

# Voice Controlled Home Automation System: Raspberry Pi

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**Abstract:** The aim of this research paper is to develop a system that controls the devices through the voice assistance installed on the phone called SIRI. This paper deals with the automatic voice control of fans, lights and other appliances. It is used to save the consumption of electricity and human energy. This project is implemented with the help of the Raspberry Pi 3 model B and the relay control circuit. The various devices are connected to the relay circuit and the instruction set is sent to Raspberry Pi through e-mail via the iMAP protocol.

**Key Words:** Android, Arduino UNO, Bluetooth, Smart Home.

## 1. INTRODUCTION:

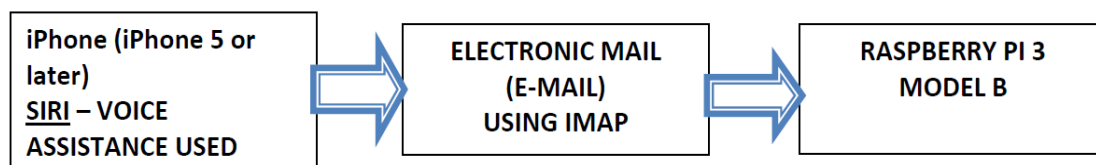
The world has become global due to the technological revolution in the IT sector (Information Technology) which played an important role. The revolution in IT makes the idea come true to have an automated home.[6] The home automation system uses IC (integrated chip) to control electronic devices and systems in the home. The incentive behind voice-activated home automation is the ease, efficient use and consumption of electricity, which is why many types of research and many solutions have been proposed in home automation. These systems use PC, mobile Internet, GSM Bluetooth technology and ZigBee network, etc. [2,3]Home automation is common in Western countries, but it is not so useful in the INDIAN regions, the main reason behind this is its high cost. So we try to make this project as cheap as possible to implement it in the local region. With the voice, people can easily interact with the system. It is a very useful project for adults and people with physical disabilities, who cannot perform various activities efficiently. Human beings make mistakes and forget to turn off the devices when they are not needed and, in this case, they are useful for using energy consumption effectively and safely.

## 2. HISTORY:

The first idea was introduced in 1800s, when Nikola Tesla developed the idea of having a remote control for vessels and vehicles in 1898.[1] After development of electrical appliances the idea of home automation was developed. Al-Ali and M.Al-Rousan developed a Java based Home Automated System. It was developed using Wi-Fi as a medium for communication between the hardware and software components. It would use internet as a medium for connectivity. Its disadvantage was that the unavailability of internet would fail the entire system of communication. Inbuilt smart home management scheme was presented in and it was developed using Ethernet. [4,5]The system also had GSM support for the issue of unavailability of network. The main disadvantage of this system was its high cost. B.Chakradhar D.Naresh & S.Krishnaveni presented the idea of Bluetooth based home automation system. It used arm processor (ARM9 and ARM7), and so the system has a complex architecture.

## 3. SYSTEM OVERVIEW:

The home automation system is based on Raspberry Pi 3 model B and various appliances are connected to it via relay driver. [7] The voice commands are sent using SIRI i.e. a voice assistant developed by Apple and comes preinstalled on iPhone (later iPhone 4) which is further communicated to micro-controller using Electronic Mail (E-Mail) and protocol used is iMAP.



### • CONCEPT

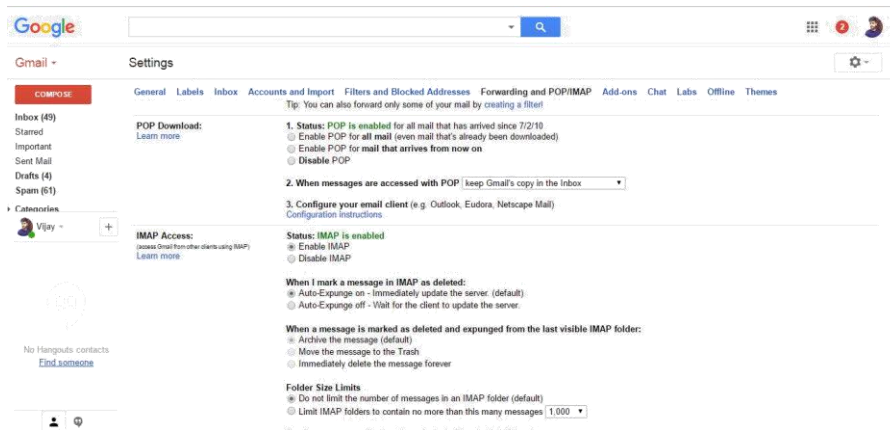
Notes can be created by Siri using the command word 'NOTE', which will be synced to a Gmail Account. The command will be fetched from the account. [8,11] There will be prefixed commands and their function will already be stated, so when the prefixed command is fetched from Gmail, the appropriate function will be performed.

Example: "Note turn on light" is sent by SIRI and fetched from Gmail Account, the Raspberry Pi will turn on the light as the prefixed command is received.

**SETUP**

A Gmail Account is required for the system to work. [9,10] It is not recommended to use your primary email account as the username and password is to be shared in the python script. Then less secured app must be turned on this is because Google identifies the connection between the mail server and python script are less secure.

