

Designing and Implementation of an Application of Smart Home using Internet

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Abstract: In this project an electrical system is designed for the comfort of user. The user can automatically turn on/off his electrical devices like lights, fans, air conditioners, etc. by simply sending an email. Here a code is written in python such that it always checks for the mails of type domain i.e. mails of user if it receives any mail it writes corresponding bit into serial communication port of Arduino and corresponding operation is performed.

Keywords: Automation, Device control, Serial communication, Arduino, python.

1. INTRODUCTION

Nowadays due to increase in work load and busy life of people they are interested to make their lifestyle easy by using a large number of gadgets for different purposes. Every year the number devices we use for our requirement is increasing and control of them is also becoming difficult. For this purpose, we intend to automate [1] all the gadgets through a single device and allow the user to have a control and status of all the devices through internet. So in this, Smart Home automation is an innovation used to control home machines utilizing portable and so on furthermore for the home security purposes [2].

In Smart Home [1] framework, utilizing GSM, miniaturized scale controller and sensors [1], home security and home appliances are mechanized for vitality sparing and making life more proficient. But by sending SMS we will be charged and phone signals aren't always available, so for more efficiency we can use email instead of SMS. So here our aim is to design a Smart Home system and develop it that has capability of controlling electrical home appliances and as per the message the user sends through email [7]. Through this, the user can easily access his/her home appliances with efficient use which will not only saves power but also saves money.

Smart Home Automation

It is a technology used in houses such that various home appliances or devices communicate and share information with each other using a local area network or Internet[3]. This innovation can be utilized to screen, control and caution in light of different home applications like checking water level or temperature in light of prerequisite Smart Home framework, utilizing GSM, miniaturized scale controller and sensors [1] [3], home security and home apparatuses are robotized for vitality sparing and making life more proficient. The devices connected automatically communicate [5] with each other and share information.

Basically people are fond of smart homes because they can control their home from anywhere. Moreover, all home appliances can be controlled from anywhere around the world. Another important reason is security here we can install cc cameras, sensors can be used such that if anything wrong happens local police and security company will be alerted and also the owner.

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2. DESIGN AND ITS IMPLEMENTATION

The block diagram is as shown and any device like mobile phone or laptop or computer can be used to send e-mail which contains instruction command. At the receiving end receiver module is connected to microcontroller [2] to which we connect home appliances that we wish to control.

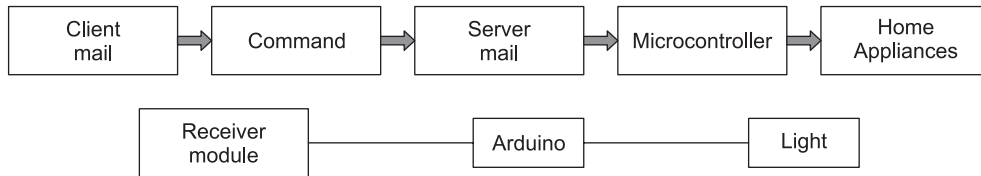


Figure 2.1: Block Diagram

When server mail receives e-mail with corresponding command the python [6] checks the command and writes corresponding serial bit into serial communication [4] line of Arduino and now based on bit on/off of electric appliance takes place.

