

SURVEY ON SMART GARBAGE MONITORING AND ALERT SYSTEM USING IOT MODEM

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Abstract: Now days we see that dustbins are put at open places in the urban areas are overflowing because of increment in the waste continuously. It makes unhygienic condition and makes unpleasant smell around the surroundings nature leads in spreading some deadly diseases and human illness. To overcome such issues waste management system is proposed for Smart Cities which are based on Internet of Things (IoT). In this system there are numerous dust bins situated all over the city. It will take minimum efforts to clean all the dustbins over the city by checking whether the dustbins are full or not. Also it detects over weight through the load cell. Control system sends SMS as well as updates of dustbin will be upload on webpage automatically.

Key Words: PIC microcontroller, IoT.

1. INTRODUCTION:

With increase in population we have an increase in the garbage around urban areas. Here we propose a smart dustbin that operates automatically to help solve this issue using IOT and sensor based circuitry. Usual dustbins require to be opened by pressing foot against its lever and then throwing garbage. Also a person needs to keep track when it is full so that it can be emptied and does not overflow. Here we propose a smart dustbin that does all this by itself. Another ultrasonic sensor detects the human movements and opens the bin automatically. The dustbin opens automatically when it receives the signal and closes its hatch. Also the dustbin consists of a level sensing ultrasonic sensor that constantly measures the level of garbage in the bin and automatically detects if it is about to fill up. The dustbin now consists of a smart circuitry that transmits this information over the web to signal the main garbage collector of the facility to empty the particular garbage bin. We use IOT modem to develop the online web part for the IOT system. This bin is of a vast usage in offices, homes and even in public places for garbage management. Thus we get a fully automated smart dustbin that allows for automated garbage cleaning

2. LITERATURE REVIEW:

S.NO	TITLE	AUTHOR	ADVANTAGES	DISADVANTAGE	CONTENT
1	Efficient Waste Collection System	Saurabh Dugdhe1 , Pooja Shelar, Sajuli Jire and Anuja Apte.	The system will summarize the collected information and generate report	Improper disposal & improper maintenance of the domestic waste creates issues in public health & environmental pollution.	This technique of waste removal will keep the city clean. The proposed system is an attempt to improve current waste collection system in India for the “Clean India Mission”. The system will also generate reports about waste gathering and fuel consumption
2	Smart Waste Collecting Hopper (SWaCH)	Vivin T Wilson, Sidharth Panicker, Madhu Venkatesh, Sneha G Bhat.	reducing human effort and labour cost, user-friendly	For SWaCH to be enhanced, it should be redesigned.	Swach is a smart robot that provides timely,automatic wast collection

3	Intelligent System for Valorizing Solid Urban Waste	Pedro Reisa , Rui Pitarmab , Celistino Gonçalvesc, Filipe Caetano.	Intelligent Ecologic System – a system to automate and to improve the process of municipal solid waste treatmentour, contribution to a sustainable, intelligent and efficient functioning of a city, attributes and characteristics of a smart city	This system is still in the preliminary stage of laboratory testing for the experimental validation and optimization, namely through the detection of possible operational improvements, including studying / analyzing the validation of waste after collection	iEcoSys system- technological tool that identifies the waste produced individually, using RFID tags embedded in rubbish bags – the iBags. When depositing waste, the recycling center identifies and weighs each bag and the collected data is sent to a server system using ZigBee.
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**3. MATERIALS:
POWER SUPPLY**

In power supply firstly the DC socket is used to convert the 230v AC supply into DC supply. The output DC supply of DC socket is given to bridge rectifier as an input. We will get pulsating DC at the output of bridge rectifier. The LM7805 regulator is used to convert the pulsating dc to pure 5v DC output. The supply is given to the PIC-controller and GSM. In the schematic there are Port C, pin no 25 and 26 in the PIC are used as transmitter and receiver respectively. Also in port A, pins from 2-7 are used as input pins. PIC16F877a Controller is used. The GSM modem and Aurdino Ethernet shield are interfaced with PIC controller. The DC socket, rectifier and regulator are used for power supply. The ultrasonic sensor is used to detect the level of garbage and the load cell is used for checking the overweight.

PICMICROCONTROLLER

PIC refers to input and output interface controller. It is family of microcontroller formed by Microchip Company. It is more popular due to their low price, large availability, free development tools and reprogramming in flash memory. PIC microcontroller has fabulous features and they are good for a wide range of applications. It has enhanced Harvard architecture which is built by microchip technology. PIC microcontrollers are mostly used in the embedded based projects. It supports a low power consumption sleep mode. System uses 16F877A for implementation because it has low power consumption less than 2mA at 5V and 3mA, 18microA at 3V more efficient, less time consuming. It is flash microcontroller. It has 10 bit A to D convertor and two PWM modules. PIC16F877A is used as smart microcontroller which performs two main functions. It identifies operated data from batteries and Because of its high performance, low power consumption, more efficient, we are going to use PIC 16F877A microcontroller.



