

## HOME AUTOMATION FOR HOME SECURITY USING CLOUD STORAGE.

Gujjula Gopinath, Prof. P Praveen Raju  
Department of Electronics and Communication Engineering  
Sreyas Institute of Engineering and Technology  
(Affiliated to JNTU & approved by A.I.C.T.E)  
Bandlaguda, Beside Indu Aranya, Nagole,  
Hyderabad-500085, Ranga Reddy Dist.

**Abstract--** Home automation is nothing but automating the control of appliances in your house. Any device can be used like a computer or a mobile to control home appliances. Devices like mobiles and computers are integrated with electrical appliances for automation purpose. Security to house, centralized controlling of lighting, security lock for gates & doors can also be provided in home automation systems. These possibilities can provide comfort and convenience to the people. Implementing automation of house will result in increasing efficiency, reduction in energy consumption, and safety to the household appliances. In this busy life, home automation has become a vital and popular technology due to its ease, flexibility. The main challenge lies in how simple and cost efficient is to install the abovementioned facilities like security for locks gates, centralized controlling in house. This paper discusses about implementing the home automation system using raspberry pi module and other components.

### I. INTRODUCTION

Due to these smart phones and tablets that gets connected to the network easily are the main things which makes home automation systems popular in these days. An app, either a mobile app for phones and tablets or a web page for computers are developed for automation of household appliances. many techniques can be applied in home automation system

from monitoring the basic parameters to surveillance of the house. These techniques can be categorized as control of domestic appliances like monitoring of weather parameters, monitoring of hazards. our phones and devices get connected to the home network for controlling of appliances. Remote access is also possible if you integrate the whole system to cloud. if you want to have local automation system you can use many technologies. Through integrating these technologies with our home environment, the communication between appliances and devices will be in an integrated manner. As the technologies is increasing there is an advancement in wireless communications like Bluetooth, WIFI, GSM. Every communication has its importance and specific features. out of the three mention wireless technologies we use WiFi communication in our home automation Project. the reason we chose WiFi is it has the 10 capabilities which suit this home automation. the other important factors are our daily gadgets like phones laptops will not work without internet. So we can make use of these gadgets working on internet for controlling the appliances from anywhere. So there will not be other equipment which is to be purchased, which intern reduce the cost It will indirectly reduce the cost of this system.

The main objective of implementing this home automation project is to design a secured home using Raspberry pi, which is called as a credit card sized computer. The functionality of the raspberry pi is just like a mini computer but in addition it will have general purpose input output pins for integrating sensors and home appliances. In our project, these pins are used as input pins which are connected to sensors and output pins which are used to connect to appliances. The communication between our pi connected to the sensors and appliances and device (app) is WiFi - Communication. We in turn integrate our system with cloud to monitor our home environment. Security is provided to our system by installing camera which will act like a surveillance camera.

## II. EXISTING SYSTEMS

There are many systems that are used to design home automation systems using mobile phones or tablets. Every system has its own characters features and limitations. At present, some companies already established which are officially registered which are working to provide the best automation system features. The below mentioned models are the existing system for home automation.

- i. Bluetooth Home automation: It was proposed by N. Sriskanthan. This model of home automation is based on Bluetooth communication. He used a pc with Bluetooth connectivity that communicates with the electronic device used to connect the home appliances. The limitation of this technique is it cannot be used through mobile. It lacks mobile technology. And remote access of home automation is not possible. it can be done locally.
- ii. Webpage based Home automation: It was proposed by Muhammad Izhar Ramli. here he used a web page to control home appliance and the technology used is internet. It ia wired communication he used Ethernet shield. he also developed a server which will automatically restart if the network connection is down. he developed a telephone and PIC remotecontrolled device for controlling appliances. the main limitation is that it is not wireless communication.
- iii. Amul Jadhav, he was the person who developed an app which integrates with home appliances
- iv. Pratik Gadtaula of Telemark University College he proposed a home automation model and also wrote thesis on that prototype. The challenge that he took to 12 design this model is integrating microcontroller and microprocessor which will be used for connecting house appliances. He used wired and wireless, he developed an app for controlling purpose. the Limitation is that he made the simple one as a complex thing. we have taken our project idea from this study.
- v. GSM/Gprs based Home Automation: This system uses Gsm/Gprs module for automating of house. the controlling of appliances is based on the message / command that we sent from our mobile. the main disadvantage is that we have to

recharge our mobile as well the sim that is placed in GSM module

- vi. Zigbee based Home automation: In this model Zigbees are used for home automation purpose. This is very expensive.