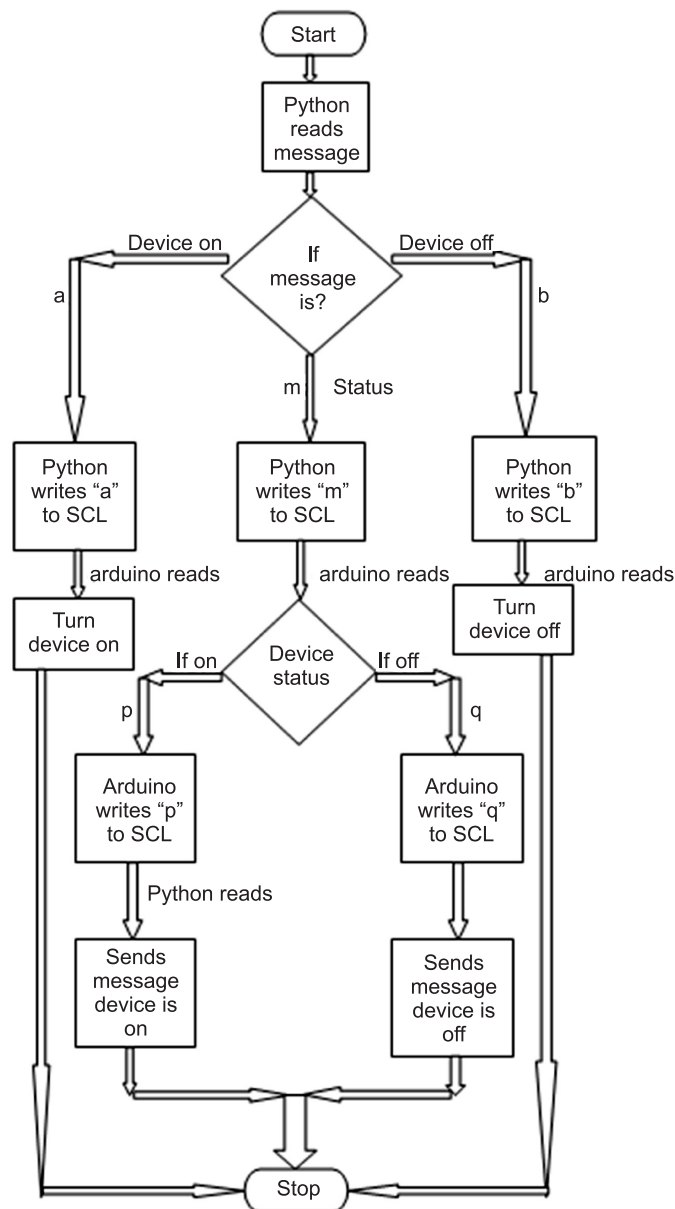


Figure 2.2: Design Flow

Arduino has 14 digital pins and we can use 14 home appliances, here the commands are sent via e-mail. A code is written using python such that it reads every mail received by server [5] but only responds to the mail from client if it contains instruction only. Then it interprets [6] data and writes corresponding serial communication bit to Arduino. The serial communication code is written using Arduino [5].

3. RESULTS AND ANALYSIS

3.3.1. Device Working

Through this we can either on/off the device and also know the status of device based on our choice. Here we are having three commands i.e., LIGHTON, LIGHTOFF, STATUS. The corresponding command is selected and written in the body of subject and mail is sent. Suppose when 'Light on' is selected the python will be continuously checking server mails whenever it receives mail from client containing instruction then only it responds and writes corresponding serial communication bit in serial communication port of Arduino [4][5]. If we send Light on 'a' is written into serial communication line and light will be on.

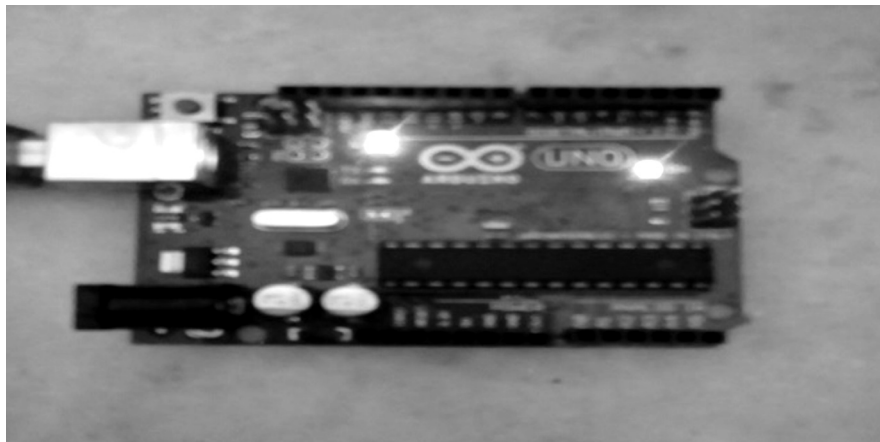


Figure 3.1.1: LED on Arduino is ON

And now if we send 'Light off' the serial bit 'b' is written in serial communication line and light will be off.