ULTRASONIC SENSOR

This is the HC-SR04 ultrasonic ranging sensor. This temperate sensor gives non-contact estimation usefulness with a going exactness that can reach up to 3mm. Each HC-SR04 module incorporates the ultrasonic transmitter, a recipient and a control circuit. There are just four sticks that you have to stress over on the HC-SR04: VCC (Power), Trig (Trigger), Echo (Receive), and GND (Ground). You will discover this sensor simple to set up. Operating Voltage: 5V, DC Operating Current: 15mA, Measure Angle: 15



GSM

The GSM Module is used to send the message to the contractor for cleaning the dustbin. A GSM modem is a specialized type wireless modem that works with a GSM wireless network. It accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. A GSM modem can be an external device. An external GSM modem is connected to a computer through a serial cable or a USB cable. When a GSM modem is connected to a computer, this allows the computer to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS. GSM Modem sends and receives data through radio waves. In this project GSM modem is used to send the messages.

FIRE, PIR AND RAIN SENSOR

- **PIR sensor** is used to find any animals fall inside the dust bin to eat the waste food in the dustbin. Then the Buzzer will ring. When hear the buzzer sound then the animal get fear and went off from the dustbin.
- **Rain sensor** is used, when it rains then the dust bin will not open because the rain water fill the dustbin and the garbage start decay will cause lot of diseases in rainy seasons.
- **Fire sensor** is used to find the fire in the dustbin If it gets fire then the intimation will send through the IOT modem.

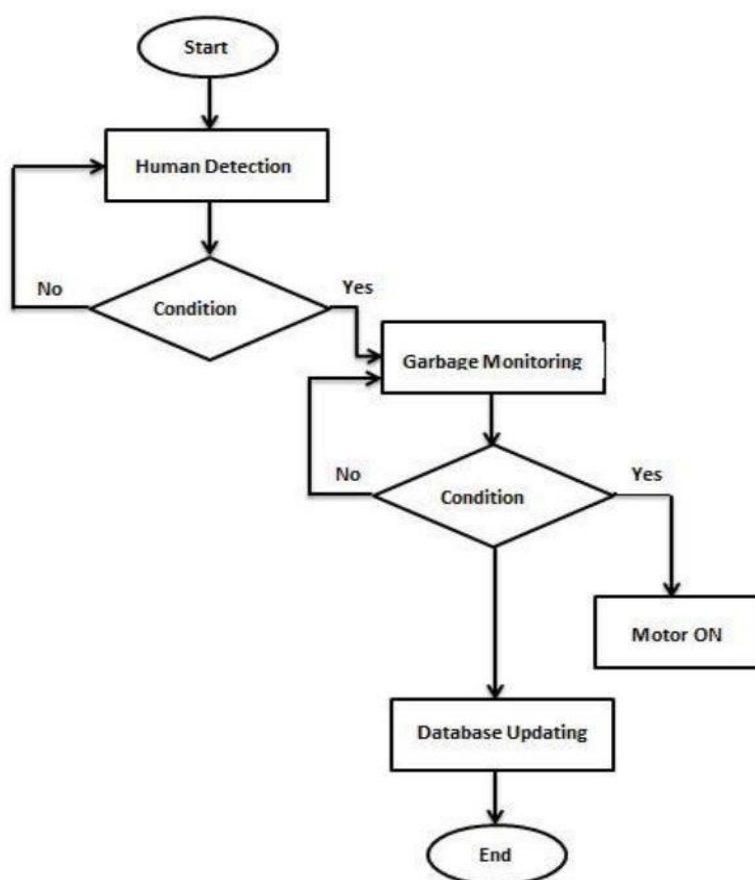
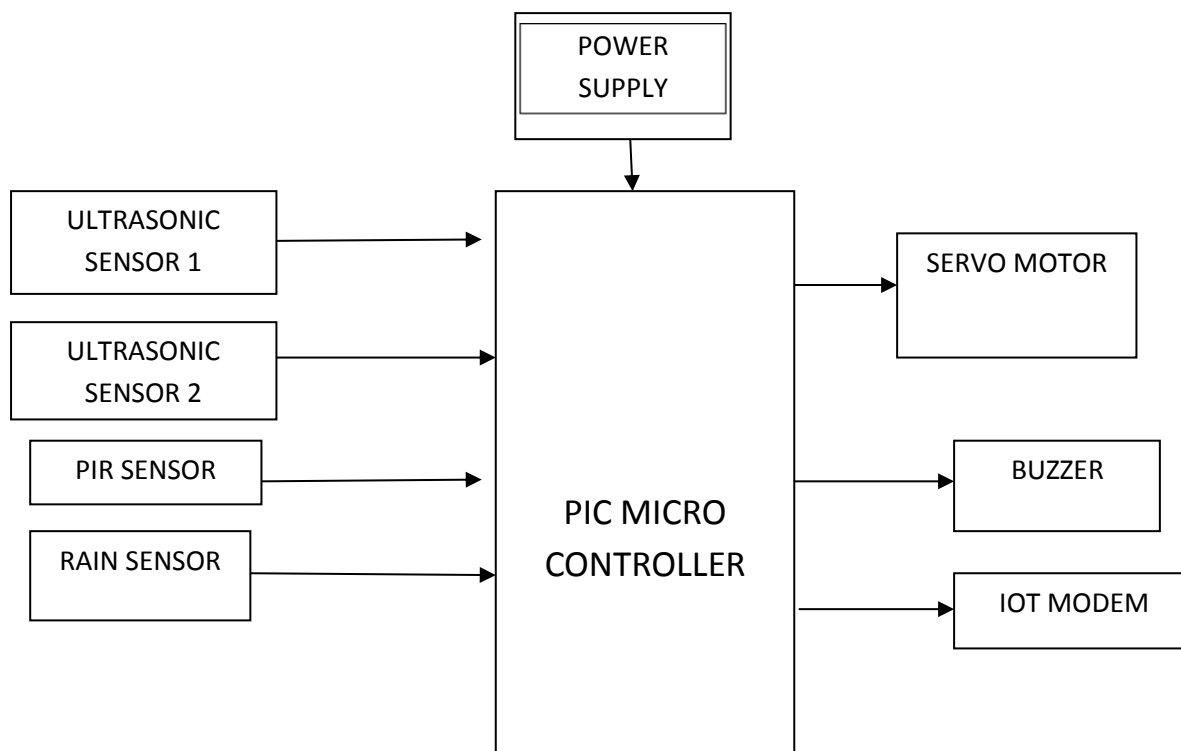
4. METHODOLOGY:

