pad on wheels. These systems are known as "air brakes" or "pneumatic brakes". At early period the cast iron brake shoes was used in Indian Railways after that Asbestos brake shoe was used because of some excessive frictional problem. But Asbestos material brake has created very harmful health problems; due to this some replacement was necessary in brake shoe and therefore NAO material brake shoe is recently used in Indian Railways.

1.2. NON ASBESTOS BRAKE SHOE :- It is typically used in high performance car and trains also. It content typically nonferrous metals inorganic and organic fibers, abrasive, lubricants and property modifiers such as glass, rubbers, Kevlar.

1.3. CERAMIC BRAKE SHOE :- The comparative new type of brake shoe is the ceramic brake shoe. Ceramic shoe are composed of denser ceramic material with embedded copper fibers. Ceramic shoe were developed as an alternative replacement for organic and semi metallic brake shoe because at the time these types produces more noise and dust. Its longer life than organic and semi metallic brake shoe, minimum brake dust which does not stick on wheel. It is stable under a wide range of temperature for consistent performance.

2. LITERATURE REVIEW:

I. Dr. D.S. Deshmukh & Jha Shankar Madanmohan [1], "Design Evaluation and Material Optimization of a Train Brake " stated that, A moving train contains energy, known as kinetic energy .The extensive majority of the world's trains are equipped with braking systems which use compressed air as the force to push blocks on to wheels or pads on to discs.

II. Vempada Vasudeva Rao & P. Jagan Mohan Rao [2] "Design, Static Analysis and Comparison of Materials on Train Brake Pad" Stated that ,Train is one of the major transportation which makes the things easier at low cost. This train run by diesel and the consumption of the diesel is depends up on the performance of engine and braking system, as the kinetic energy of the train is to be reduced by breaking and electric system. The kinetic energy is to converted into heat by contact of brake pad to the rotating wheels.

III. Ramana Chary & MD Ezaz Kha [3] "Design and analysis of train brake system" Stated that ,A moving train contains energy, known as kinetic energy, which needs to be dissipated from the wheel and pad in order to cause it to stop the wheel. The simplest way of doing this is to convert the energy into heat. The conversion is usually done by

applying a contact material to the rotating wheels or to discs attached to the axles this material creates friction and it converts into heat. The wheels slow down and eventually the train stops.

3. PROBLEM IDENTIFICATION:

A moving train contain very huge of kinetic energy. This energy dissipated on surrounding in the form of heat. Friction is created heat, if the brake gets too hot they will cease to work because they cannot dissipate enough heat. Train brake is exposing to large thermal traces during routing braking and extraordinary thermal traces during hard braking. The major drawback in exciting train brake shoes pad is due to high thermal stresses, crake create on the surface of brake pad. The aim at this project is to modified the current brake pad and to improving design. Modification is done by covering the frictional surface of brake pad by ceramic layer.

4. OBJECTIVE

1. The aim of project is to give the better solution on the problem of crack formation on the brake pad surface due to excessive heat and thermal stress.
2. The current using brake shoe made up by NAO material which has low thermal stability as compare to ceramic material. The main objective of project is to overcome the thermal stresses and improve a life of brake pad with the help of ceramic material.
3. Heat dissipation also must increase so material does not affect very much. So all environmental issue may be resolved is also main perspective

5. METHODOLOGY:

Present paper deal with problem identification and solving the problems of thermal stresses, deformation and equivalent stresses. The methodology for achieving this purpose is as follows.

1. To study the existing working of air brake system.
2. To examine the current brake shoe and its material, its physical properties etc.
3. To identify the various parameters this affects the brake shoe.
4. To study the various materials used for brake shoe.
5. To modify the existing design of brake shoe.
6. Analysis of existing and modified brake shoe and compare its results.
7. To reduce thermal stresses, total deformation, equivalent stress and equivalent strain etc.
8. To increase the life of brake shoe.

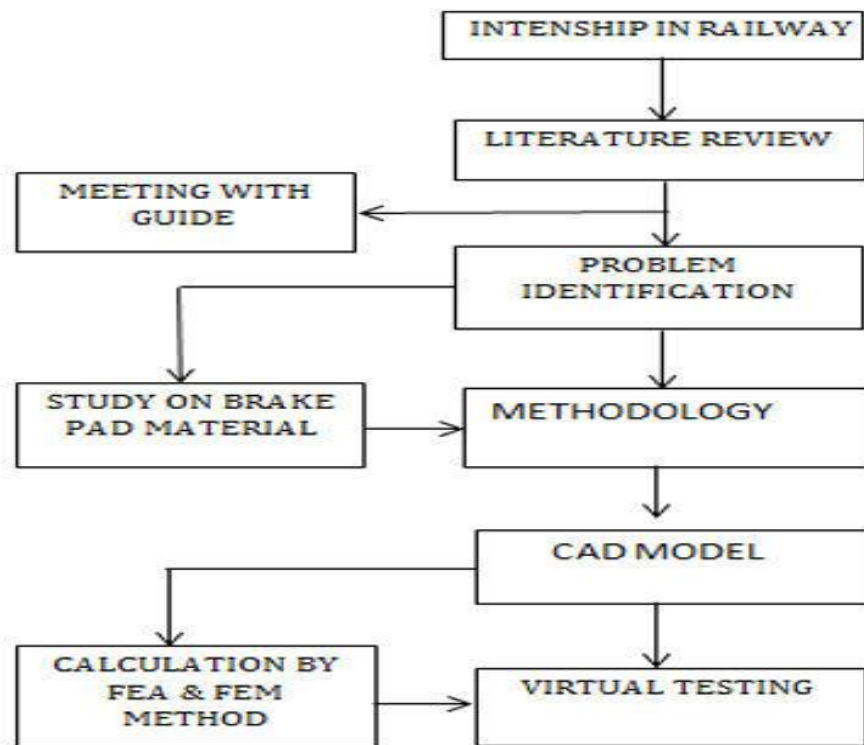


FIGURE1.1 - METHODOLOGY

6. CONCLUSION:

To analyze the non-asbestos (NAO) brake shoe pad use of Indian railway has some drawbacks like low thermal stability due to this thermal stresses come on the brake pads and therefore cracks is form on the surface of brake pad. To modified the non-asbestos brake pad with the help of ceramic coating on the frictional surface and to improve the design of brake pad and reduce the thermal stress and to avoid the thermal crake formation on the surface of brake pad.

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National Seminar (TECHTRENDS-2018)

Resent Advances in Engineering & Technology (RAET-2018)

27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

DESIGN AND FABRICATION OF EXTERNAL AIR BAG AND SAFETY

¹Ninad Falke, ²Sagar Hadagode, ³Mangesh Bante, ⁴Prof. Prafulla Deshpande

^{1,2,3} B.E. Scholar

⁴ Professor, Department of Mechanical Engineering
Department of Mechanical Engineering

Suryodaya College of Engineering and Technology, Nagpur, India

Email - ¹mr.ninadfalke@gmail.com, ²sagarhadagode123@gmail.com, ³mangeshbante01@gmail.com,
⁴prafulla.deshpande3116@gmail.com.

Abstract: Automotive airbag system has augmented occupant safety through the incorporation of increasingly sophisticated features. An airbag is an automotive safety restraint system consisting of a cushion, designed to inflate rapidly during collision. It absorbs the shock and reduces the number the casualty rate. The success of this safety system heavily depends on its correct implementation and timing of its inflation. The objective of this study is to present front air bag defects and its adverse effects on the occupants. It is important to understand how failures occur and which mechanism is responsible for injuries

Keywords:- External airbags, Safety, Crushing.

1. INTRODUCTION:

Airbag was invented by John W. Hetrick and modified by David S. Breed in 1952 and 1967 respectively. Since then it has revolutionized occupant's safety. Car occupants form 64% of the total road casualties. An US study shows that about 3.3million airbags have been deployed, saving more than 6377 and preventing countless injuries. An airbag is a occupant safety device. It is a type of occupant restraint system that consists of a flexible fabric bag, also known as air cushion. Designed to protect occupants in frontal crashes, airbags inflates in milliseconds after a crash is detected cushion that protects the body from the hard interior structures of a vehicle as it decelerates. Airbags are directly linked to the life of the drivers and the passengers, as they are used as last line of defense in a collision. Hence the proper functioning of system is vital. In order to obtain a precise and reliable airbag operation, a robust system has to be designed. It is estimated that in all crash scenarios, airbags deduce fatalities by 16%for unbelted drivers and 13%for belted drivers. Airbags are intended to augment the safety along with seatbelts. Airbag in conjunction with seatbelts are effective injury prevention device; however their deployment can introduce new injuries. Increasing demand for safety becomes a clearly visible trend in contemporary engineering. The widespread research is oriented towards development of systems protecting against heavy dynamic excitation (such as impact or blast) or harsh environmental loading.



Figure 1>Car Design and fabrication prototype

2.LITERATURE REVIEW:

[1]Ankit V. Gujrathi, Dr.Dhananjay R. Dolas, "AN OVERVIEW OF AUTOMOBILE AIRBAG DEFECTS", Automotive airbag system has augmented occupant safety through the incorporation of increasingly sophisticated features. An airbag is an automotive safety restraint system consisting of a cushion, designed to inflate rapidly during collision.

[2] Tasnim N. Shaikh, SatyajeetChaudhari and HirenRasania, "AIR BAG: A SAFETY RESTRAINT SYSTEM OF AN AUTOMOBILE", The present paper represents a brief review of life saving system in roll- over accidents, while driving on the road by a four wheeler. An Airbag is an automotive safety restraint system for an occupant as well as passengers. The system consists of a flexible fabric envelope or cushion, designed to inflate rapidly during an automobile collision. Its purpose is to cushion occupants during a crash and provide protection to their bodies when they strike interior objects such as the steering wheel or a window etc. Thus it lowers the number of injuries by reducing the force exerted by steering wheel, windows and the dashboard at any point on the body.

[3] Ajay Sharma, Sumit Sharma, MayankChhabra, "RECENT DEVELOPMENTS IN AIRBAGS FOR PASSENGER SAFETY IN AUTOMOBILE ENGINEERING", In order to alleviate the critical injuries due to the car accidents, various types of airbags are used. By using different kinds of airbags, the fatality from car accidents is bating day by day very rapidly. The airbags are the big part of this epoch. An airbag is used to prevent the various injuries such as head, chest, & other severe injuries which are caused by the car collision. The bag is designed in such a way so that it can easily inflate in

Paper Title:-AN EXTERNAL AIRBAGS AND SAFETY-A REVIEW ISSN:-2349-3585 |www.ijrdt.org 181
less than a seconds after the collision.

[4] William J. McFeely, Dennis I. Bojrab, Kent G. Davis, Douglas F. Hegyi, "AIRBAG DEPLOYMENT STUDY - OTOLOGIC INJURIES SECONDARY TO AIRBAG DEPLOYMENT OTOLOGIC INJURIES SECONDARY TO AIRBAG DEPLOYMENT", Airbags are clearly successful at mitigating injury severity during a motor vehicle accident (MVA). Deployment unfortunately has introduced new injury causing mechanisms. A retrospective review of 20 patients who sustained otology injuries resulting from airbag inflation was conducted.

2.1 PROBLEM IDENTIFICATION:

The main problem of high speed vehicle is crushing during the impact on an object at the time of accident. Internal air bags secure only peoples seating in vehicle not a vehicle but external air bags can secure both the vehicle and peoples. Because of an external air bag the impact of collision can be partially overcome and to minimized the damage of vehicles.

3. OBJECTIVE:

The main objectives of this project are: -

- To overcome the accidental damage of vehicle.
- To design an external airbags to protect the passengers in the vehicle when any collision or accidental incident occurs.
- Other than that, the work is being carried on in order to have an external airbags on the car of the cars in order to protect the passengers from the front crashes and to prevent the damage of engine and its various components

4. METHODOLOGY:

It involves the study of present design method. In this we will first identify the mechanical and electronic element to use design and will find out the dimension of the machine component by analytical as well as graphical method.

1. Design of Frame: First design the car frame we calculate load acting on the Car frame on that base calculate the dimension of frame and length of frame.
2. Design of Air bags: The air bag is part of an inflatable restraint system, also known as an air cushion restraint system (ACRS) or an air bag supplemental restraint system (SRS), because the air bag is designed to supplement the protection offered by seat belts. An air bag and air bag system design have significantly overcome collision. The potential air bag material including polyester fibre, nylon 6,6.

ANALYSIS OF CAR BODY:

STATICS STRUCTURAL ANALYSIS

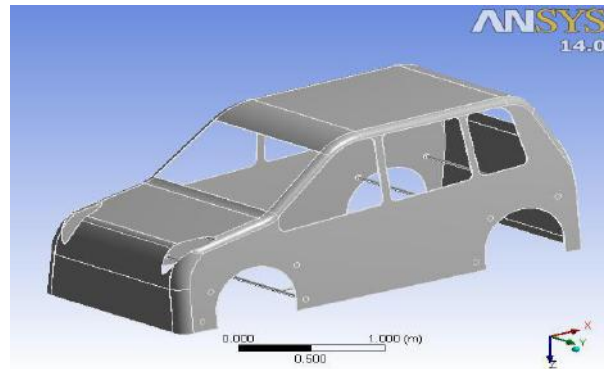


Figure 3> Car body

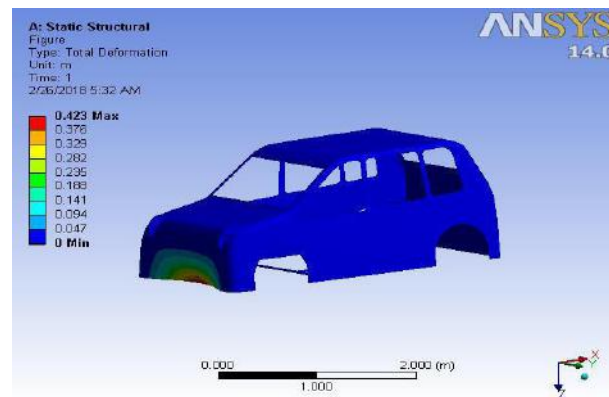


Figure 4> Total Deformation

EXPLANATION OF STRUCTURAL ANALYSIS:

Figure 3 shows the car body having made up of structural steel sheet metal of 2mm thickness.

Figure 4 show the meshing of car body having tetrahedral elements.

Figure 5 show the total deformation produced in car body, it is varies 0 m(min.) to 0.423m (max.)

Figure 6 show the total deformation produced in car body, it is varies 8.2229×10^{-11} Pa (min.) to 2.8×10^9 Pa(Max.)

EXPLICITE DYNAMICS ANALYSIS

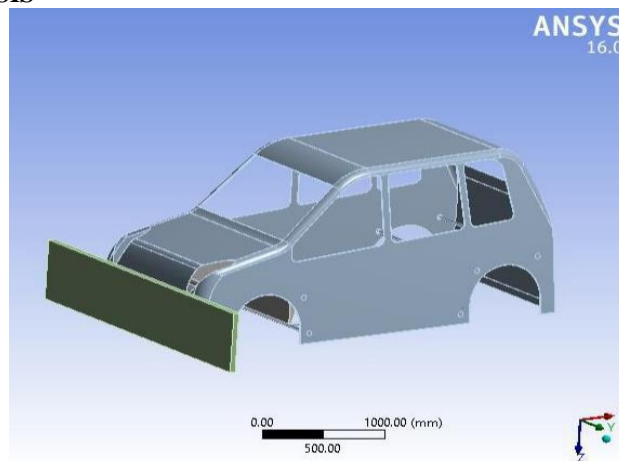


Figure 7> Car Body

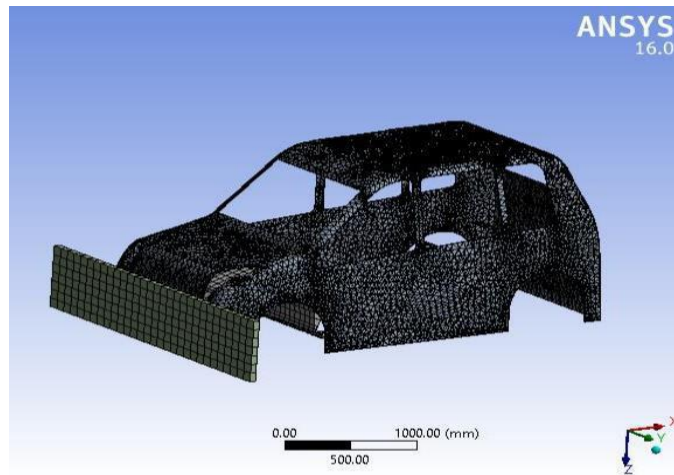


Figure 8> Meshing

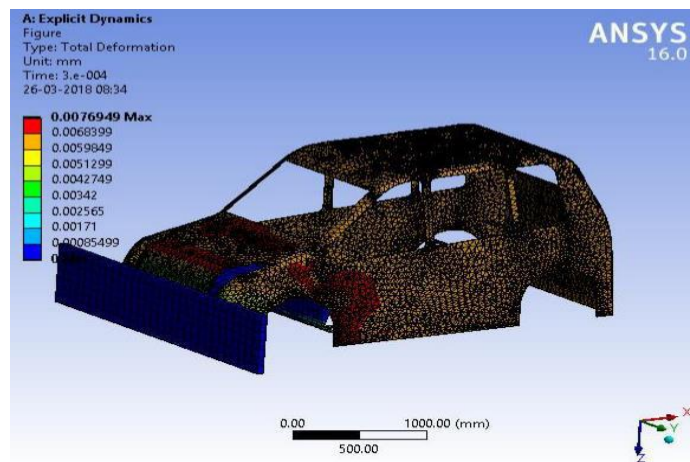


Figure 9> Total Deformation

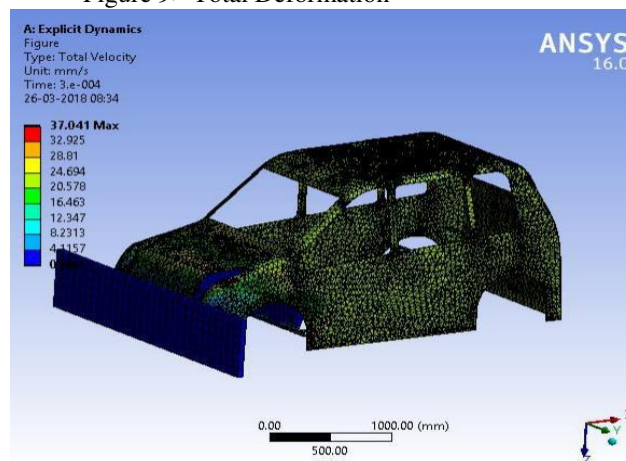


Figure 10> Total Velocity

5. EXPLANATION OF EXPLICITE DYNAMICS ANALYSIS:

Figure 7 shows the car body having made up of structural steel sheet metal of 2mm thickness and front object is wall.