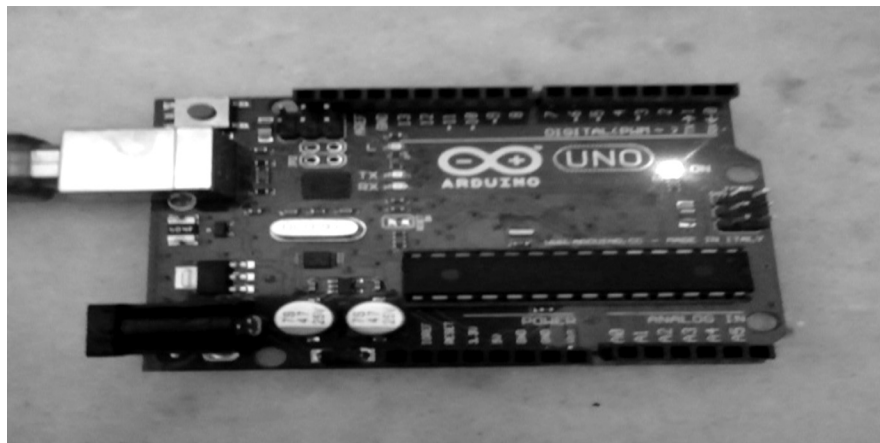
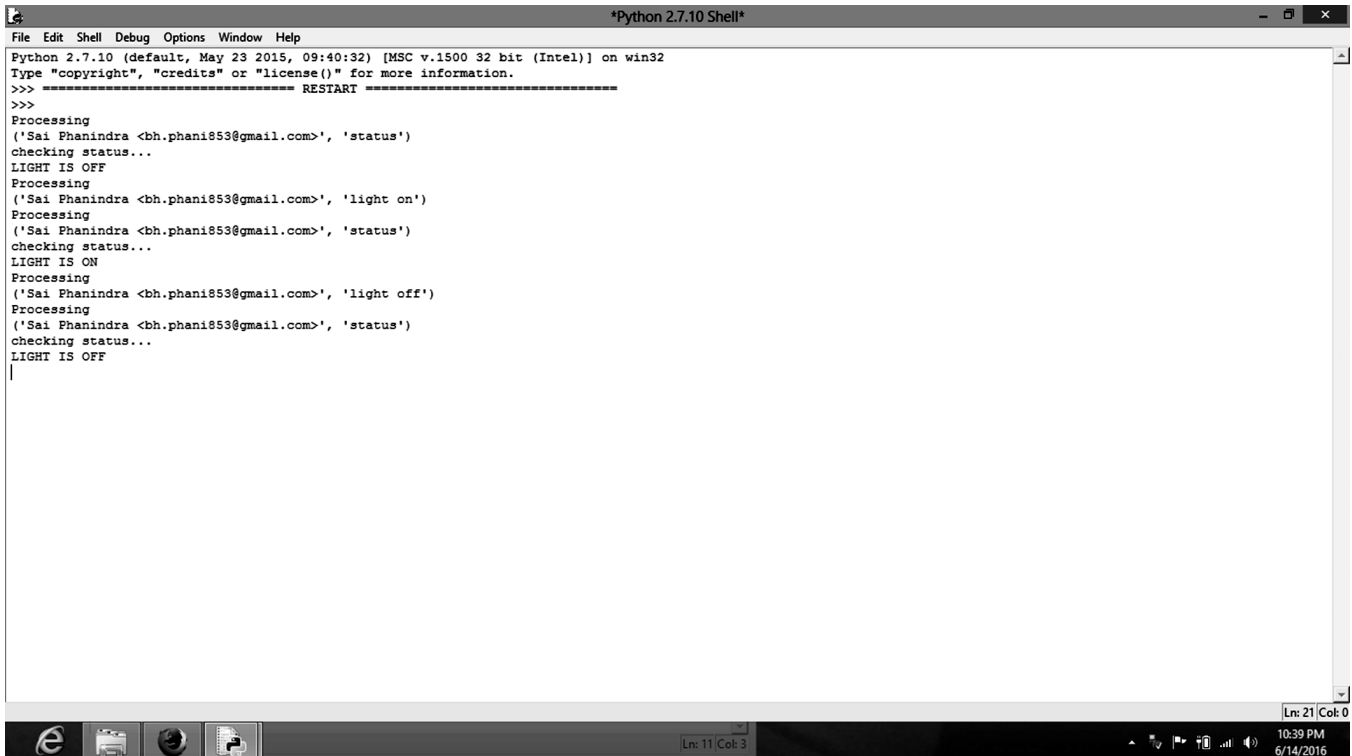


Figure 3.1.2: LED on Arduino is OFF

3.3.2. Status

If the command is "status", we have to display the status of the device whether it is on/off. For this purpose we are using python [6] to read the server when it finds a message "status" in the sever received from the

client it starts writing a character 'm' into serial communication line of Arduino [5][6] to check whether a device is on/off, the Arduino checks the status of all the devices connected to it and writes respective characters assigned to it in serial communication line then the python reads the respective character and creates a mail [7] with message status of the device based on the character it obtains and sends it to the client through server [5][6].