## III. PROPOSED DESIGN

Our System is divided in to Three layers. Home monitoring system, cloud computing and Controlling management. Controlling management will make the users to access the whole home monitoring system through an android app installed in their phone or computer. Home monitoring system consists of all hardware part sensors and appliances connected to the microprocessor unit for monitoring weather conditions and hazards like fire gas etc. Cloud computing the name itself says that our Home monitoring system and controlling management are integrated to the cloud for visualization purpose. here notifications are generated when hazards are detected. controlling commands from app goes to home monitoring system through this cloud.

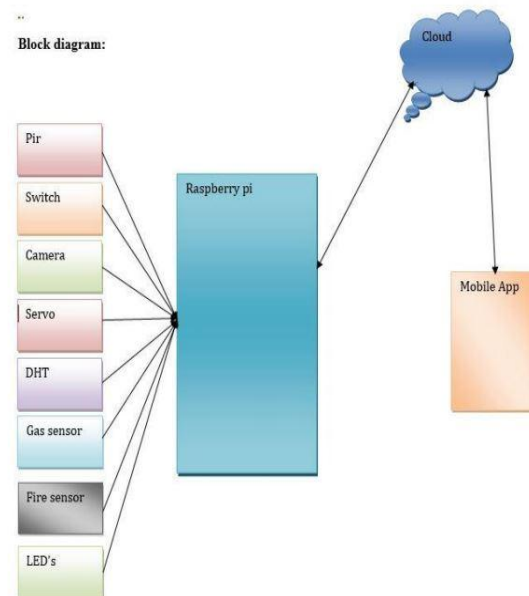


Fig: 1: Block Diagram

## IV. HARDWARE DESCRIPTION

The working of any system depends on arrangement and co-ordination of the components and modules available. The different modules present in this project are

a. Raspberry pi:

Raspberry pi is just a microprocessor which works like a normal computer. It is also called as credit card sized computer. This minicomputer was introduced by Eben Upton. he was the CEO of Raspberry Pi Foundation. this was introduced to promote computer science technology to the outside world. this raspberry pi has the capacity of processing multi tasks. This is the heart of our home automation project where all the sensors and home appliances are Integrated.

#### b. Camera:

It is used as a surveillance camera which clicks the photograph of the person who presses the door bell, as well as the picture of an intruder.

#### c. DHT Sensor:

DHT Sensor is also called as Digital Temperature and Humidity sensor. This is a low-cost device which is used to sense temperature and Humidity. It uses different components for sensing these two different parameters. Capacitive humidity sensor is used for sensing humidity and thermistor for sensing temperature in the surrounding area. This sensor is used to monitor the environmental conditions in the home.

#### d. PIR Sensors:

PIR sensor is used to sense the motion of a moving object. It detects only living beings. These can be used in many applications like security surveillance and automation of things. It can be equipped in shopping malls lifts for closing and opening off doors whenever a person enters. These Sensors are very small inexpensive and does not wear out. The abbreviation of PIR is "Passive infrared Radiation". These can also be referred as "IR Sensors".

#### e. Switch Button:

Push buttons can be used as switches or door bells. It has a simple mechanism inside which makes this work as a switch. this switching mechanism can be used to control a machine that is to turn off or turn on. push buttons are made of plastic or metal and a switch will be elevated up on rectangular shape to accommodate human, so that this electronic switch can easily be pressed and depressed.

#### f. Flame Sensor:

A flame sensor detects the presence of fire or flames. In extremely hazardous environments, flame sensors work to minimize the risks associated with fire. There are several different types of flame

sensor - some will raise an alarm while others may activate a fire suppression system or deactivate a combustible fuel line. Among the many different types of flame sensor, ultraviolet flame sensors, near IR array flame sensors, infrared flame sensors and IR3 flame detection sensors are the most prominent.