Figure 8 show the meshing of car body having tetrahedral elements.

Figure 9 show the total deformation produced in car body during in motion having magnitude of 0mm (min.) and 0.008 mm

Figure 10 shows the velocity limit of ranges is 0mm/s to 37.041mm/s.

6. ANALYTICAL CALCULATIONS:

Calculation for impact and momentum:-

Force analysis: - Force analysis is decided by the Newton's 2nd law of motion

It states that, "the rate of change of momentum is directly proportional to impressed force".

Mathematically,

$$M = m \times v$$

Where,

M = Mass moment

m = mass of object

v = velocity of the object

Rate = Final M - Initial M

FORCE = $Mv - Mu$

v = Final velocity

u = Initial velocity

As per Newton Law of motion,

$$F = M \times a$$

Where

a = acceleration

$$a = \frac{v - u}{t}$$

Where, v = final velocity of an object

u = initial velocity of an object

t = time in second

$$F = M \times (v - u) / t$$

Force iterations:-

Standard values of

Mass of a Wagon R Car = 1350 kg

Speed: - 100 km/hr (assumed)

Time = 18.6 sec (to achieve speed of 100 km/hr)

1. Force iteration 1 :-

For the speed of 120 km/hr. Initial velocity = 20 km/hr

time (t) = ?

$$\therefore t = \frac{120 \times 18.6}{100} = 22.32 \text{ sec}$$

$$F_1 = \frac{M(v - u)}{t} = \frac{1350 \times 9.81 \times (120 - 20)}{22.32} = 59334.6 \text{ N}$$

$$F_1 = 59334.6 \text{ N}$$

2. Force iteration 2 :-

For the speed of 110 km/hr. Initial velocity = 20 km/hr

time (t)= ?

$$\therefore t = \frac{110 \times 18.6}{100} = 20.46\text{sec}$$

7. MATERIALS FOR AIRBAG: The potential air bag material including polyester fiber, nylon 6,6.

8. CONCLUSION:

From the above study, it was found that external air bags and safety system concept can be used in vehicle for high speed and slow speed instead of traditional air bags system. It's also helpful to prevent the damage of light implemented in the four wheelers. The external air bags system so as that at high speed and minimum speed vehicle does not properly applied break a vehicle that is the collide vehicle. Speed to desired range the collide the vehicle external air bags system will be automatic by sensing the object coming in front of it. It's also helpful for the inexperienced driver who is unable to take the proper judgment of the vehicle while taking the turn. The vehicle will get stopped by detecting the obstacles that are the front and back of it and will reduce the intensity of the collision. Its efficient method to be implemented in the vehicle for the external air bag and safety, the cost is also very efficient so that it can be implemented in low price car also. This concept will reduce the number of death and will be prevent the vehicle as well as living being form the damage vehicle.

The number of persons killed or injured in traffic has dropped continuously since the development of air bag system. On the basis of various studies to conclude that an air bags is necessary in the vehicle for safety purpose. External air bag is used for saving the life of driver as well as to overcome the accidental effect on engines and its components. In short external air bag is used for both the purposes.

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PERFORMANCE ANALYSIS OF COATED AND UNCOATED CARBIDE TOOL WHILE TURNING OPERATION (AISI4140 ALLOY STEEL)

¹Gaurav V. Thombre, ²Chetan A. Rathod, ³Dipak C. Vinchurkar, ⁴Nitin P. Padghan

¹B.E Scholar, ² B.E Scholar, ³ B.E Scholar, ⁴Assistant Professor

Mechanical Engineering Department, Suryodaya College of Engineering and Technology, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, India

Email – ¹gauravthombre1996@gmail.com, ²crathod663@gmail.com, ³vinchurkardipak@gmail.com, ⁴nitinpadghan19@gmail.com

Abstract: Hard coating are well known to improve the performance of cutting tool in machining application, such as high speed machining. The development of tool for speedy machining of hard and it is difficult to cut material has remains a problem for economy and quality of production. The present work studied the performance of coated and uncoated carbide tool in machining of AISI 4140 steel. The influence of cutting parameter (cutting speed, feed rate and depth of cut) on surface roughness and hardenability has been analysed under the different cutting condition (coated and uncoated carbide tool). For design of experiment we had done three levels of cutting speed, feed rate and depth of cut.

Key Words: AISI 4140 steel, Coated and Uncoated Carbide Tool, Surface Roughness, Hardenability.

1. INTRODUCTION:

The recent developments in science and technology have put tremendous pressure on manufacturing industries. The manufacturing industries are trying to decrease the cutting costs, increase the quality of the machined parts and to machine more difficult materials. Machining efficiency is improved by reducing the machining time with high speed machining. When cutting ferrous and hard to machine materials such as steels, cast iron and super alloys, softening temperature and the chemical stability of the tool material limits the cutting speed. Finish hard turning is a new machining process that enables manufacturers to machine hardened materials to their finish part quality without the aid of the productivity enhancement of manufacturing processes imposes the acceleration of the design and evolution of improved cutting tools with respect to the achievement of a wear resistance.

Machining efficiency is improved by reducing the machining time with high speed machining. When cutting ferrous and hard to machine materials such as steels, cast iron and super alloys, softening temperature and the chemical stability of the tool material limits the cutting speed. The surface roughness of the machined work piece changes as the geometry of the cutting tool changes due to wear and slowing down the wear process means more consistency and better finish. The surface roughness of the machined work piece changes as the geometry of the cutting tool changes due to wear, and slowing down the wear process means more consistency and better surface finish.

2. LITERATURE REVIEW:

1. N. N. Bhoale, R. S. Pawade, (2012), investigate the effects of cutting speed and feed rate in the work piece deflection and surface integrity during milling of cantilever shaped Inconel 718 plate under different cutter orientations. They used a CNC vertical milling machine using 10 mm diameter TiAlN coated solid carbide ball end milling cutter. The cutting speed selected was 78.5 and 125.6 m/min. the feed rate was 0.05, 0.075 and 0.1 mm/tooth. Surface integrity is assessed in terms of micro hardness beneath the machined surface. They observed that at large cutting speed as well as feeds, thicker work piece with larger work piece inclination shows higher micro hardness as compared to the other machining conditions. They used response surface methodology (RSM) as a design of experiment tool. A PVD coated TiAlN layered solid carbide end mill of 10 mm diameter was used for conducting ball end milling experiment. They observed that the maximum hardness occurs at the region beneath 25 μ m to 100 μ m and it shows decreasing trend as the depth beneath the surface increases. Also, at large cutting speed as well as feeds, the thickness of work piece and work piece inclination shows more hardness as compared to the other machining conditions. Higher value of micro-hardness was obtained very close to the machined surface at 25 μ m depth of as higher cutting speed, and higher axial feed. The statistical analysis of the experimental results show that the parameters, have significant influence on the magnitude of micro hardness.

2. H. Singh *et. al.*, (2011), investigated the effects of cutting parameters like spindle speed, feed and depth of cut on surface finish and material removal rate on EN-8. Taguchi methodology has been applied to optimize cutting parameters. They work in four levels by varying spindle speed between 1000 rpm to 2000 rpm, feed rate from 0.05 to 0.3 mm/rev and depth of cut from 0.5 to 2 mm. they obtain results which showed that the spindle speed (the most significant factor) contributed 63.90%, depth of cut (second most significant factor) contributed only 11.32% and feed rate contribution was least with 8.33% for Ra. The contribution for feed and RPM was 60.91% and 29.83%. Whereas the depth of cut contributed only 7.82% for material removal rate. They experimentation was carried out on a HMT lathe with 5 kW power range, work piece material used was EN-8 steel. They used four levels, three factors and sixteen experiments were identified.
3. S. Thamizhmaniet. Al, (2007), concluded that depth of cut is only significant factor which contribute to surface roughness is 14.467%. The second factor which contributes to surface roughness is feed having 9.764%. It is recommended from the result that depth of cut of 1 to 1.5mm can be used to have lower value of surface roughness. Taguchi gives systematic simple approach and efficient method for optimum operating condition. A Hass make CNC machine was used for experimentation having spindle speed of 6000rpm and power of the machine is 35 KW/HP.
4. K. A. Kumar et. al, (2012) investigated the effect of machining parameters like speed, feed, depth of cut on surface roughness for face turning operation using EN-08. Machining was done using cemented carbide insert. The surface roughness was measured by using Mituoyo SJ-310 instrument, dry facing process was used. The objective was to establish correlation between cutting speed, feed rate and depth of cut and optimize the turning conditions based on surface roughness. Results shows the influence of cutting speed and feed rate and depth of cut on surface roughness, they conclude that the effect of feed rate is greater than the effect of cutting speed and to improve the surface roughness, a good combination of cutting speed and feed rate needs to be selected. The feed has the variable effect on surface roughness. The relationship between feed rate and surface roughness shows that increasing the feed rate, increase the surface roughness.

3. PROBLEM DEFINATION:

Nowadays, it is very difficult to get the desired properties on the job easily and on cheap rate as well. May be it was because of the old technology and unsatisfactory theories over the tool, material and process. So our project is providing a practical theory to overcome the below problems:

- The major problem earlier was the technology; the old technology was quite unable to get the accuracy as it can get at the current days.
- Without knowing the speed of the spindle at which high production rate can be achieved.
- New theories are able to provide more accuracy than the old one but they might be costly.

4. OBJECTIVES:

Lots of problems were noticed in earlier production, so to avoid all them we are objectively working over. The major objectives are as follows:

- To investigate effect of cutting speed, feed rate, depth of cut, surface roughness, material removal rate and micro hardness beneath the machine surface.
- To compare the performance of coated and uncoated carbide tool.
- To check surface roughness with different cutting speed and feed rate.

5. METHODOLOGY:

As told earlier we are dealing with the most widely used material AISI4140 alloy steel in industries this day. In our research we are going to inspect tool which is coated and uncoated carbide tools in turning process. By using main parameters of turning process which is feed rate, depth of cut, speed and this all process in going to take place on lathe CNC.

Firstly we, are going to inspect coated carbide tool for that we have to fit our job on lathe chuck of CNC machine for turning process and then we have to note down the parameters depth of cut, feed rate, speed. Similarly we have to do this process for 3 times in a row but have to change the parameters every time. for ex:- if we are taking 200rpm for the first time than for the second time we will take 300rpm for turning process than for the third time we have to increase it for 350rpm. Similarly we will do same for the other parameters (depth of cut & feed rate) and have to note it down carefully.

6. PROCEDURE:

Cutting Parameter level

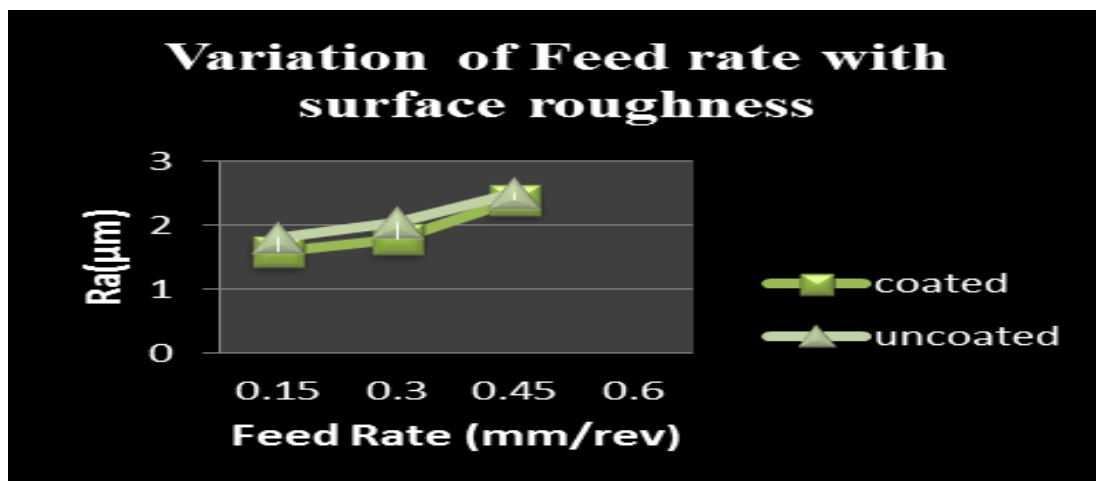
Sr.no	Unit	Level 1	Level 2	Level 3
Cutting speed	m/min	80	100	120
Feed rate	mm/rev	0.15	0.3	0.45
Depth of cut	mm	0.3	0.5	0.8

PROCESS PARAMETERS:

Sr.no	Vc (m/min)	F (mm/rev)	DoC (mm)	Ra (µm) coated	Ra (µm) uncoated
1	80	0.15	0.8	6.12	7.53
2	80	0.45	0.8	3.09	3.4
3	100	0.45	0.8	2.85	3.05
4	120	0.15	0.8	1.93	2.13
5	120	0.3	0.8	2.41	2.93
6	120	0.45	0.8	2.75	2.98
7	80	0.15	0.5	2.16	5.53
8	100	0.3	0.5	5.21	2.75
9	120	0.45	0.5	4.18	3.2
10	80	0.15	0.3	1.6	1.81
11	80	0.3	0.3	1.78	2.04
12	80	0.45	0.3	2.39	2.5
13	100	0.15	0.3	1.15	1.36
14	120	0.15	0.3	1.47	1.62
15	120	0.45	0.3	3.1	3.28

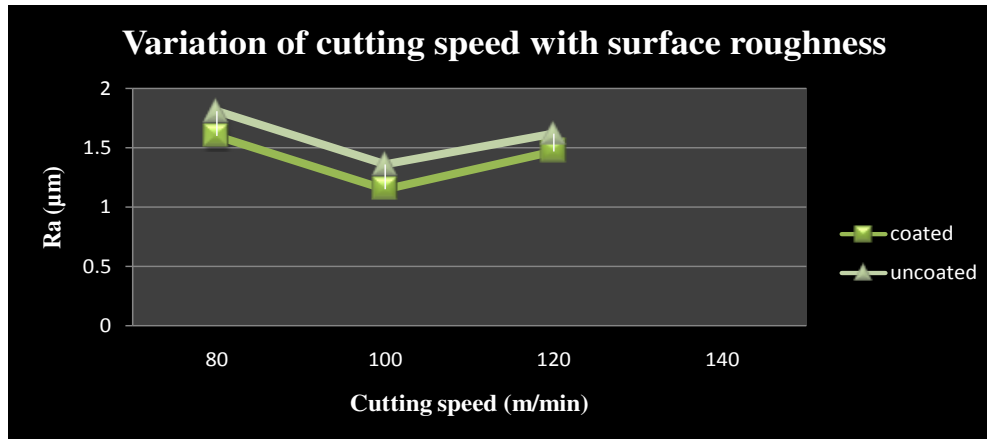
8. RELATIONSHIP BETWEEN INPUT PARAMETER AND SURFACE ROUGHNESS:

1.Relationship between feed rate and average surface roughness at cutting speed 80 m/min and constant depth of cut is 0.3mm.