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Python 2.7.10 Shell
File Edit Shell Debug Options Window Help
Python 2.7.10 (default, May 23 2015, 09:40:32) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> ----- RESTART -----
>>>
Processing
('Sai Phanindra <bh.phani853@gmail.com>', 'status')
checking status...
LIGHT IS OFF
Processing
('Sai Phanindra <bh.phani853@gmail.com>', 'light on')
Processing
('Sai Phanindra <bh.phani853@gmail.com>', 'status')
checking status...
LIGHT IS ON
Processing
('Sai Phanindra <bh.phani853@gmail.com>', 'light off')
Processing
('Sai Phanindra <bh.phani853@gmail.com>', 'status')
checking status...
LIGHT IS OFF
|
Ln: 21 Col: 0
Ln: 11 Col: 3
10:39 PM
6/14/2016

```

Figure 3.2.1: Python accessing mail and SCL

3.3.3. Analysis and Comparison

The use of Arduino facilitates us to work with serial communication line without the help of any external processor and to communicate with the system. The python programming which is running in the system helps to communicate to the server and deliver the response back to the system which is used by Arduino board to access the information and control the device.

Here the main part lies in knowing the status of the system though the automation of devices can be achieved through various implementation methods knowing and displaying of status is a tedious task. In our project, this is achieved through the python programming itself in the form of email and this method is cost effective because by the means we chose to transfer the data does not cost any additional charges.

4. CONCLUSION

We had created a centralized control of the devices through internet which gives an advantage of controlling any device anywhere in the world. Through this we are able to overcome the unwanted power wastage. With this project, we are able to solve the problems arises with present day. It can also be implemented in the systems of automation everywhere by minute alterations without involving humans by making it communicate it between the devices. It is a highly efficient model with traits of very less response time and cost effectiveness.

References

1. Shaik Thasleem Bhanu, Abhinesh A GREEN HOUSE AUTOMATION USING ZIGBEE and GSM TECHNOLOGIES, IJECE, ICFTCC-2015 (International Conference on Futuristic Trends in Computing and Communication.)
2. Subhamay Sarker, Mithun Chakraborty ,Anindita Banerjee Low Cost Embedded System/Android Based Smart Home Automation System Using Wireless Networking International Journal of Electronics and Communication Engineering. ISSN 0974-2166 Volume 7, Number 2 (2014), pp. 175-186.
3. Raqibull Hasan, Mohammad Monirujjaman Khan, Asaduzzaman Ashek, Israt Jahan Rumpa Microcontroller Based Home Security System with GSM Technology Open Journal of Safety Science and Technology, 2015, 5, 55-62, June 2015 in SciRes.
4. Kimmi Aswini, Y. Aruna Suhasini, K. Rama Rao Home Appliances Control Using Brain Wave Sensor by EEG International Journal of Advanced Research in Computer Science and Software Engineering Volume 5, Issue 10, October-2015 ISSN: 2277 128X.
5. Omar Abdurraheem Mahdi, Bhavya Alankar Wireless devices using Remote Control DevicesUsing Android SmartPhone IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727, Volume 16, Issue 3, Ver. I (May-Jun. 2014), PP 23-27.
6. Tarun Kumar Patel, Utkarsh Wadekar, Aniket Wabale, Prof. S. S. Datkhore Appliances Control Using Ethernet and Raspberry PI International Journal of Advanced Research in Computer Science and Software Engineering Volume 5, Issue 3, March 2015 ISSN: 2277 128X.
7. Tatikonda Venkata Rao, G. Chandra Reddy HOME APPLIANCES CONTROL THROUGH ELECTRONIC-MAIL International Journal of Advanced Research in Science and Engineering Volume 4, Issue 12, December 2015.