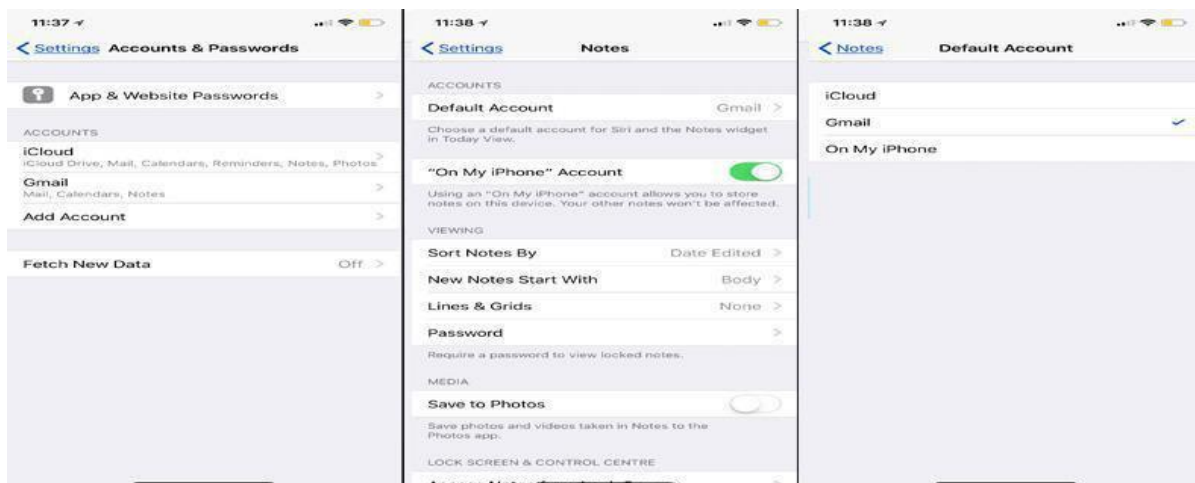
As the script uses iMAP protocol, so iMAP needs to be enabled in Gmail Account.



1). Now, navigate the following, in your Settings app and add your Gmail account:

**Settings → Accounts & Passwords → Add Account**

2). Turn on Notes for that gmail account.



3). Ensure that the default account for creating Notes with Siri is Gmail account.

**Settings → Notes → Default Account → Gmail**

That's all! Now, just tell Siri to create a Note like this:

*“Note turn on light”*

This note should appear under the Notes label in your Gmail account.

**CODE**

Copy the script to the home directory of the Raspberry Pi as **voicecontrol.py**. The user can add and edit the script for custom prefix commands to work. Also add the Gmail Account username and password as configured on your iPhone.

```
import imaplib
import email
import os
import pkgutil
```

```
Import time
# Add Gmail username and password here
username = ""
password = ""
class ControlException(Exception):
    pass
class Control():
    def __init__(self, username, password):
    try:
        self.last_checked = -1
        self.mail = imaplib.IMAP4_SSL("imap.gmail.com", 993)
        self.mail.login(username, password)
        self.mail.list()
        self.mail.select("Notes")
        # Gets last Note id to stop last command from executing result, uidlist = self.mail.search(None,
        "ALL")
    try:
        self.last_checked = uidlist[0].split()[-1] except IndexError:
        pass self.load() self.handle()
    except imaplib.IMAP4.error:
        print("Your username and password do not match")
        print("Or IMAP is not enabled on your account.")

#Add prefix commands here
moduleName = "... "
commandWords = ["... "]
def execute(command):
    #Write anything you want to be executed when the command Words return
    def fetch_command(self):
# Retrieve the last Note created if new id found self.mail.list()
self.mail.select("Notes")
result, uidlist = self.mail.search(None, "ALL") try:
latest_email_id = uidlist[0].split()[-1] except IndexError:
return
if latest_email_id == self.last_checked: return
self.last_checked = latest_email_id
result, data = self.mail.fetch(latest_email_id, "(RFC822)")
voice_command = email.message_from_string(data[0][1].decode('utf-8')) return
str(voice_command.get_payload()).lower().strip()
def handle(self):
print("Fetching commands..")
print("\n")
while True:
try:
command = self.fetch_command()
if not command:
raise ControlException("No command found.")
print("The word(s) " + command + " has been said")

except (TypeError, ControlException):
pass
except Exception as exc:
print("Received an exception while running: {exc}".format( **locals()))
print("Restarting...")
time.sleep(1)
if __name__ == '__main__':
Control(username, password)
```

#### **4. ADVANTAGES OF THE SYSTEM:**

- No extra hardware is required as the commands are being sent through the iOS device i.e. iPhone
- Runs on any computer with python installed on it – the Raspberry Pi is good as you can make it control anything around you. The possibilities are endless.
- It is easy to install, beginners can easily make use of this system.
- You will get the power of Siri's fantastic speech recognition capabilities and will be able to use it from anywhere in the world, as long as your device has an internet connection.
- Supports all iOS firmware till iOS 11.2.3 as the earlier procedures stopped working after iOS 7.

#### **5. CONCLUSION:**

Raspberry Pi is an innovative technology. The large number of users and fan base support the fact that the device can see a rich future in the upcoming days. The device can definitely help anyone who really needs to learn electronics and computer. Increasing processing power can surely help the product in the future. With the power of voice, enables the users to have efficient utilization of electricity, also ease to user as the user can simply order and the following instructions are performed. With the advancement in now home automated system are being developed with Artificial Intelligence (AI) i.e. allowing the system to grasp up various routines of the user.

#### **6. ACKNOWLEDGMENT**

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