In proposed system we use Ultrasonic sensor1 to monitor the drainage level and if comes to fill then the intimation will send through IOT modem. Ultrasonic sensor 2 is used to find the human arrive. If any humans come near the dust bin then it senses and dust bin opens up automatically through servo motor. PIR sensor is used to find any animals fall inside the dust bin to eat the waste food in the dustbin. Then the Buzzer will ring. When hear the buzzer sound then the animal get fear and went off from the dustbin. Rain sensor is used, when it rains then the dust bin will not open because the rain water fill the dustbin and the garbage start decay will cause lot of diseases in rainy seasons. Fire sensor is used to find the fire in the dustbin If it gets fire then the intimation will send through the IOT modem. All of the sensor details will send through IOT modem as a message. By doing this we can easily monitor the dustbin and clean the bin immediately.

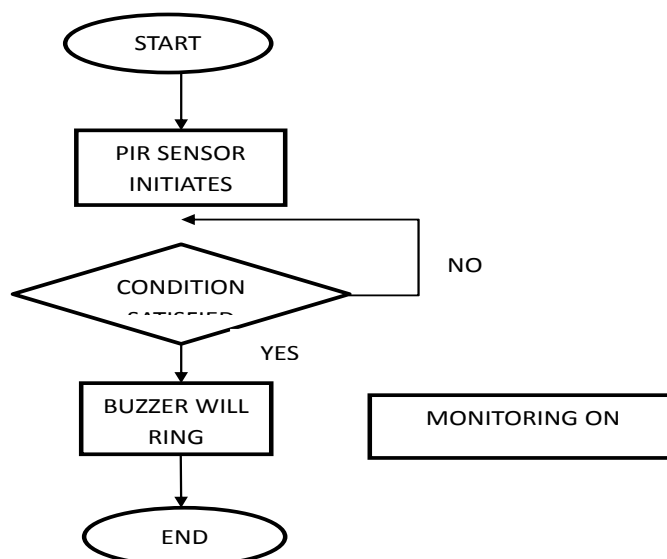
MODULE SPLITUP 1:

Ultra sonic1 sensor along with the servo motor identifies the *human arrive*

Ultra sonic sensor2 identifies the *garbage level*



PIR sensor is used to find any animals fall inside the dust bin to eat the waste food in the dustbin. Then the Buzzer will ring.