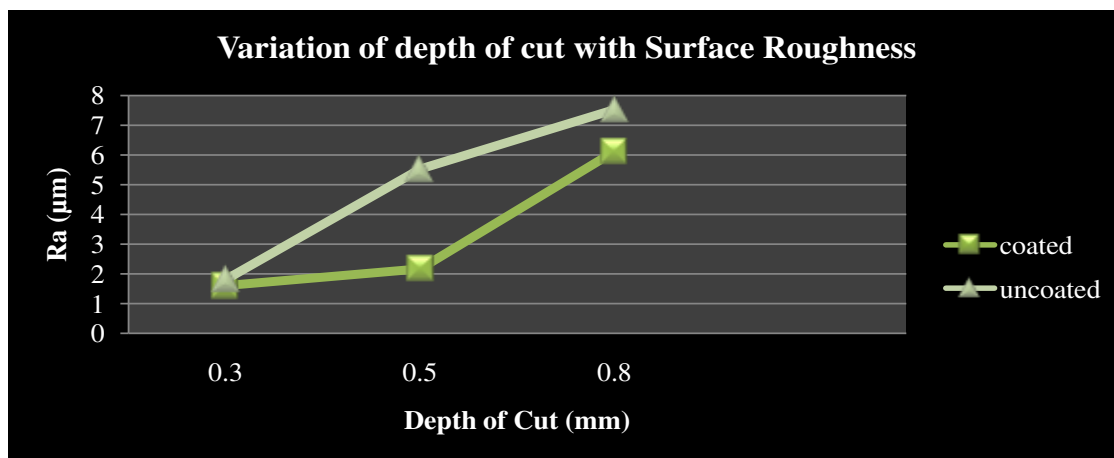
From above graph .. it has been found that there is a direct relationship between feed rate and surface roughness at constant cutting speed 80 m/min and depth of cut 0.3 mm. for a lower feed rate 0.15 mm/rev the value of Ra found to be 1.6 micron for coated tool and 1.81 micron for uncoated tool which is lower than the Ra values feed rate 0.3 mm/rev and 0.45 mm/rev. The Ra value goes on increasing as the feed rate increases it might be due to at higher feed the rate of plastic deformation is increases this resulting into increase of surface roughness

2. Relationship between cutting speed and average surface roughness at feed rate 0.15mm/rev and depth of cut 0.3 mm.



From the above graph ... it was found that there is inverse relationship between cutting speed and Ra up to certain cutting speed and goes on increase. At 80 m/min cutting speed the Ra found that is 1.60 and 1.81 micron for coated and uncoated tool respectively and at 120 m/min the Ra value is 1.47 and 1.62 micron for coated and uncoated tool respectively by keeping the other parameter constant. This might be due to that at low speed of cutting tool and work surface having more friction constant this causes the formation of built up edge. This leads generation of the surface irregularities over the machine surface. But at high cutting speed 100 m/min the roughness value is optimum and then it increase at cutting speed 120 m/min at high cutting speed built up edge are disappears.

3. Variation of surface roughness with depth of cut at cutting speed 150m/min and Feed rate 0.15 mm/rev.



The above graph shows the variation in surface roughness with depth of cut. It was found that there is a direct relationship between the depth of cut and surface roughness. At 0.3 mm depth of cut the Ra was 1.6 micron and at 0.8 mm depth of cut is increased up to maximum value 6.12 by coated tool and 7.53 micron by uncoated tool.

The increment in Ra value because at high depth of cut the compression tool and machine surface is more hence temperature which cause more tool wear. This cause surface irregularity which increase surface roughness value same relationship was found when Depth of cut increases from 0.3 to 0.8 mm.

9. RESULT AND CONCLUSION:

The effect of influencing turning parameter of cutting speed and feed rate on turning of AISI 4140 steel was studied when turning by using coated and uncoated carbide tool in green machining and the following conclusion are drawn.

1. The result indicate that the process parameter cutting speed and feed rate have significant effect on the quality of surface finish of AISI 4140 steel.
2. The surface roughness is mostly affected by the feed rate, at higher feed rate the surface roughness value is more.
3. It observe that optimum value of surface finish 1.15 micron is found at cutting speed 100 m/min and feed rate 0.15 mm/rev at 0.3 mm depth of cut in case of coated carbide tool and surface finish 1.36 micron is found at same cutting speed, feed rate and depth of cut when turning by uncoated carbide too.

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AN EXTERNAL AIRBAGS AND SAFETY

¹Arun Yadav, ²Md Shadab Alam, ³Ashish Kukade

¹B.E Scholar, ²B.E Scholar, ³B.E Scholar,
Department of Mechanical Engineering

Suryodaya College Of Engineering And Technology, Nagpur, India.

Email - ¹arun3y9@gmail.com, ²alamansari173@gmail.com, ³ninadfalke123@gmail.com

Abstract: Automotive airbag system has augmented occupant safety through the incorporation of increasingly sophisticated features. An airbag is an automotive safety restraint system consisting of a cushion, designed to inflate rapidly during collision. It absorbs the shock and reduces the number the casualty rate. The success of this safety system heavily depends on its correct implementation and timing of its inflation. The objective of this study is to present front air bag defects and its adverse effects on the occupants. It is important to understand how failures occur and which mechanism is responsible for injuries.

Key words: External airbags, Safety, Crushing.

1. INTRODUCTION:

Airbag was invented by John W. Hetrick and modified by David S. Breed in 1952 and 1967 respectively. Since then it has revolutionized occupant's safety. Car occupants form 64% of the total road casualties. An US study shows that about 3.3million airbags have been deployed, saving more than 6377 and preventing countless injuries. An airbag is a occupant safety device. It is a type of occupant restraint system that consists of a flexible fabric bag, also known as air cushion. Designed to protect occupants in frontal crashes, airbags inflates in milliseconds after a crash is detected cushion that protects the body from the hard interior structures of a vehicle as it decelerates. Airbags are directly linked to the life of the drivers and the passengers, as they are used as last line of defense in a collision. Hence the proper functioning of system is vital. In order to obtain a precise and reliable airbag operation, a robust system has to be designed. It is estimated that in all crash scenarios, airbags deduce fatalities by 16%for unbelted drivers and 13%for belted drivers. Airbags are intended to augment the safety along with seatbelts. Airbag in conjunction with seatbelts are effective injury prevention device; however their deployment can introduce new injuries. Increasing demand for safety becomes a clearly visible trend in contemporary engineering. The widespread research is oriented towards development of systems protecting against heavy dynamic excitation (such as impact or blast) or harsh environmental loading.

1.1 MATERIALS: The potential air bag material including polyester fiber, nylon 6,6.

1.2 METHOD: It involves the study of present design method. In this we will first identify the mechanical and electronic element to use design and will find out the dimension of the machine component by analytical as well as graphical method. The air bag is part of an inflatable restraint system, also known as an air cushion restraint system (ACRS) or an air bag supplemental restraint system (SRS), because the air bag is designed to supplement the protection offered by seat belts. An air bag and air bag system design have significantly overcome collision.

2. DISCUSSION: Tests were carried out on the prototype device to see its effectiveness as to what degree it meets its expected performance. The main problem of high speed vehicle is crushing during the impact on an object at the time of accident. Internal air bags secure only peoples seating in vehicle not a vehicle but external air bags can secure both the vehicle and peoples. Because of an external air bag the impact of collision can be partially overcome and to minimized the damage of vehicles.

3. ANALYSIS:

We are using creo 2.0 and ansys 14.0 cad software for the analysis of our project calculation.

1. Structural analysis of body without engine:- (Speed 90 m/s)

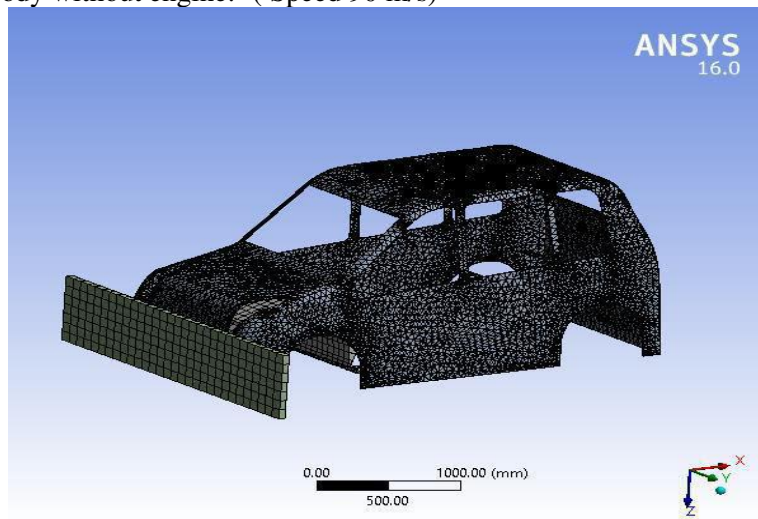


Fig.2.1 Explicit Dynamics Solution Total Deformation

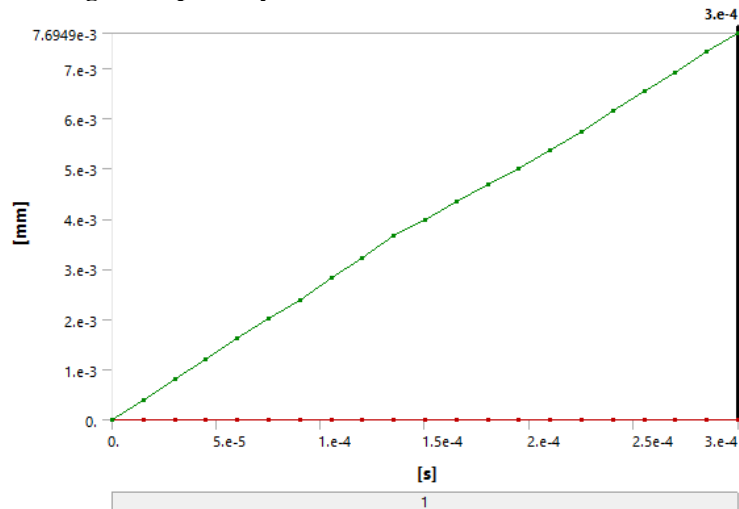
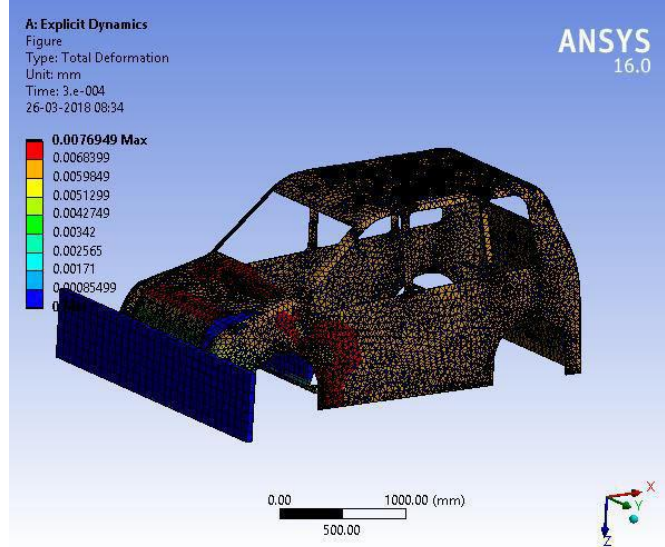


Fig.2.2 Explicit Dynamics Solution Total Deformation Figure



3. RESULT:

Calculation for impact and momentum :-

Force analysis :- Force analysis is decided by the NEWTON'S 2ND LAW of MOTION

It states that, "the rate of change of momentum is directly proportional to impressed force".

Mathematically,

$$M = m \cdot v$$

Where,

M = Mass moment

m = mass of object

V = velocity of the object

Rate = Final M - Initial M

FORCE = $Mv - Mu$

V = Final velocity

U = Initial velocity

As per Newton's law,

$$F = M \cdot a$$

a = acceleration

$$a = \frac{V - u}{t}$$

Where, *v = final velocity of an object*

u = initial velocity of an object

t = time in second

$$\therefore F = M \times \frac{V - u}{t}$$

Force iterations :-

Standard values of

Mass of a Wagon R Car = 1350 kg

speed :- 100 km/hr (assumed)

time = 18.6 sec (to achieve speed of 100 km/hr)

1. Force iteration 1 :-

For the speed of 120 km/hr.

Initial velocity = 20 km/hr

time (t) = ?

$$\therefore t = \frac{120 \times 18.6}{100} = 22.32 \text{ sec}$$

$$F_1 = \frac{M(V - U)}{t} = \frac{1350 \times 9.81 \times (120 - 20)}{22.32} = 59334.6 \text{ N}$$

$F_1 = 59334.6 \text{ N}$

2. Force iteration 2 :-

For the speed of 110 km\hr .

Initial velocity = 20km\hr

time (t)= ?

$$\therefore t = \frac{110 \times 18.6}{100} = 20.46sec$$

$$F_2 = \frac{1350 \times 9.81 \times (110 - 20)}{20.46} = 58255.8N$$

$$F_2 = 58255.8N$$

3. Force iteration 3 :-

For the speed of 100 km\hr .

Initial velocity = 20km\hr

time (t)= 18.6sec

$$F_3 = \frac{1350 \times 9.81 \times (100 - 20)}{18.6} = 56961.29N$$

$$F_3 = 56961.29N$$

4. Force iteration 4 :-

For the speed of 90km\hr .

Initial velocity = 20 km\hr

time (t)=?

$$\therefore t = \frac{90 \times 18.6}{100} = 16.74sec$$

$$F_4 = \frac{1350 \times 9.81 \times (90 - 20)}{16.74} = 55379.03N$$

$$F_4 = 55370.03 N$$

4. RECOMMENDATIONS:

The main problem of high speed vehicle is crushing during the impact on an object at the time of accident. Internal air bags secure only peoples seating in vehicle not a vehicle but external air bags can secure both the vehicle and peoples. Because of an external air bag the impact of collision can be partially overcome and to minimized the damage of vehicles.



5. CONCLUSION:

The number of persons killed or injured in traffic has dropped continuously since the development of air bag system. On the basis of various studies to conclude that an air bags is necessary in the vehicle for safety purpose.

External air bag is used for saving the life of driver as well as to overcome the accidental effect on engines and its components. In short external air bag is used for both the purposes.

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Design and Analysis of Feeder for Ginning Machine

¹Prafulla D Deshpande, ²Nitinkumar P Padghan,

^{1,2} Asst.Professor, Department of Mechanical Engineering,
SCET, Nagpur,India

Email - ¹prafulla.deshpande3116@gmail.com, ²nitinpadghan19@gmail.com,

Abstract: *Gin machinery operate more competently when the cotton flow rate is constant. In near the beginning gins the flow rate was frequently erratic because of the variable employment rate of the person receipt the wagon. The feed control will develop to solve this problem by providing an even flow of cotton to the gin's cleaning and ventilation system. The unit feeder also performs a similar function and may be old to feed seed cotton directly from a unit into the gin. Green boll trap use sudden changes in flow direction and/or reduce air velocities to separate heavy foreign materials from seed cotton. The primary purpose of a feeder is to nourish seed cotton uniformly to the gin stand at controllable rates. Seed cotton cleaning is a secondary function. Feed rollers, located at the top of the extractor feeder and directly under the distributor hopper, control the feed rate of seed cotton to the gin stand. The feed roller is motorized by variable speed motors forbidden manually or automatically by various interlock systems with the gin stand. Irregular feed of lint through the feeder to ginning machine, it decreases the production rate of seed and fiber. It also affects the quality of the fiber and seed. To overcome these errors, different analysis process will used. The function of the gin is to disconnect lint from gin to create two marketable products, fiber and seed. The gin's customer is the grower, the one who pays in one way or another to have the cotton ginned. It is the ginner's accountability to maximize the proceeds from every module of cotton.*

Keywords: *Ginning Machine, Feeder Shaft, Creo, Ansys*

1. INTRODUCTION:

The principle of functioning of single roller gin is popularly known as McCarthy principle named after its advocate It lies in picking and then touching the cotton fibers between the roller and fixed knife prevent the seeds to pass through. The seed cotton, when terrified into the hopper, passes through the machine. While the machine is working, at each elevation of the touching knife the grids lift the cotton to the level of the stationary knife-edge and of the uncovered surface of the rollers. The free ends of the fibers are gripped, in the grooves of the rotating roller, and dragged forward till the seeds reach the edge of stationary knife. The edge where the fiber is trapped is the ginning point. By the downward motion of the moving knife, the seeds are detached from the cotton at the ginning point and are frightened out through the slots of the grid. It is important that the groove of the rollers should be kept well open and when the leather roller becomes smooth, rough file should be applied sporadically to the surface to keep the same grip and pull on the fiber. The seeds are then hammered by means of the rapidly moving knife whereby some fibers are separated. In subsequent cycles, the remaining fibers also get estranged. This development is continued till all the fibers from the seed get indifferent.