5. ANALYSIS:

ADVANTAGES OF PROPOSED SYSTEM

- Prior information will give to the corporation to clean the dust bin.
- Can save the bin from rain and fire.
- Can avoid causing disease by open close system.

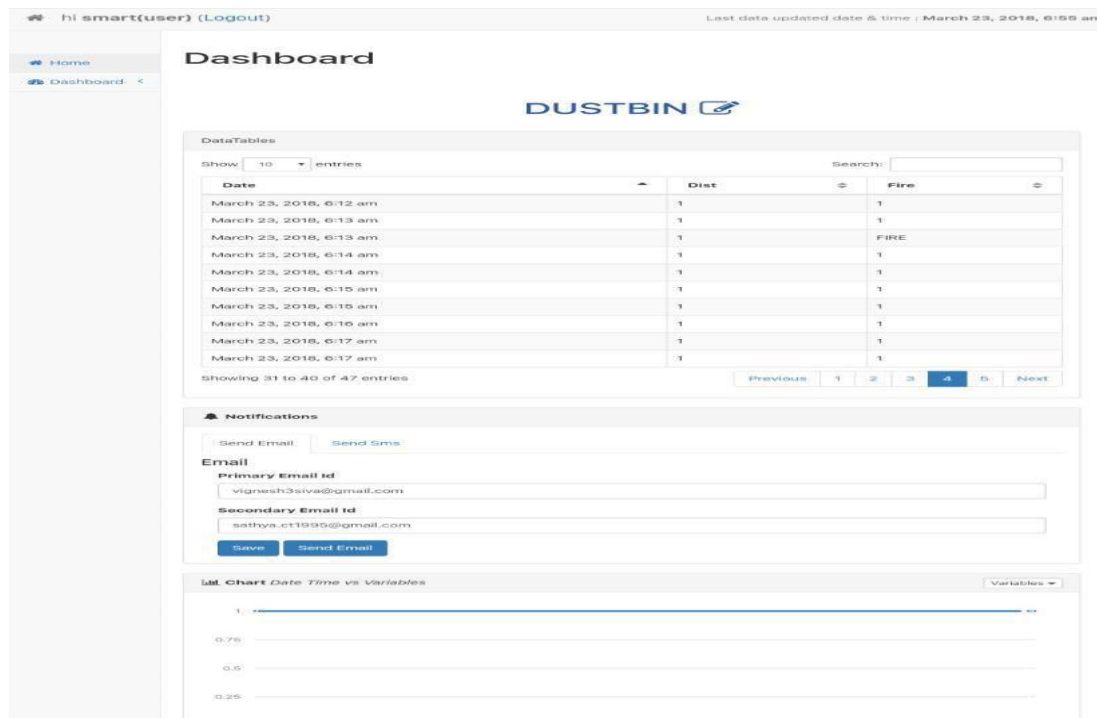
APPLICATION

Lowers waste and recycling costs by reducing the number of times compactor(s) are emptied. Reducing the environmental hazards to the residents. Saving tax payers money to pay less on the garbage collection fees. New products such as advertisement on smart can may be included. Local event signage can be posted electronically. With the help of proper technology (GSM & SOFTWARE APPLICATIONS) we can guide the trucks to choose the shortest path. It also favours the “SMART CITY” project and “DIGITAL INDIA”

6. FINDINGS:

Sensor checks the level of garbage. It shows percentage 1,50 and if dustbin is full i.e greater than 90% it displays message on LCD and sends the SMS via GSM module to the respective cleaning coordinator. Coordinator send the cleaning vehicle for cleaning. After cleaning, dustbin becomes empty and status of the dustbin over the city is displayed on webpage. Also we have used ULTRASONIC sensor for detecting the human and automatically opens the dustbin.





7. CONCLUSION:

The complete design of the dustbin is given, the circuit for the automation of open close system is successfully simulated and the desired results are obtained. Various features such as wastage filling, affordability, prevention against damage and maintenance issues is kept in mind while designing the dustbin. Implementation these Smart Dustbins can prevent the accumulation of the garbage along the roadside to a great extent thereby controlling the widespread of many diseases. It can prevent pollution and also prevent the consumption of the spread out garbage by the street animals. This Smart Dustbin can contribute a lot towards a clean and hygienic environment in building a smart city.

8. RECOMMENDATIONS:

In proposed model we connected single dustbin to cloud to get the data further we will connect the entire dustbin together. Data of dustbin can be checked in cloud database further we will design a web portal to connect all the dustbin together. Further indication will be given to the user to move left or right side by when dustbin is full. Further all the dustbin full data will together sent to the authorities with a new algorithm. Further Reset button will be given to dustbin to work in manual mode when cleaners collect the garbage

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