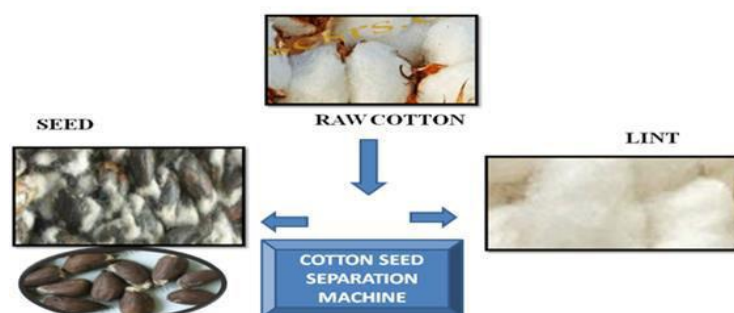


Fig.1.1-Product of Cotton Seed Separation Machine

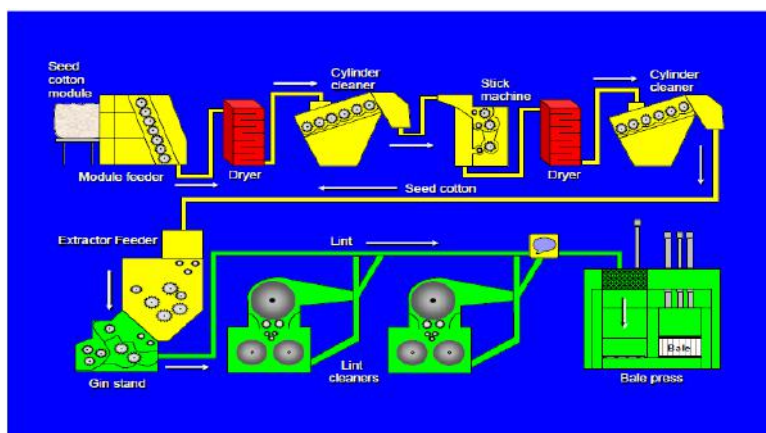


Fig.1.2- Cotton Seed Separation Machine Plant Setup

FACTORS INFLUENCING THE INSTALLATION OF COTTON SEED SEPARATION MACHINE

While installation of the cotton seed separation machine plant we have to take count of the following factors

1. Staple length of the raw cotton necessitate to be process:-The staple length drama very important parameter for judgment the quality of the cotton, as the Staple length of the cotton increase the cost of the cotton also increases. According to the staple length the grid size will be decide.
2. Percentage of Trash content in the seed cotton (raw cotton):-Cotton should not have the lowest rubbish content to get better superiority of the Staple length.
3. Percentage Moisture content in the raw cotton:-Cotton should have medium moisture content otherwise it will easily break.
4. Electrical power cost:-Power cost is varying day by day but it is better to select the county in which the cost of power per unit is lower with 24x7 availability of power.
5. in commission cost of the plant:-This is largest overall cost, this absorb cost of the labor, Material cost etc.
6. Availability of the raw cotton inside 300 Km area around plant.

Sr.No.	VARIETY OF COTTON	STAPLE LENGTH(MM)	CUT-OFF/OVERLAP(MM)	SEED SIZE/GRID SIZE(INCH)
1	DESHI/BENGAL/WAGAD	17-18	5--6	1/4"
2	J-34(NARMA)	24-25	9-9.5	9/32"
3	Y-1 G-12 KALYAN JAYDHAR	26-28	6--7	1/4"
4	B.T.COTTON	28-30	9.5-10	9/32"
5	SHANKAR -4 SHNKAR-6	30-31	10-10.5	9/32",19/64", 5/16"

2. METHOD:

1. Finding the requirement of small scale firm.
2. After attainment the requirement it was validate.
3. Conniving of ginning machine by general method of designing.
4. Determination of Torque for Feeder Shaft
5. Designing of Various Components of Machines such as Chain drive system , design of shaft , Design of V-Belt etc.
6. creation of 3D model by using CAD Software.
7. Analysis of Components in cotton seed separation machine by Analysis software.

2.1. IRREGULAR FEEDING OF RAW COTTON:-

In the cotton seed separation machine the running cost is very high as the cost of the raw cotton is more. In ideal operation the output (i.e. lint) from the machine is 1/3 of raw cotton .While separation machine if some fiber is remains on the seed then these results in lowering the lint quality.

2.2. INSTALLATION COST OF THE DOUBLE ROLLER GINNING MACHINE IS VERY HIGH.

The installation and running cost of Double Roller ginning machine is very high as compare to the single roller cotton seed separation machine.

2.3. TORQUE ESTIMATION REQUIRED FOR FEEDER SHAFT:-

Torque required for the feeder shaft must be calculated first because on this value, we decide HP of electric motor.

2.4. RELIABILITY OF FEEDER SHAFT:-

By performing various experiments, finding the value of probability of failure.

3. DISCUSSION:

Design of Feeder Shaft

1. Load acting on feeder shaft

$$a) \text{ Weight of Feeder shaft} = W_c = \left(\frac{\pi}{4}\right) \times (dc)^2 \times tc \times \rho \times g = \left(\frac{\pi}{4}\right) \times (0.190)^2 \times 0.012 \times 7200 \times 9.81 = 24.01N$$

Where, dc (254 mm) is diameter of shaft, tc (12 mm) is the thickness of shaft and ρ (7800) is density of cast iron

b) Horizontal tangential cutting force on cross cutter is 38 N and Planer roller is 21 N.

2. Torque transmitted by the shaft

T= force *perpendicular distance

$$T = 24.01 \times 0.095 = 2.28Nm$$

Where, P is power (1 H.P) , N is rpm and K_1 is load factor for electric motor to line shaft

3. Total load acting on shaft due to driven chain located on feeder shaft

$$\frac{F_1}{F_2} = e^{\mu\theta} = e^{0.3 \times 180 \times \frac{\pi}{180}} = 2.56$$

Where, $\mu=0.3$ is coefficient of friction , assuming angle of contact $\theta=180^\circ$.

$(F_1 - F_2)R_p = T$, Where R_p is the radius of sprocket

$$(2.56F_2 - F_2) \frac{0.152}{2} = 92.22$$

Therefore $F_1 = 1992.26$ N and $F_2 = 778.22$ N

$$\text{Weight, } W_p = \left(\frac{\pi}{4}\right) \times (dp)^2 \times tp \times \rho \times g = \left(\frac{\pi}{4}\right) \times (0.152)^2 \times 0.005 \times 7200 \times 9.81 = 64.00N$$

Total load acting o shaft $P_6, F_{p6} = F_1 + F_2 + W_p = 2834.48 \approx 2835N$ (downward)

4. ANALYSIS:

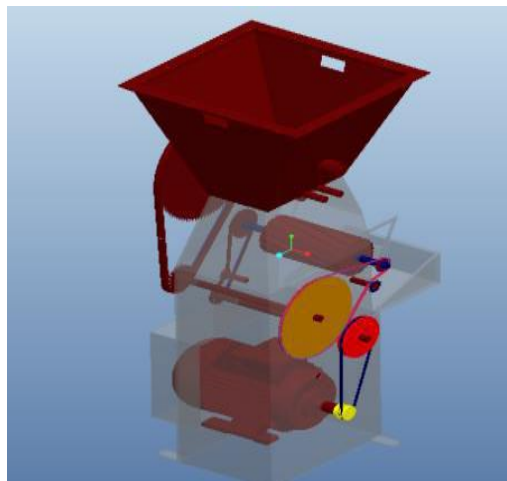


Fig 1.3: Isometric View of Ginning Machine

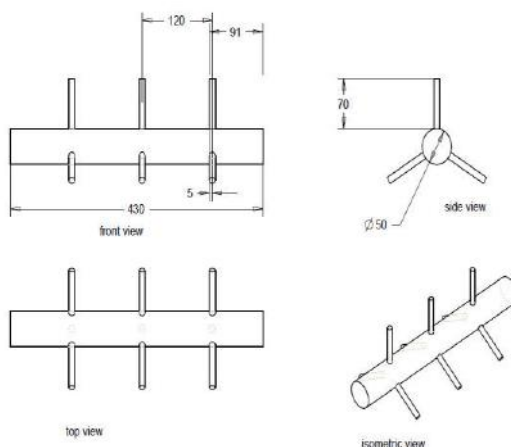


Fig 1.4: Feeder Shaft

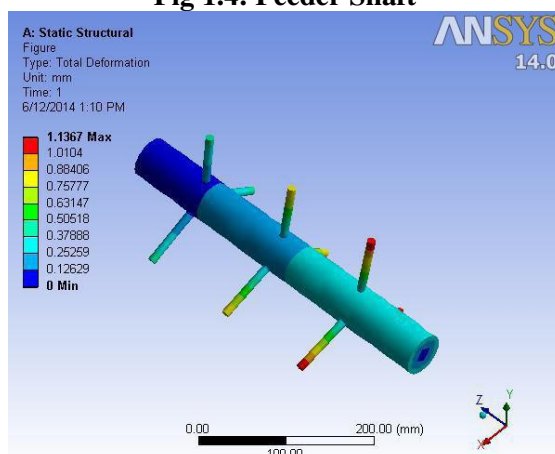


Fig 1.5: Feeder Shaft

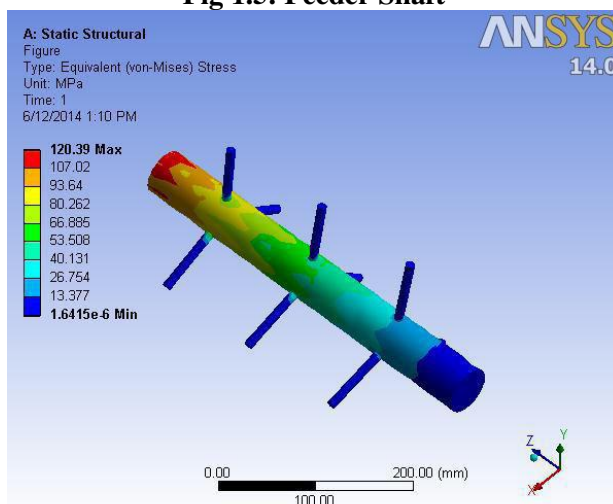


Fig 1.6: Stress

5. CONCLUSION:

The example of single roller was designed and residential. Single roller ginning machine is ended by v-belt and chain sprocket combination. The machine is simple and robust in construction. Quality evaluation studies designate that quality of lint is not affected. Prototype of single roller Ginning Machine have purpose in various cotton research institutes, agricultural universities, cotton markets, ginneries and seed industries for ginning and to find out ginning percentage. The propose improvements built-in in prototype Single roller gin are encouraging therefore scale-up model having roller length equivalent to one with commercial DR gin can be planned and developed. Further its' performance could do with to be evaluated by shipping out the extensive experimentation. Many methods are worn for the design analysis that assumes all the mean variables are continuous. But in actual structural analysis almost all the variables are discrete.. At each age band, a new set of approximations is formed by the process of selecting individuals according

to their level of fitness in the problem domain and breeding them together using operators borrowed from natural genetics. This process leads to the evolution of populations of individuals that are better suited to their environment than the individuals that they were created from, just as in natural adaptation. The replacement of conventional drive shaft results in reduction in weight of automobile. The finite element analysis is used in this work to predict the deformation of shaft. The deflection of steel, HS Carbon / Epoxy and HM Carbon / Epoxy shafts was 0.00016618, 0.00032761 and 0.0003261 mm respectively

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Performances Evaluation of Vacuum Operated Plastic Molding Machine

¹Prof. K .K. Tonpe, ²Prof. P. M. Wanjari,

¹Assistant Professor, ²Assistant Professor,

¹Department Of Mechanical Engineering, SCET, Nagpur, India.

Email - ¹Ketantonpe2704@gmail.com, ²prashanta13@gmail.com ,

Abstract: Vacuum-forming or thermoforming is one of the most common methods for processing plastic materials. Vacuum-formed products are prevalent in our daily lives. The process involves heating a plastic sheet until soft and then draping it over a mould. A vacuum is applied sucking the sheet onto the moulds can be rapid prototype models, thereby shortening the mould fabrication time. Using prototypes for the moulds makes it economically feasible to produce low quantities of large parts and to operate medium size production runs. More sophisticated machines and moulds are used for the continuous automated production of high volume items like yogurt pots and disposable mould. The sheet is then removed from the mould. In its advanced form, the vacuum-forming process utilizes sophisticated pneumatic, hydraulic and heat controls thus enabling higher production speeds and more detailed vacuum-formed applications. Vacuum-forming offers several processing advantages over other forming processes. Low forming pressures are used, which enables comparatively low cost tooling. And, since the process requires only low pressures cups and packaging.

It also offers many of the same benefits on its own with the only difference being that you do need to have a shape ready for making a mold. The design ideas are of course endless, and those with an entrepreneurial spirit should find this to be an enormously inspirational tool. Users have the self-sustainability of being able to create literally at the kitchen counter whatever their hearts desire, without having to go to a factory or middleman for manufacturing. This allows for a whole lot of fun but also speed in production, unheard-of affordability, and the ability to customize at will. Technology, specifically the introduction of the process technology, is expected to revolutionize vacuum-forming production and to bring with it additional benefits including, labor-cost savings, a shortening of product development time and new design developments.

Key Words: Plastic Molding, Plastic Molding, thermoplastic

1. INTRODUCTION:

In today's life, most of the items are made with plastics. And many things are made up by using plastic molds like ice cubes in an ice tray and much more. Responsible for churning out everything from construction helmets to hot tubs or food packing, Thermoforming is easily one of the fascinating forms of manufacturing. But this can be done by using industrial tools and machines and it also required some of the technical knowledge. As these machines are costly and required technical knowledge many small scale industry and small businessmen's cannot afford these machines and tools. Also, these industrial machines required more time, depend on the application of use.

So, we have to decide to make this Vacuum Operated Plastic Molding Machine(VOPMM)which will help to make plastics molds and items. This machine is used at industrial or at a commercial level. This machine can also be used by non-technical people to create molds in less time due to its relatively simple process.

Well, The VOPMM is about much more than just pretty as the mold maker can manufacture everything from cast concrete molds to architectural models, toys—and even a terrarium, as we get further out there with examples

It also offers many of the same benefits on its own with the only difference being that you do need to have a shape ready for making a mold. The design ideas are of course endless, and those with an entrepreneurial spirit should find this to be an enormously inspirational tool. Users have the self-sustainability of being able to create literally at the kitchen counter whatever their hearts desire, without having to go to a factory or middleman for manufacturing. This allows for a whole lot of fun but also speed in production, unheard-of affordability, and the ability to customize at will. Using the VOPMM and its vacuum-forming, the mold-making process is very simple.

Now, what is mean by Thermoforming? Thermoforming is a manufacturing process where a plastic sheet is heated to a pliable forming temperature, formed to a specific shape in a mold, and trimmed to create a usable product.

The sheet, or "film" when referring to thinner gauges and certain material types, is heated in an oven to a high-enough temperature that permits it to be stretched into or onto a mold and cooled to a finished shape.

There are so many processes and machines available in the market, the completion of the new model provide more practical usage than previous one. Researchers who have done work on design and analysis but still there are so many scopes regarding this design and analysis. Even though there are many types of the plastic molding machines.

The main purpose of the project is to get knowledge of analysis and fabrication. The design is user-friendly and uses simple properties. The design is done so that knowledge of analysis and fabrication are increased. In order to make it user-friendly, we planned to create a Vacuum Operated Plastic molding Machine that will reduce the time of manufacturing of plastic molds which is faster than any other type of manufacturing of plastic molds. This machine primarily usage is to save time and make it user-friendly. It can be used by anyone without technical skills. In today's life, most of the items are made with plastics. And many things are made up by using plastic molds like ice cubes in an ice tray and much more. Thermoforming is easily one of the fascinating forms of manufacturing. But this can be done by using industrial tools and machines. As these machines are costly and required technical knowledge many small scale industry and small businessmen's cannot afford these machines and tools. Thus this machine will help to save time and use it friendly.

This project involves the process of analysis the different plastics used in the molding machine considering the stresses and ergonomic factor for people to use. This project mainly about generating a new concept of vacuum forming that would make easier to make molds in less time. After the design has completed, it was transformed into its real product where the design is use for guidelines.

A Vacuum Operated Plastic Molding Machine is basically one of the most aidable machines. It helps to reduce the time required in the molding process. Thus it helps to create design ideas to increase business. Apart from that, this of vacuum forming can actually be the future mode of manufacturing molds. It can be used everywhere where plastic molds are required to create new designs shapes. But with the added a thermoforming concept can be applied.

2. PROBLEM IDENTIFICATION:-

Users of this technology are facing the problem of time, cost, and technical skills. When People wants to design their own plastic shapes or having an idea to create different things from these molds .They can't do this because this can be done by using industrial tools and machines and it also required some of the technical knowledge. As these machines are costly and required technical knowledge many small scale industry and small businessmen's cannot afford these machines and tools. Also, these industrial machines required more time, depend on the application of use.

The design ideas are of course endless, and those with an entrepreneurial spirit should find this to be an enormously inspirational tool. Users have the self-sustainability of being able to create literally at the kitchen counter whatever their hearts desire, without having to go to a factory or middleman for manufacturing. This allows for a whole lot of fun but also speed in production, unheard-of affordability, and the ability to customize at will. Using the VOPMM and its vacuum-forming, mold-making process is very simple

3. STUDY OBJECTIVE OF RESEARCH:-

The main objective of the Vacuum Operated Plastic Molding Machine is to create molds. This project is limited to the fabrication of the forming machine. The machine will be fabricated to mechanical and electrical systems. The design ideas are, of course, endless, and those with an entrepreneurial spirit should find this to be an enormously inspirational tool. Users have the self-sustainability of being able to create literally at the kitchen counter whatever their hearts desire, without having to go to a factory or middleman for manufacturing. This allows for a whole lot of fun but also speed in production, unheard-of affordability, and the ability to customize at will. Using the VOMM and its vacuum-forming, the mold-making process is very simple, and to understand it better, just take a look at the video we posted at the end of this article.

- ✓ Safety factor
- ✓ Easy to use:- Because of its simple design and construction it is easy to use.
- ✓ Cost factor: - The cost of machine operated to crush the can is less as compare to manual traditional method.
- ✓ Time factor: - The time required to de-shelled the coconut is upto 3 sec. in machine operated can crusher machine is much less than manually traditional process.

4. RESEARCH METHODOLOGY: -

- It involve the study of present design method. In this we will first identify the mould element to use to design and will find out the suitable plastic material by analytical as well as graphical method.
- Estimation of power required: Assumption for calculations of heat and force required in forming plastic material, suction force required to suck the air between the mould and forming plastic sheet.

- Selection of shaft: First select the shaft to provide height and support between the hotbox and vacuum box.
- Selection of Hotbox: Hotbox is a box in which heating process is carried out. It consist of heating coils and gypsum board. In the box gypsum board is used to stop the heat to pass through it and walls of the hotbox. Heating coils is used to create required amount of heat to heat the plastic material. The box is made up of sheet metal
- Selection and Design of Vacuum Box: A vacuum box is a box which is used to create suction, with the help of vacuum cleaner. The purpose of box is to create at the floor space where the object is to be mould and the given power can be used economically. For light duty purpose small vacuum box is used and for heavy duty large vacuum box is used.
- Selection of Vacuum Cleaner: It include the selection of vacuum cleaner usually vacuum cleaner of more than 11KW is used to create required suction pressure.
- Selection of Miniature Circuit Breaker (MCB): It include the selection of MCB usually dependent on the type of current use and power required.

5. CONSTRUCTION:

The major components of the developed Vacuum Operated Plastic Molding Machine (VOPMM) shown in Figure 6.1 are hot box, vacuum box, steel rods and Frames. The steel rods is the main supporting structure upon which other components of this machine were supported. The steel rods are a cylindrical bars made up of steels. these steel rods are hollow and having a thickness of 2mm. The steel rods having a length of 70cm and diameter of 2.54 cm The Molding machine unit comprises of two rods and both are supporting rods to the machine. The vacuum box plywood is 12mm thick, and dimensions of the vacuum box is 60x50x20cm. The suction area of the vacuum box is 30x40 cm. The hotbox is made up of sheetmetal and the dimensions of the hotbox is same as of vacuum box.

The construction of the machine comprises following parts to be assembled and fabricated:

- Hot Box
- Vacuum Box
- Frames
- Steel Rods
- MCB box
- Heating Coils
- Strainer
- Nuts, Bolts and Screws
- Vacuum Cleaner

6. WORKING OF MACHINE:

The working principle of a Vacuum Operated Plastic Molding Machine (VOPMM) is very simple. Thermoforming is one of the oldest and most common methods of processing plastic materials. Thermoformed plastic products are all around us and play a major part in our daily lives. It is a very versatile process used to manufacture a wide range of products from simple packaging trays to high impact aircraft cockpit covers. It is also used extensively to make design prototypes of products to be produced by other processes. The process, however, is basically the same in each case. In its simplest form thermoforming is the heating of a plastic sheet which is then draped over a mould whilst a vacuum is applied. The Molding is then allowed to cool before it is ejected from the mould using a reverse pressure facility. But because of robust design, cost and technical use. So, we had modified the design which is simple in use. It doesn't require a special technical knowledge and skilled labor, it also had a low cost. Here are the main steps of operating a Vacuum Operated Plastic Molding Machine (VOPMM):-

- Place an plastic sheet of required size and thickness inside the frame and fixed it by clamp.
- Raise the frame near upto the hotbox.
- Select a 3D template or object which u have to mould and place it on the strainer which is at the top of vacuum box.
- Switch on the Power supply of hotbox and wait for the required time to form the plastic sheet.
- Switching the vacuum cleaner on, lower the frame .
- Lower the frame all over the 3D template upto the top surface of the vacuum box.
- Wait for cooling down the plastic sheet.
- Remove the plastic sheet from the frame by unclamping it .
- Trimming of the Object

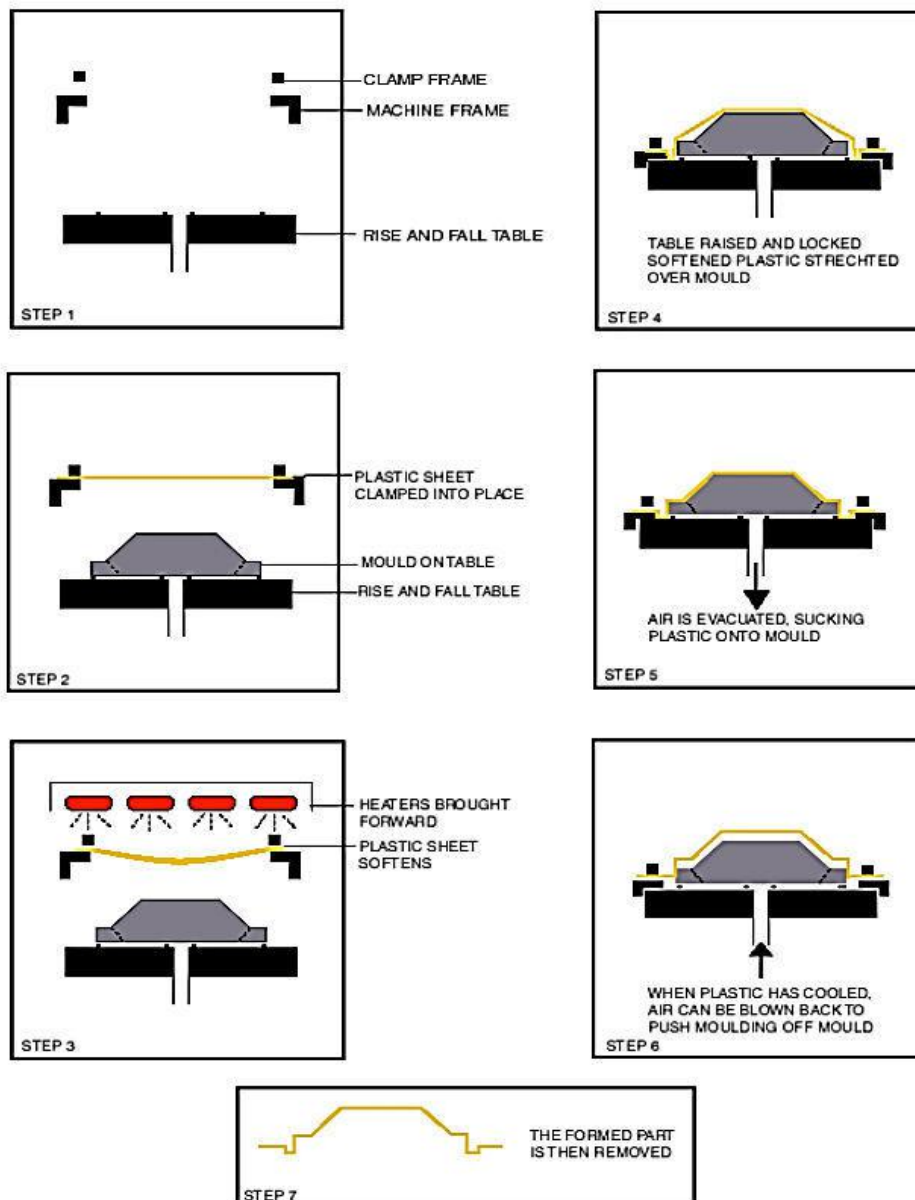


Figure 6.1 The basic principles of vacuum forming Machine



Figure 6.2 Vacuum Operated Plastic Molding Machine



Figure 6.3 Workshop Helmet Created on VOPMM

6. EXPERIMENTAL RESULT & DISCUSSION

For experiment, the following specimen of Plastics are considered,

Dimensions of Plastic sheets:-

Length, L = 350 mm

Width, W = 450 mm

The following tables show the comparison between Plastic Sheets of Different Materials and to compare Time to heat

1. Time Calculations of 1mm Thickness:-

Table 6.1 Time Calculations of 1mm Thickness

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	1 mm	30
2.	ABS	1 mm	40
3.	PP	1 mm	50
4.	PE	1 mm	50
5.	PETG	1 mm	30
6.	PVC	1 mm	30
7.	PC	1 mm	60

2. Time Calculations Of 1.5mm Thickness:-

Table 6.2 Time Calculation Of 1.5mm Thickness

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	1.5 mm	45
2.	ABS	1.5 mm	60
3.	PP	1.5 mm	75
4.	PE	1.5 mm	75
5.	PETG	1.5 mm	45
6.	PVC	1.5 mm	45
7.	PC	1.5 mm	90

3. Time Calculations of 2 mm Thickness:-

Table 6.3 Time Calculation of 2mm Thickness

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	2 mm	60
2.	ABS	2 mm	80
3.	PP	2 mm	100
4.	PE	2 mm	100
5.	PETG	2 mm	60
6.	PVC	2 mm	60
7.	PC	2 mm	120

4. Time Calculations of 3 mm Thickness:-

Table 6.4 Time Calculation Of 3mm Thickness

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	3 mm	90
2.	ABS	3 mm	120
3.	PP	3 mm	150
4.	PE	3 mm	150
5.	PETG	3 mm	90
6.	PVC	3 mm	90
7.	PC	3 mm	180

5. Time Calculations Of 5 mm Thickness:-

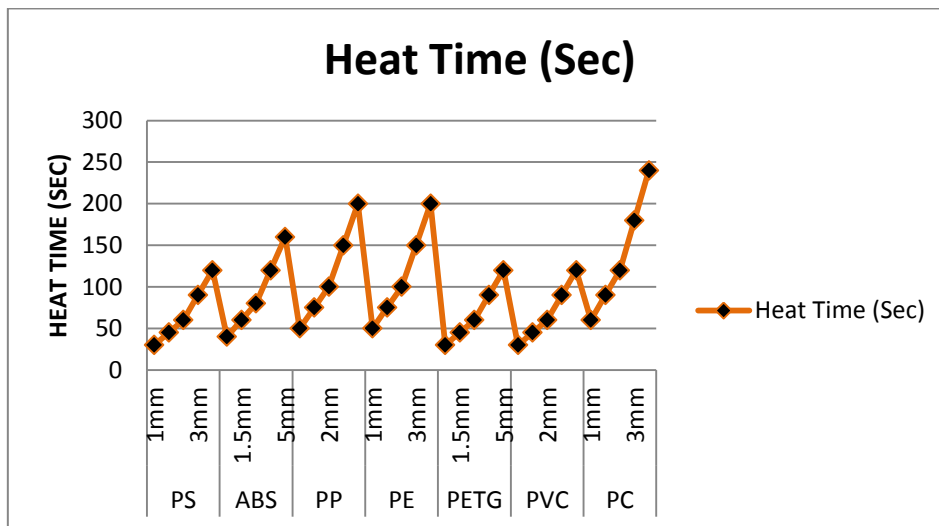
Table 6.5 Time Calculation Of 4mm Thickness

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	5 mm	120
2.	ABS	5 mm	160
3.	PP	5 mm	200
4.	PE	5 mm	200
5.	PETG	5 mm	120
6.	PVC	5 mm	120
7.	PC	5 mm	240

7. RESULT & DISCUSSION:

Comparison between plastic material to time to heat at different sheet thickness:-

Sr. No.	Plastic Material	Thickness (mm)	Heat Time (Sec)
1.	PS	1mm	30
		1.5mm	45
		2mm	60
		3mm	90
		5mm	120
2.	ABS	1mm	40
		1.5mm	60
		2mm	80
		3mm	120
		5mm	160
3.	PP	1mm	50
		1.5mm	75
		2mm	100
		3mm	150
		5mm	200
4.	PE	1mm	50
		1.5mm	75
		2mm	100
		3mm	150
		5mm	200
5.	PETG	1mm	30
		1.5mm	45
		2mm	60
		3mm	90
		5mm	120
6.	PVC	1mm	30
		1.5mm	45
		2mm	60
		3mm	90
		5mm	120
7.	PC	1mm	60
		1.5mm	90
		2mm	120
		3mm	180
		5mm	240



Graph 7.1 :- Comparison between plastic material to time to heat at different sheet thickness

The results of the performance test above table show that Different thermoplastics have different characteristics and are better suited to specific applications. Ideally the material should be easy to form with a low forming temperature, good flow characteristics and thermal strength, high impact strength and low shrinkage on cooling. To improve thermal stability in certain materials like, for example, PVC, stabilizers are added to help prevent degradation when heated. The machine was fabricated with standard and locally sourced materials and its estimated cost Twenty Eight thousand (Rs.28000.00) thus, the machine is affordable to small industries and maintainable

8. CONCLUSION:

From the above study, it was found that vacuum operated plastic molding machine can be used instead of other molding process as well as we can implement plastic moulds, food packing boxes etc. Users have the self-sustainability of being able to create literally at the kitchen counter whatever their hearts desire, without having to go to a factory or middleman for manufacturing. This allows for a whole lot of fun but also speed in production, unheard-of affordability, and the ability to customize at will. The molding machine is constructed in such a way that even a illiterate can operate it without much skills and knowledge. It is made efficient and the cost of production of this molding machine is very less. This solely will reduce the cost of manufacturing and increase the small scale productions.

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Synthesis and characterization of europium ion doped polymer in optoelectronic Nano Devices

¹ S. G. Itankar, ² M. P. Dandekar,

¹Assistant Professor, ²Assistant Professor

¹ Department of Basic Science and Humanities,

Suryodaya College of Engineering and Technology, (Polytechnic), Nagpur, India.

Email - ¹skawadkar18@gmail.com, ²mpdandekar.@gmail.com,

Abstract: Optical materials doped with rare earth elements are of great importance in science and technology. In this paper Eu³⁺ doped Polysterene (PS) nanofibers have been fabricated by electrospinning technique. The fabricated fibers were characterized by scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), energy dispersive spectroscopy (EDX) and photoluminescence (PL). Spectral analysis of PS/Eu³⁺ nanofibers has been made based on the measurement of the emission spectra. The photoluminescence properties shows superior bright red emission spectra from the Eu³⁺ and relatively stronger hypersensitive behavior of the ⁵D₀ → ⁷F₂ transition. Eu³⁺ doped Polysterene (PS) nanofibers are very much suitable for photoluminescent white light fabric designing in smart textiles. It also shows the potential application in various polymer optoelectronic devices. This paper represent the brief discussion on the potential application of smart nano fabric in the field of textiles.

Keywords - Polysterene (PS) nanofibers; electrospinning; photoluminescence.

1. INTRODUCTION:

The one dimensional nanostructures have been interesting because when the diameters of the material are shrunk to nanometers, several specific characteristics such as very large surface area to volume ratio, improved mechanical performance, and flexibility in surface functionalities appear [1-3]. Recently, nanofibers have attracted much attention due to their large specific surface area, high aspect ratio and so on [4,5]. Among various nanomaterials processing technique, electrospinning has become one of the versatile, simple and convenient technique that uses electrostatic force to produce polymeric, ceramics and composite continuous ultrafine fibers with diameter ranging from microns to a few nanometers [6-8]. The properties of electrospun nanofibers significantly depend upon the material from which they are made. Currently nanofiber can be produced on an industrial scale from dozens of polymers including biocompatible or environmentally friendly biodegradable polymers. Polymer nanofibers are promising candidates for next generation photonic devices, e.g. fibrous dielectric nanostructures can be used as single mode light waveguides, sensors or building blocks of photonic band gap materials. Nanofibers with photoluminescence properties can provide a wide range of applications in photovoltaic devices, photodiodes, sensors, wave-guiding and all optical switching [9].

2. MATERIALS:

Synthesis of PS/Eu³⁺ solution

Initially PS solution was prepared by using 1g of PS powder in 10 ml N, N dimethylformamide (DMF). Then solution was stirred for 5 hours at room temperature. EuCl₃ of different weights (0.1g and 0.5g) were separately dissolved in the PS solution to obtain EuCl₃/PS solution with 1:10 and 1:2 concentrations. Each of EuCl₃/PS solution was rigorously stirred for 12 hours at room temperature for homogenous mixing. The PS/Eu³⁺ solutions were ready for the fabrication for nanofibers.

3. METHOD:

3.1 FABRICATION OF POLYMERS/EU³⁺ NANOFIBERS BY ELECTROSPINNING

The PS/Eu³⁺ nanofibers were fabricated by electro spinning. The prepared solution of europium doped polysterene PS/Eu³⁺ was then loaded into a different 5 ml disposable glass syringe with a stainless steel needle having an orifice of 0.5 mm. The needle was electrically connected to a positive high voltage 18 KV provided between the

needle and the collector placed at a distance of 20 cm. The solution flow rate was kept at 0.4 ml/hr and maintained using computer control programming. A dense web of different polymer/Eu³⁺ nan fibers were collected after around 10 hours on the grounded collector made of aluminum foil of thickness 0.05 mm. The nan fibers were then dried in vacuum oven at 80°C for 12 hours. Same procedure is repeated for the weight composition of EuCl₃/polymer = (1:2). The electro spun nan fibers were ready for the characterization [10-13].

4. DISCUSSION:

4.1 PS/Eu³⁺ NANOFIBERS

Similarly, SEM images of electro spun PS/Eu³⁺ nan fibers are shown in Fig.1. The average diameter of PS/Eu³⁺ was found to be 150 nm and 1400 nm for composition (1:10) and (1:2) respectively. This results because of addition of Eu³⁺ ions in the polymer solution.

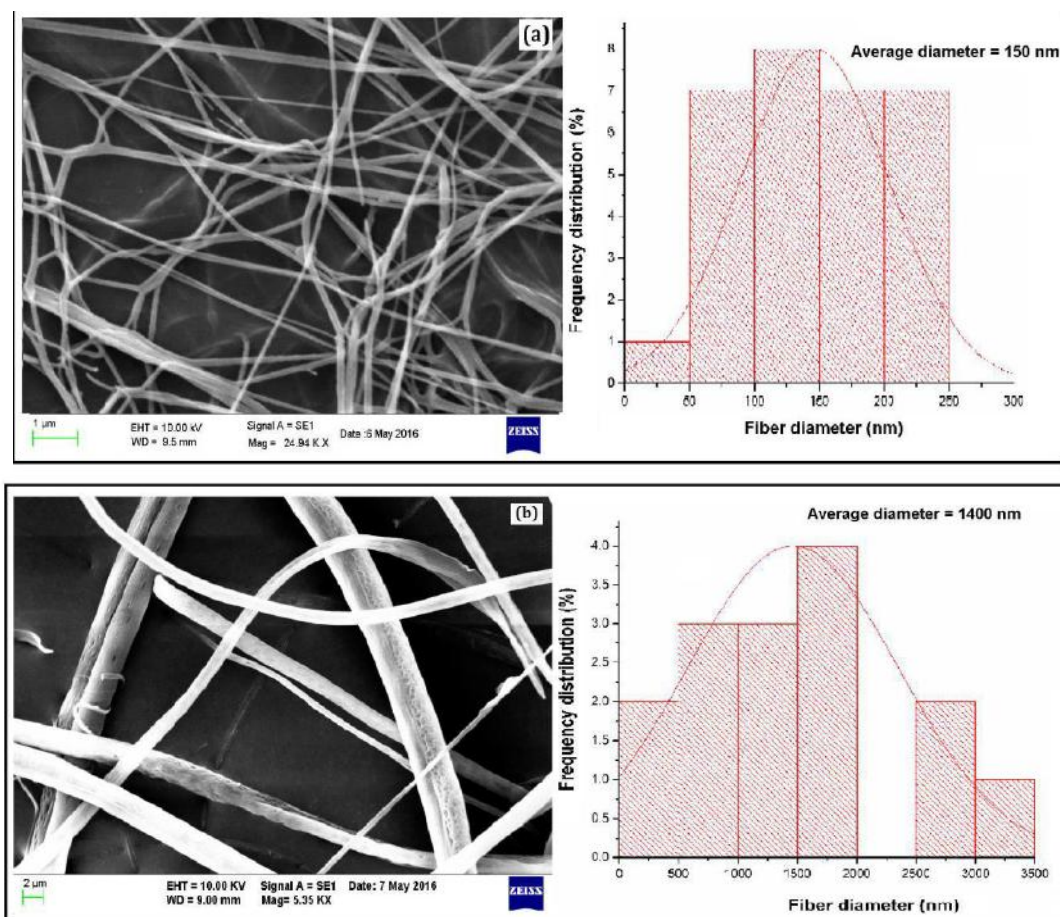


Figure 1. SEM images and histogram of electrospun nanofibers (a) PS/Eu³⁺ (1:10) and (b) PS/Eu³⁺ (1:2)

From overall results of SEM images and their respective histograms it was clear that on addition of Eu³⁺ with the polymers, there is slightly change in the diameter of the SEM images of nanofibers. Due to doping of Eu³⁺ the ions are getting homogeneously mixed with polymers. The effect of Eu³⁺ was seen on the diameter of nanofibers, results in the form of increased diameter. It was happened because of the strong interaction between the Eu³⁺ ions and polymer molecular chain which avoids the formation of beads during the process of synthesis. Another reason behind this increasing diameter of nanofibers is the addition of metal ions. Adding metal ions (Eu³⁺) increases the electrical conductivity of solution. These results to increase in surface charge of spinning jet. Because of this spinning, solution becomes more fluent due to decrease in viscosity and increase the jet quantity of solution. Hence results in increase the diameter of nanofibers[14].

4.2 EDX SPECTRUM OF PS/EU³⁺

The peak for element Eu can be detected confirming its existence in PS/Eu³⁺ nanofibers (fig.2). PS/Eu³⁺ contain maximum concentration of carbon only indicates its presence due to PS polymer. PS contains concentration of carbon only.

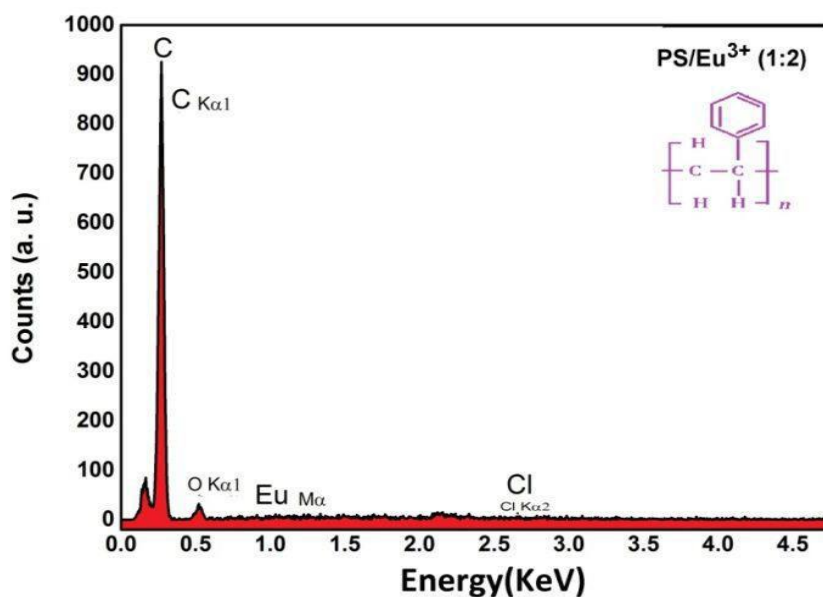


Fig.2. EDX spectrum of PS/Eu³⁺

4.3 XRD of PS/Eu³⁺

The XRD profiles for the sample PS/Eu³⁺ (1:2) nanofibers are shown in figure 3. From literature it was found that the XRD of pure PS nanofibers shows a broad diffraction noncrystalline peak, suggesting that the sample is largely in an amorphous state [15]. But when Eu³⁺ ions are doped in polystyrene, more intense and sharp crystalline diffraction peaks at 2 θ values of 39.2°, 45.6° and 58.2° corresponding to (100), (200) and (110) confirms the semi-crystalline nature (JCPDS card no.38-0928). The peaks of PS/Eu³⁺ nanofibers show semi-crystalline nature [16]. This confirms that Eu³⁺ ions are doped in PS.

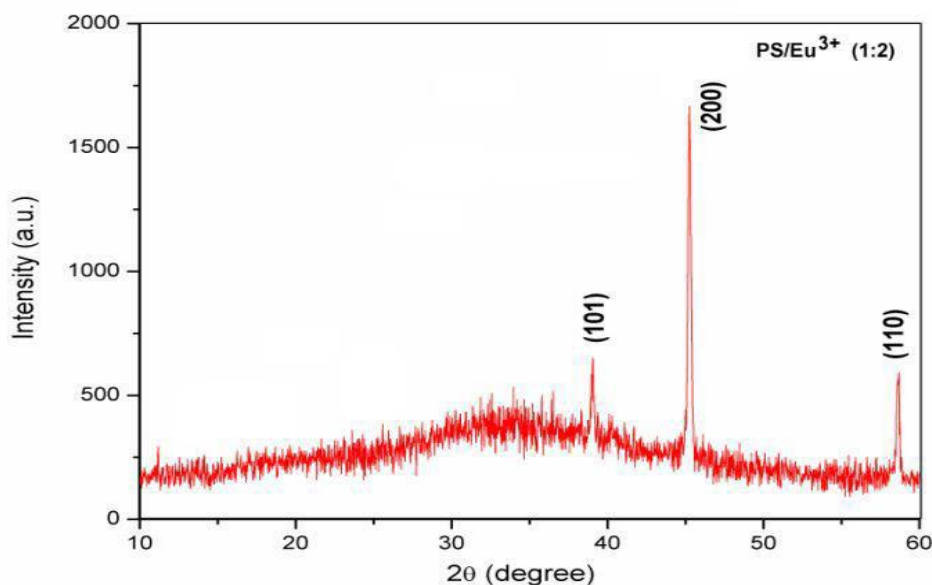


Figure 3. XRD of PS/Eu³⁺

4.4 FTIR of PS/Eu³⁺ Nanofibers

FTIR of pure PS and PS/Eu³⁺ (1:2) nanofibers are shown in fig.4. The FTIR of PS spectra show absorption at 1724.69 cm⁻¹, 1536.53 cm⁻¹ are characteristic vibration bands of aromatic C=C contributing from styrene units. Bands at 1536.53 cm, 1447.37 cm and 1089.70 cm are corresponding to C-C stretching frequency of ring in the plane; C-C stretching vibration of ring in the plane, C-C stretching frequency of ring in the plane and C-H bending vibration of ring in the plane respectively. In FTIR of PS/Eu³⁺ spectra, the appearance of the band on high frequency side at 2357.24 cm⁻¹, which was also induced by the Eu³⁺ ions coordination with the C-H group of PS molecule chains, indicating Eu³⁺ doped in PS matrix [17-19].

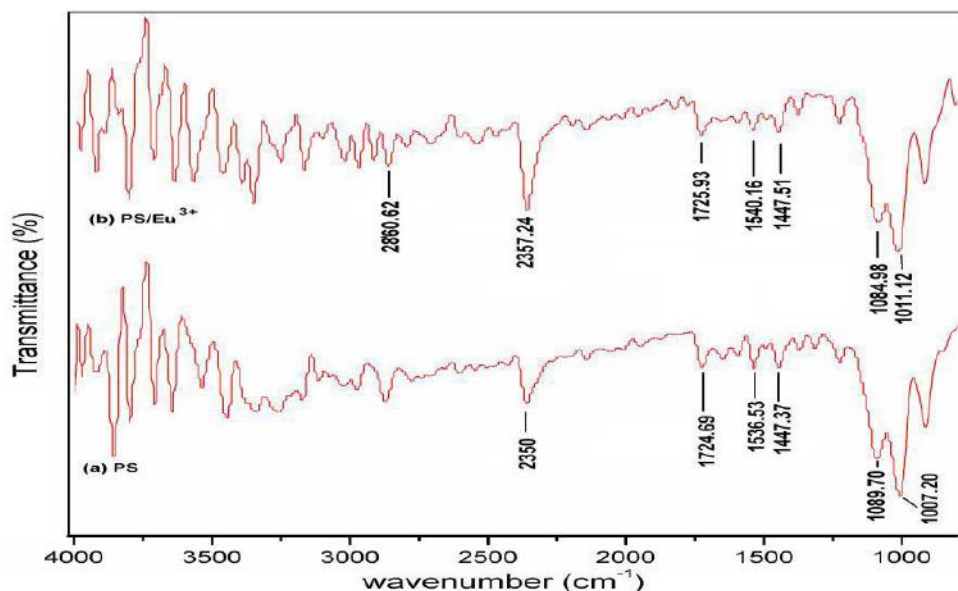


Figure 4. FTIR of pure PS and PS/Eu³⁺ (1:2) nanofibers

4.5 PS/Eu³⁺ nanofibers

Figure 5 shows excitation spectra of PS/Eu³⁺ (1:2) nanofibers registered at room temperature by monitoring the luminescence intensity of the (⁵D₀ → ⁷F₂) transition at 616 nm. It is observed that the nanofibers exhibit an intense broad excitation band at 411 nm. Figure shows the emission spectra of PS/Eu³⁺ nanofibers with different weight compositions (1:10, 1:2) under 411 nm. It has emission band at near about 592 and 616nm which was the characteristics of photoluminescence of europium ions. Its emission intensity is very less as compared to all other fabricated nanofibers. In this figure the intensity of magnetic dipole transition and electric dipole transition are very weak. It may be due to non homogeneous distribution of europium ions with molecular chain of polystyrene[20,22].

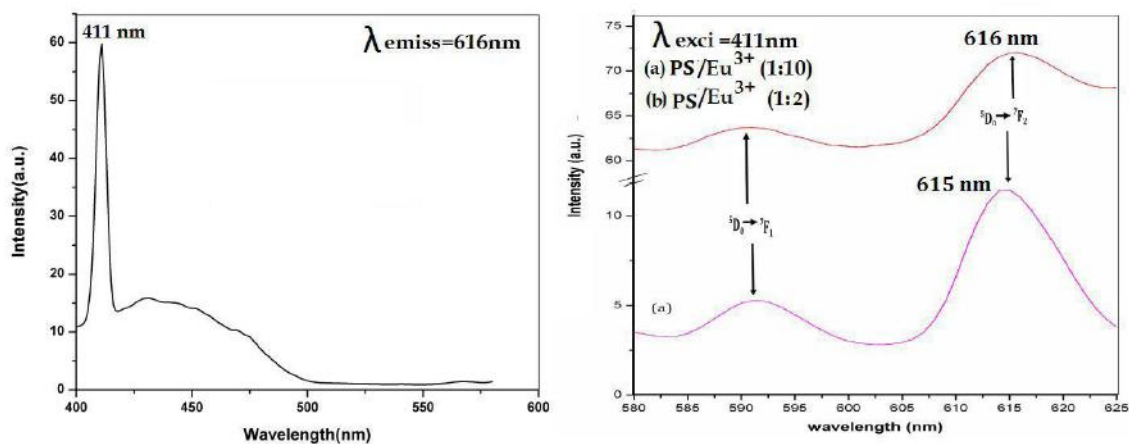


Figure 5. Excitation and Emission spectra of PS/Eu³⁺ (1:2) nanofibers.

4.6 CIE chromaticity coordinates for PS/Eu³⁺

To evaluate the material performance on color luminescent emission, CIE chromaticity coordinates are evaluated for the polymer/Eu³⁺ at excitation wavelengths of 411 nm. It can be clearly seen from the diagram and the calculated values that polymer/Eu³⁺ samples give an intense red emission due to the presence of relatively intense 614 nm lines (⁵D₀ → ⁷F₂) under 411 nm excitation. The CIE coordinates (x, y) is represented as the point ‘ . ’ in the CIE diagram.

The CIE diagram shows emission color coordinates. The CIE coordinates for the prepared nanofibers are with the help of CIE diagram as shown in figure 5. From figures it is observed that with an increase in the concentration of doping of the Eu³⁺ ions with polymer, there is a small shifting of CIE color coordinates towards the more intense red light and hence showing increase in the emission intensity. It confirms that along with the increase in concentration of europium, the intensity of red light emission also increases.

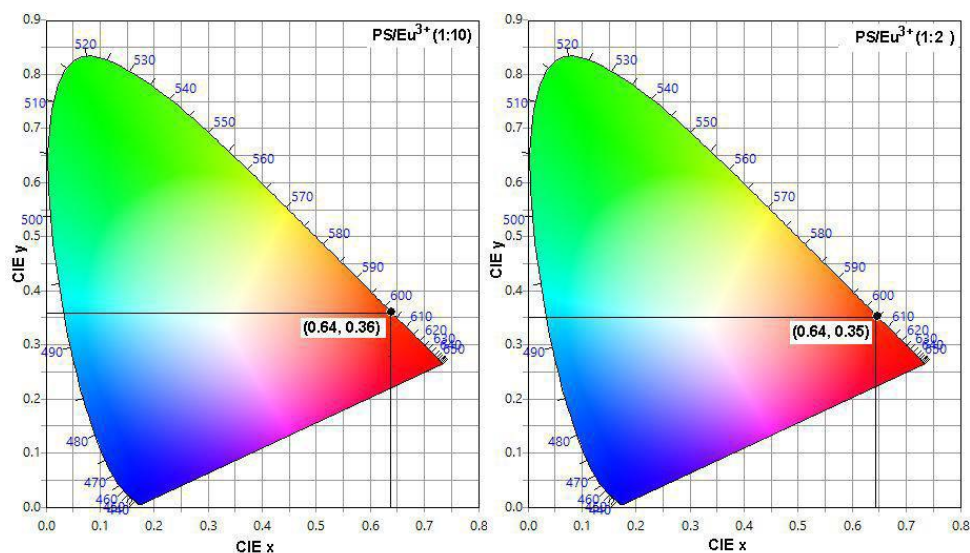


Figure 6. CIE chromaticity coordinates for PS/Eu³⁺

5. CONCLUSION:

Electrospun polymer nanofibers have been studied in wide range of application from medical to consumer products and industry to high tech applications. Electrospun nanofibers were extensively used in making bullet proof military jackets because of the property of hardness as well as bending flexibility. In future, number of photoluminescent nanofibers can be fabricated by using various rare earth complexes like Eu(TTA₃)phen, Eu(DBM) in textiles industries which show photoluminescent properties for making new kind of light emitting clothes. Photoluminescent fabric is one of the most common ways to use nanotechnology in the textile industry. Light emitting fibers can be woven into textiles and used in making glowing clothes.

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27th March, 2018 at Suryodaya College of Engineering and Technology, (Polytechnic)
Near Dighori Naka, Vihirgaon, Nagpur, MH, India

Comparative chromatographic study of Silica gel-G, Urea formaldehyde & Starch as an adsorbents for the separation of some toxic metal cations by Thin Layer Chromatography.

V. S. Nagpurkar

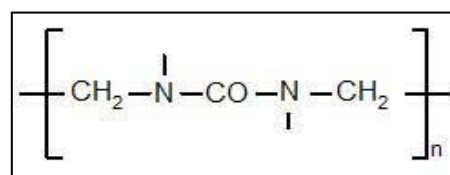
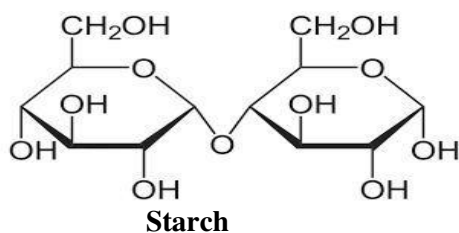
Assistant Professor, Department of Basic Sciences and Humanities
Suryodaya College of Engineering and Technology, Vihirgaon, Umrer Road, Nagpur, India
Email id:- Vijay_17nagpurkar@yahoo.co.in

Abstract: Different stationary phases were used to obtained effective separation of Cr^{6+} , Fe^{3+} , Cu^{2+} , U^{6+} , V^{5+} , Ni^{2+} , Co^{2+} and Ag^+ from their three and four component mixtures by thin layer chromatography. The separations were carried out on Silica gel G, Urea Formaldehyde polymer, Starch, Mixture of Urea Formaldehyde & Starch, mixture of Urea Formaldehyde & Silica gel-G using aqueous solutions of cationic and anionic surfactants as mobile phase. Of all above adsorbent, silica gel-G and urea formaldehyde were found to be most suitable adsorbents. The effect of concentration and pH of mobile phase on the R_f values of individual metal ions were studied and optimum conditions for separation of metal ions from their mixture were established. Up to mixtures of four components could be effectively separated by anionic surfactant (Sodium Dodecyl Sulphate) as mobile phase while only ternary mixtures could be separated by cationic surfactants (Benz Alkonium Chloride) as a mobile phase.

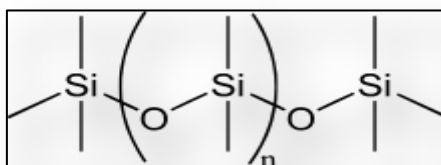
Key Words: SDS, BAC, Thin Layer Chromatography

1. INTRODUCTION:

Due to industrialization, there is an increased usage of metallic substances. Industrial waste is the major source of different kinds of metal pollution in aquatic systems. The major sources of pollution of toxic metals are electroplating stainless steel industries, metal finishing industrial effluents, sewage and waste-water treatment plants discharge and chromates from cooling water [1]. A lot of organic and inorganic solvents have been used by different researchers. Even amino acid like Valine, L-IsoLeucine etc have been used for separation of toxic metal ions[1,2]. Some workers have tried to study difference in the migration of ions using impregnated and non impregnated silica gel-G using formic acid [4]. Aqueous solution of Oxalic acid as a solvent was used with silica gel G to develop rapid method of separation [3]. Ammonia solutions and amino acids was successfully used to separate heavy toxic metal cation[5] & [7], Carbamid-Formaldehyde polymer used as thin layer for chromatographic separation[6]. There was need to study the effect on mobility on different adsorbent like urea formaldehyde and starch to enhance the method to separate mixture of toxic metal ions. The present study involves use of silica gel G, laboratory prepared urea formaldehyde polymer, starch, mixture of silica gel G and urea formaldehyde polymer and mixture of urea formaldehyde polymer and starch as an adsorbent to observe their effect on mobility variation on separation of metal cations comparatively



Urea formaldehyde



Silica Gel

2. EXPERIMENTAL:

2.1 APPARATUS

Glass plates, Glass jars with lid for the development of glass plates, Glass sprayer for spraying reagents, pH meter.

2.2 REAGENTS :

Urea, formaldehyde solution, silica gel-G, starch, SDS (Sodium Dodecyl Sulfate) and BAC (Benzalkonium Chloride) were obtained from Merck. Dimethylglyoxime, dithiozone, potassium ferrocyanide, silver nitrate and ethanol were obtained from SD Fine (India). All other chemicals were of analytical grade.

2.3 STOCK SOLUTIONS:

TLC was performed using standard 1% aqueous solution of chloride, nitrate, potassium or sulphates of metal ions listed.

2.4 DETECTION:

Fe^{3+} , Cu^{2+} , U^{6+} , V^{5+} were detected using 1% aqueous potassium ferrocyanide, Co^{2+} & Ni^{2+} were detected using a 1% solution of alcoholic dimethylglyoxime, Ag^{+} was detected by 0.5% of dithiozone in carbon tetrachloride and Cr^{6+} was detected by using saturated solution of alcoholic silver nitrate.

2.5 PROCEDURE:

1. Preparation of plates: Since different coating materials were to be used, the plates were prepared in laboratory. Slurry of Silica gel G, laboratory prepared urea formaldehyde polymer, Starch, mixture of silica gel G and urea formaldehyde 1:1 ratio and mixture of urea formaldehyde and starch in 1:1 ratio were prepared using double distilled water. It was then immediately applied to the glass plates by the dipping method and dried overnight at room temperature.

2. Application of Sample and Running the plate: The test solutions were spotted on overnight dried plates using fine capillary. The spots were dried using a drier. The SDS and BAC in different concentration were adjusted at required pH using sodium hydroxide and Hydrochloric acid. The plates were run for 2, 4 and 5 minutes to conclude the best plate development time.

3. Development of plate: The plates were removed from jar dried and spots were located by using different spraying reagents. All experiments were carried out at room temperature. The R_f values were measured in triplicate for each measurement.

3. RESULT AND DISCUSSION:

The various experiments were carried out to study the change in R_f value of metal cation using anionic surfactant (SDS) and cationic surfactants (BAC). To decide upon the best suitable stationary phase and experimental conditions the different concentrations of both surfactants were prepared from 1% solution to 5% solution. Plates with stationary phase such as Silica gel G, Urea Formaldehyde, Starch, 1:1 mixture of Silica gel and Urea Formaldehyde, 1:1 mixture of Urea Formaldehyde and Starch were used. Also to fix the time the chromatogram was run from 2 min to 5 min.

3.1 Choice of Proper Adsorbents:

The chromatogram of individual metal ions using different adsorbents i.e. Silica gel G, Urea formaldehyde, Starch, 1:1 mixture of Silica gel and Urea Formaldehyde and 1:1 mixture of Urea Formaldehyde and Starch were run. The conditions for running these chromatograms were arbitrarily fixed. The results obtained are tabulated in table no.1 and 2. Table 1 and 2 reveals that most of the metal ions can be separated effectively on silica gel G, urea formaldehyde and mixture of urea formaldehyde and silica gel-G using surfactants. With urea formaldehyde as an adsorbent separation of metal ions in ternary and quaternary mixtures can be achieved in 5 min. When mixed adsorbents were used it was observed that most of the metal ions travel near solvent front. Using mixture of urea formaldehyde with silica gel-G and starch as an adsorbent many ternary and quaternary mixtures can be separated using both the surfactants. From the results obtained from Table 1 and 2 it was concluded that urea formaldehyde is an alternative adsorbent in place of silica gel-G for the separation of metal ions in aqueous solution of surfactant.

media because many ternary and quaternary mixtures can be separated on urea formaldehyde polymer and the spots obtained were quite compact and sharp.

Table 1

Variation in R _f values with adsorbents					
Solvent: 3% SDS		pH=3		Development Time= 3 Minutes	
Metal ions	Adsorbents				
	R _f values				
	Silica gel-G	Urea Formaldehyde	Starch	1:1 Mixture of Silica gel-G and Urea Formaldehyde	1:1 Mixture of Urea Formaldehyde and Starch
Fe ³⁺	0.88	0.10	0.92	0.15	0.90
Cu ²⁺	0.65	0.46	0.69	0.50	0.66
U ⁶⁺	0.59	0.28	0.53	0.30	0.65
V ⁵⁺	0.89	0.78	0.93	0.80	0.93
Co ²⁺	0.80	0.72	0.78 ^a	0.76	0.80 ^a
Ni ²⁺	0.87	0.90	0.89	0.93	0.87
Ag ⁺	0.90 ^b	0.090 ^b	0.42 ^b	0.093 ^b	0.48 ^b
Cr ⁶⁺	0.56 ^c	0.59 ^c	0.48 ^c	0.62 ^c	0.65 ^c

Table 2

Variation in R _f values with adsorbents					
Solvent: 3% BAC		pH=3		Development Time= 3 Minuets	
Metal ions	Adsorbents				
	R _f values				
	Silica gel-G	Urea Formaldehyde	Starch	1:1 Mixture of Silica gel-G and Urea Formaldehyde	1:1 Mixture of Urea Formaldehyde and Starch
Fe ³⁺	0.86	0.16	0.89	0.13	0.87
Cu ²⁺	0.59	0.76	0.72	0.71	0.62
U ⁶⁺	0.48	0.22	0.56	0.20	0.60
V ⁵⁺	0.90	0.96	0.90	0.75	0.96
Co ²⁺	0.88	0.82	0.86 ^a	0.76	0.85 ^a
Ni ²⁺	0.88	0.90	0.93	0.89	0.87
Ag ⁺	0.90 ^b	0.92 ^b	0.40 ^b	0.65	0.42 ^b
Cr ⁶⁺	0.50 ^c	0.56 ^c	0.54 ^c	0.62 ^c	0.67 ^c

^a Detection clarity is poor.

^b Tailed spot.

^c Double spot.

3.2 Effect of development time:

To study the effect of development time on R_f values number of experiments performed and the results obtained are given in table 3 and 4. The R_f values were measured at pH=3 and concentration 3%. When migration time was restricted to 3 min in case of both surfactants only binary mixtures could be effectively separated. As the time was increased to 5 min up to quaternary mixtures could be separated. Further increase in time did not show much effect on R_f values. Hence migration time was fixed at 5 min.

Table 3

Variation in R_f values with adsorbents				
Solvent: 3% SDS		pH=3		Adsorbent: Urea Formaldehyde Polymer
Metal ions	Development Time in Minuet			
	R_f values			
	3	5	10	15
Fe ³⁺	0.10	0.11	0.11	0.10
Cu ²⁺	0.46	0.48	0.45	0.46
U ⁶⁺	0.28	0.30	0.30	0.28
V ⁵⁺	0.78	0.78	0.78	0.78
Co ²⁺	0.72	0.75	0.76	0.76
Ni ²⁺	0.90	0.90	0.91	0.90
Ag ⁺	0.090 ^b	0.093	0.090	0.090
Cr ⁶⁺	0.59 ^c	0.54	0.55	0.55

Table 4

Variation in R_f values with adsorbents				
Solvent: 3% BAC		pH=3		Adsorbent: Urea Formaldehyde Polymer
Metal ions	Development Time in Minuet			
	R_f values			
	3	5	10	15
Fe ³⁺	0.16	0.15	0.15	0.16
Cu ²⁺	0.76	0.72	0.73	0.72
U ⁶⁺	0.22	0.20	0.20	0.20
V ⁵⁺	0.96	0.90	0.90	0.91
Co ²⁺	0.82	0.82	0.83	0.82
Ni ²⁺	0.90	0.92	0.90	0.90
Ag ⁺	0.92 ^b	0.90	0.91	0.88
Cr ⁶⁺	0.56 ^c	0.52	0.52	0.53

^a Detection clarity is poor.

^b Tailed spot.

^c Double spot.

3.3 Effect of pH of aqueous solutions of cationic and anionic surfactants on migration of ions: Chromatograms were run using aqueous solutions of cationic and anionic surfactants of different pH. The graphs were plotted to clearly show the effect of pH of solvent on migration of metal ions.

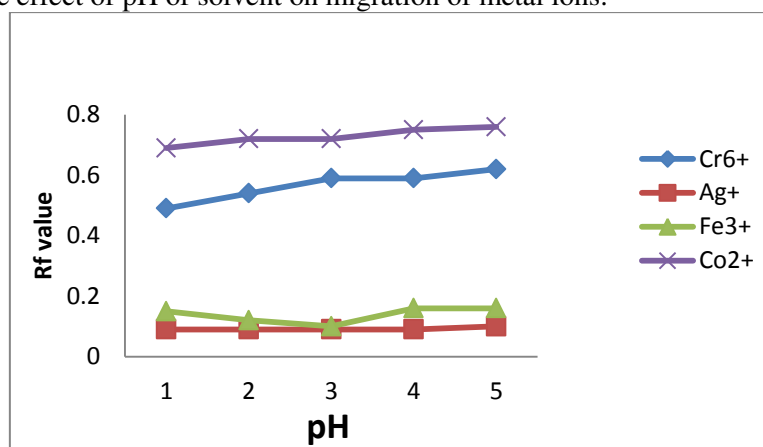


Figure 1: Separation of metal ions with 3% SDS

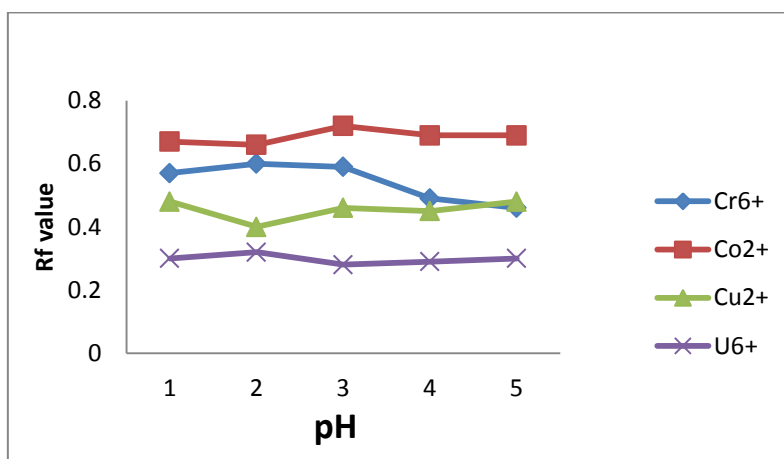


Figure 2: Separation of metal ions with 3% SDS

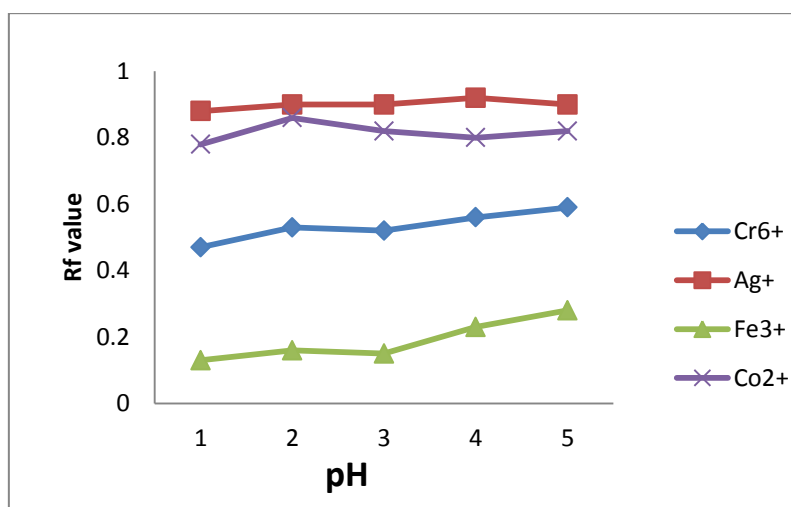


Figure 3: Separation of metal ions with 3% BAC

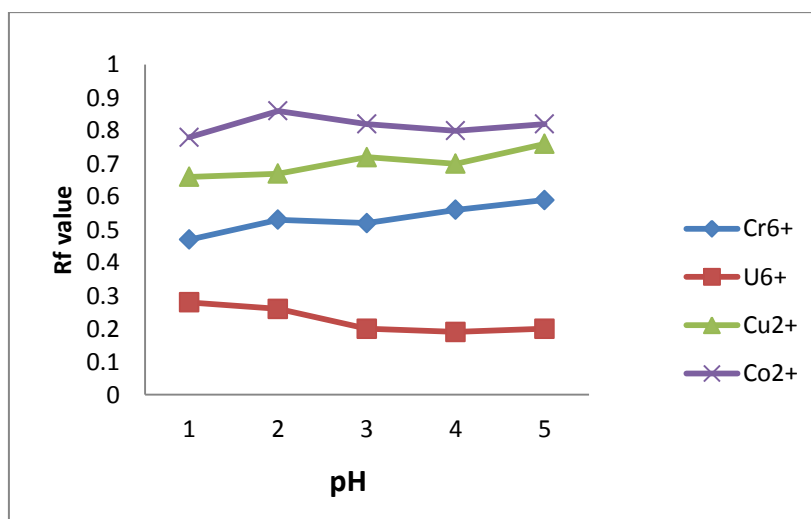


Figure 4: Separation of metal ions with 3% BAC

The above graphs clearly indicate when individual metal ions were developed using urea formaldehyde polymer as an adsorbent and development time was maintained as 5 min. At pH=3 with aqueous solutions of SDS - and BAC ternary and quaternary mixtures can be separated.

4. CONCLUSION:

The entire data represented above clearly indicate that even though SDS and BAC are surfactants behaves entirely different. Of all stationary phases used silica gel-G and urea formaldehyde were found to be most suitable. The efforts were taken to minimize the development time and 5 min development time was found to be sufficient to

develop chromatogram. Finally urea formaldehyde and silica gel – G shows better separations than rest of the adsorbents. Few representative mixtures that were separated are shown below.

Mixtures that were separated with 3% SDS (Anionic surfactants) at pH=3 and development time 5 min with urea formaldehyde as stationary phase.

1. Cr^{6+} (0.58); Ni^{2+} (0.89); Fe^{3+} (0.11); V^{5+} (0.76).
2. Cr^{6+} (0.54); Ag^+ (0.091); Cu^{2+} (0.47); Co^{2+} (0.76).
3. Cr^{6+} (0.54); U^{6+} (0.29); Fe^{3+} (0.10); Co^{2+} (0.74).
4. Co^{2+} (0.72); U^{6+} (0.22); Ag^+ (0.096); Fe^{3+} (0.12).
5. Cr^{6+} (0.52); Co^{2+} (0.70); Cu^{2+} (0.46); V^{5+} (0.79).

Mixtures that were separated with 3% BAC (Cationic surfactants) at pH=3 and development time 5 min with urea formaldehyde as stationary phase.

1. Ag^+ (0.92); U^{6+} (0.26); Cu^{2+} (0.72); Fe^{3+} (0.18).
2. Cr^{6+} (0.59); Ni^{2+} (0.88); Co^{2+} (0.80); V^{5+} (0.96).
3. Cr^{6+} (0.62); Ag^+ (0.94); U^{6+} (0.22); Co^{2+} (0.81).
4. Ni^{2+} (0.90); Fe^{3+} (0.13); Cr^{6+} (0.58); Cu^{2+} (0.75).

Many more combination of mixtures can be separated.

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Review of Multiplier's Design Circuit Using Reversible Logic Using Tanner Tool

¹Sumit Chafale, ²Sachin Malke,

¹Assitant Professor , ²Associate Proffesor,

¹Electronics & Telecommunication Engineering Department,

¹Suryodaya College of Engineering & Technology, Nagpur, India

Email – ¹sumit.chafale28@gmail.com, ² sachininfo123@gmail.com,

Abstract: For increasing performance, system capacity, minimized cost etc. Reversible logic gates are used, which is used to reduce heat dissipation and information loss This paper proposes a 4x4 bit reversible multiplier circuit using Reversible logic gate which can multiply two 4- bit numbers. It is simple and faster as compared to existing one

Key Words: Reversible logic, Reversible gate, power dissipation, Garbage.

1. INTRODUCTION:

Multiplier are used for low power consumption and high speed. Multipliers are devolped for various application DSP systems. The basic principle of multiplier is multiplication in algorithmic and structural levels. DSP applications are mainly designed with low power dissipation Multiplier. Algorithm is linear sequence, sometimes in multi-dimension. The Systolic Array is the linear arrangement of the blocks or units like the pipelining processing. It is a homogeneous network. Each block in the arrangement is a partial result from the inputs given to it from top of the array and the result is stored within itself. The stored result is passed to the adjacent adder in the arrangement. The blocks in the design are usually similar and fixed. The operations at each stage in the arrangement are done simultaneously, which increases the speed and reduces the processing time without compromising on the results. They are used to perform multiplication. In this paper a 4-bit multiplier using reversible logic is designed and implemented. In multiplication, the multiplicand and the multiplier are linearly arranged and each bit of both are multiplied with the multiplicand to obtain partial products. The carry is generated from the column. The final output is obtained by adding the partial products and carry. Landauer states that while transmitting data certain amount of energy is dissipated for each bit lost. The formula for calculating the energy dissipated for loss of each bit is $KT \cdot \log 2$ where T is absolute temperature and K is Boltzmann's constant.

2. LITERATURE REVIEW:

As each bit of information lost generates $kT \ln 2$ joules of heat energy, where k =Boltzmann's constant & T = absolute temperature at which computation is performed [1]. Bennett showed that $kT \ln 2$ energy dissipation would not occur if the computation were carried out in a reversible manner [2], since the amount of energy dissipated in a system bears a direct relationship to the number of bits erased during computation. Reversible circuits are those circuits that do not lose information and reversible computation in a system can be performed only when the system consists of reversible gates. In reversible logic there is one-to-one mapping between the input and output vectors and vice-versa. Reversible logic is likely to be in demand in high speed power aware circuits, low-power CMOS design, optical computing, nanotechnology and quantum computing.

The sequential logic differs from combinational logic in that the output of the logic device is dependent not only on the present inputs to the device, but also on the past inputs. This paper provides a step to building more complex reversible systems by introducing the novel designs of reversible sequential circuits. One of the major goals in reversible logic design is to minimize the number of reversible gates and garbage outputs (garbage outputs are the unutilized outputs required to maintain reversibility). In this work, we are proposing the reversible designs of latches and flip flops. The proposed designs are shown to be better than the existing designs in terms of number of reversible gates and garbage outputs. There are a number of existing gates in literature. But in our proposed designs, we have basically utilized the three reversible gates, viz., Fredkin Gate, Feynman gate and Toffoli gate [3, 4].

Two new reversible gates termed modified Toffoli gate (MTG) and modified Fredkin gate (MFG) are also proposed keeping the goal of minimization of number of reversible gates and garbage outputs in mind. The transistor implementations of the existing as well as the newly proposed gates are also shown. Thus, our proposed reversible sequential designs are practically feasible to implement in silicon technology. To the best of our knowledge, this is the first work to propose the feasibility of transistor implementation of reversible sequential circuits designed using reversible gates. The recently proposed work in this area [7] builds the reversible RS latch and then introduces the reversible flip flops designs based on the reversible latch implementation. In the proposed work, we have compared our work with that proposed in [7]. The paper is organized as follows. Section II deals with the basic reversible gates and their transistor implementations. Section III & IV shows the proposed reversible designs of latches and flip flops, respectively. Section VI provides the conclusions.

3. METHOD: BASIC REVERSIBLE GATES AND PROPOSED IMPLEMENTATION

This section deals with the description and implementation of existing as well as newly proposed reversible gates, utilized in designing the proposed reversible sequential circuits.

A. Feynman Gate

Feynman gate [3,4] is a 2*2 one-through reversible gate shown in Fig. 1. One through gate means that one input variable is also the output.

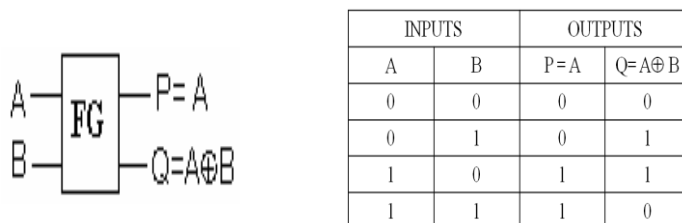


Fig. 1. Feynman Gate and its Truth Table

In other words, we can calculate the forward calculation

$$P=A, \text{ If } A=0 \text{ then } Q=B \\ \text{Else } Q=B'$$

as well as the reverse calculation

$$A=P; \\ \text{If } P=0 \text{ then } B=Q \text{ Else } B=Q'$$

B. Fredkin Gate

Fredkin gate is a (3*3) conservative reversible gate [3,4] as shown in Fig.4. It is called 3*3 gate as it has three inputs and three out- puts.

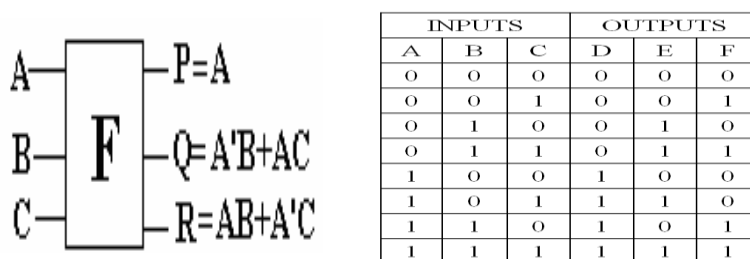


Fig. 2. Fredkin Gate and its Truth Table

Forward Computation:

$$P=A$$

If A=0 then Q=B and
R=C,

Else Q=C and R=B

Backward Computation:

A=P If P=0 then B=Q and

$$C=R$$

Else C=Q and B=R

Proposed Transistor Implementation of Fredkin Gate the proposed transistor implementation of the Fredkin Gate. In the proposed implementation design achieves 60% reduction in number of transistors compared to [5] and 75% reduction compared to. Noted that our proposed transistor implementation is suitable both for forward as well as backward computation, i.e., completely reversible in nature. The forward and backward computations for Fredkin gate are explained below.

B. Toffoli Gate

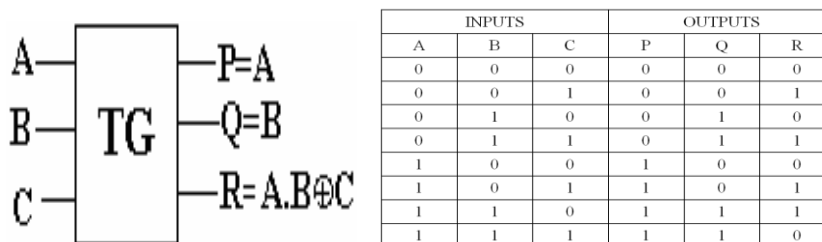


Fig.3. Toffoli Gate and its Truth Table

Toffoli Gate (TG)[3, 4] is a 3*3 two- through reversible gate as shown in **Fig. 3.**

Forward Computation:

$P=A; \quad Q=B;$

If A AND B =0 then R=C Else $R=C'$

Backward Computation:

$A=P; \quad B=Q;$

If P AND Q =0 then C=R Else $C=R'$

D. Peres Gate

The Peres gate is a computational circuit suitable for reversible computing, invented by A. Peres. The basic peres gate is a control swap gate that maps inputs (A, B, C) onto three outputs (P, Q, R).The A input is mapped directly to P output. If A = 0, no swap is performed, B maps to Q, C maps to R. Otherwise, the two output are swapped so that B maps to R and C maps to Q. It is easy to see that circuit is reversible, i.e. “undoes itself” when run in backwards. A generalized n x n peres gate passes its first n-2 inputs unchanged to corresponding outputs, and swap its last two outputs if and only if the first two n-2 are all 1. Its truth table is 3*3 conservative peres gate is shown in Fig 4

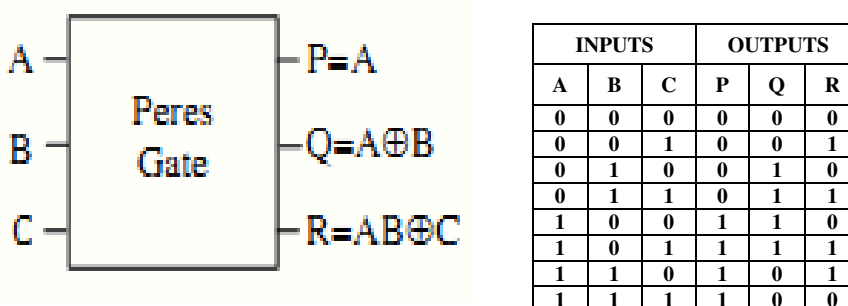


Fig 4 Peres gate & Truth table for Peres gate

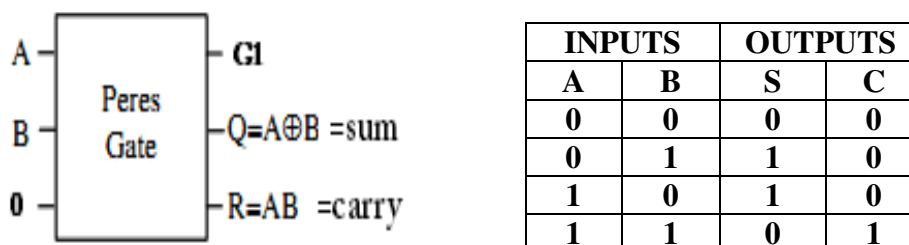


Fig.5 Peres gate as a Half Adder & Truth table for Peres gate as a Half Adder

E. TSG Gate

We have recently proposed a ‘4*4’ one through reversible gate called TS gate (TSG) [6, 7, 8] which is shown in Figure 6. It can be verified that input pattern corresponding to a particular output pattern can be uniquely determined. The proposed TSG gate is capable of implementing all Boolean functions and can also work singly as a reversible Full adder, that is reversible full adder can now be implemented with a single gate only.

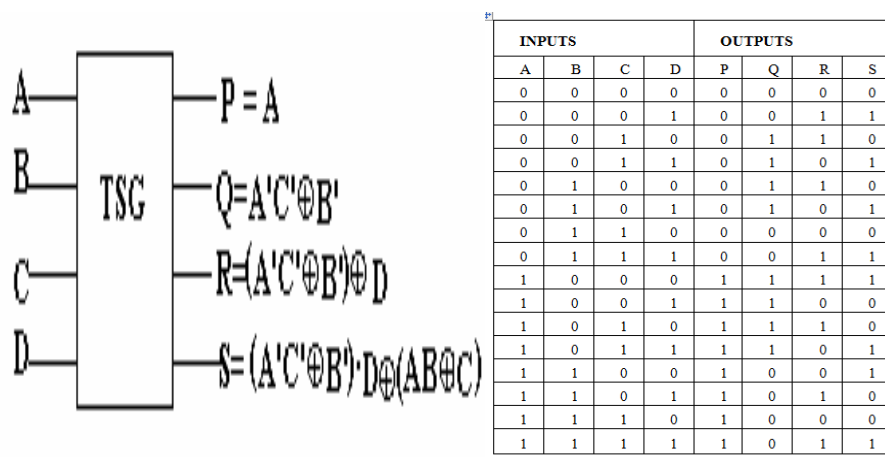
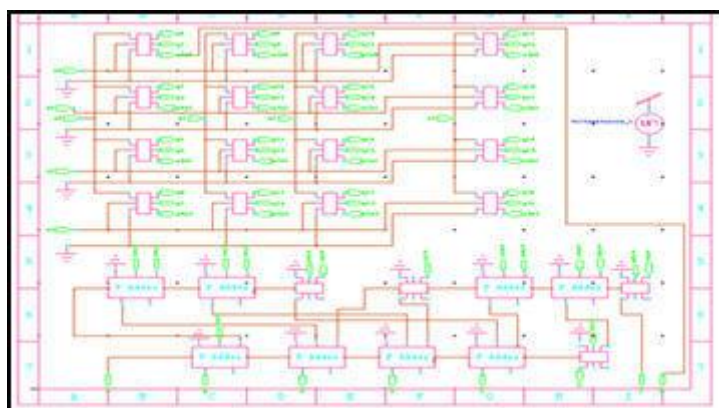


Fig.6 TSG gate & its Truth table for TSG gate

4. DISCUSSION: Peres Gate As Half adder and Full adder Multiplier Designed ANALYSIS:



No. of gate	Garbage output	Power dissipation
28	44	1.2736e-006
.measure tran average_power avg 'I(VSupply)' from 10n to 2500n		

Fig. 7 Multiplier Designed using Peres Gate As full & Half adder

5. RESULT:

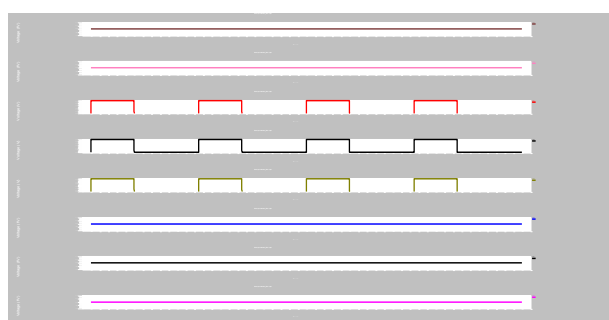


Fig. 8 Input

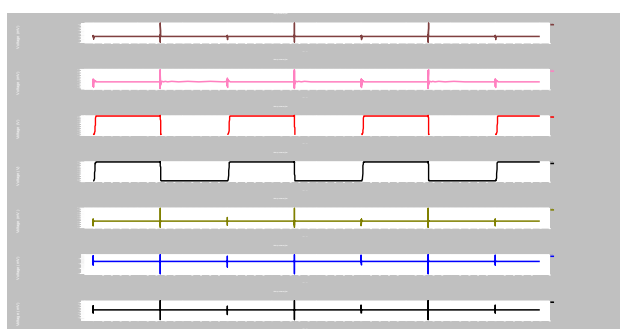


Fig. 9 Output

6. CONCLUSION: Power dissipation is 1.2736e-006 with 28 reversible gates and 44 Garbage output

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