#### g. Gas Sensor:

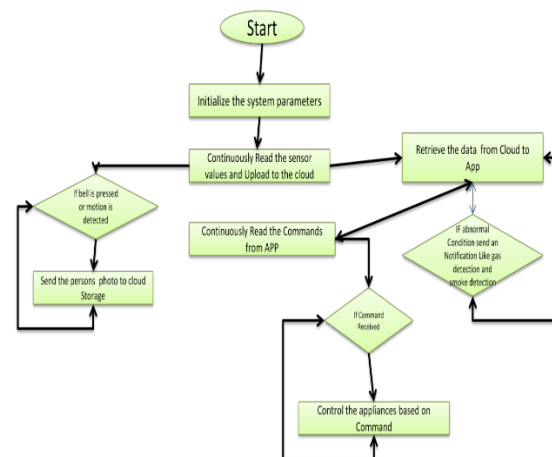
A gas detector is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system so a process can be automatically shut down.

#### h. Servo Motor:

An electrical device which is used to push or rotate an object with great precision is called as Servo Motor. Servo motor is used to rotate an object at some angle or to some distance. Simple motor which run through servo mechanism is used to design a servo motor. If the motor used is AC motor then it is called AC servo motor, if the motor used is Dc motor then it is called as DC Servo motor. Very high torque servo motor which are of small size and light weight packages are available in the market. As it is used to rotate an object or move any object these are used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc.

## V. FLOWCHART

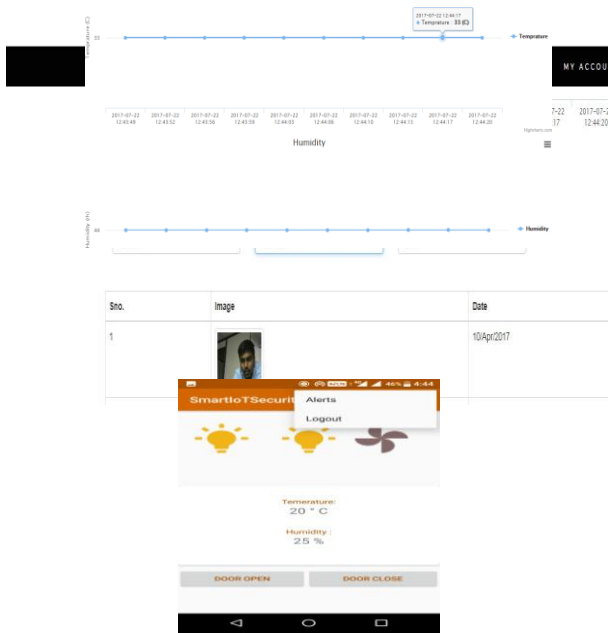
### Flow Chart



VI. RESULTS

i. Results for PUSH button and PIR Sensor:

When someone presses the button or PIR sensors any movement, camera gets switched on and takes the picture of that particular person. The persons photo graph is send to cloud and mobile



phone.

Fig 2: PIR sensor

ii. Results for DHT Sensor, Smoke Sensor, Gas Sensor

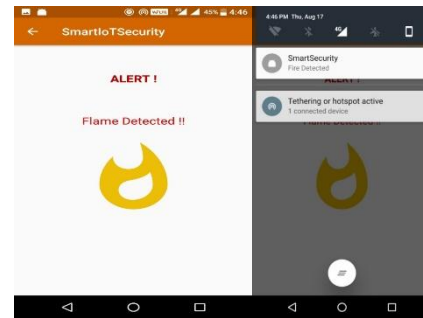
DHT sensor is used to sense ambient weather conditions. The sensed conditions are continuously uploaded to the cloud and that uploaded data is represented in the form of Graphs. The same data is Displayed on Mobile App.

Fig 3: Gas sensor on cloud

Fig 4: Gas sensor on APP

When Smoke is detected in the house immediately color of fire indicator on the cloud changes to red indicating a hazard.

Fig 5: Smoke sensor on cloud



Status



Fig 6: Smoke sensor on App

iii. Controlling appliances through app or cloud

Whenever buttons are pressed from app or cloud the appliances connected to the raspberry pi gets switched on or off.

Controls



Fig 7: Controls on cloud

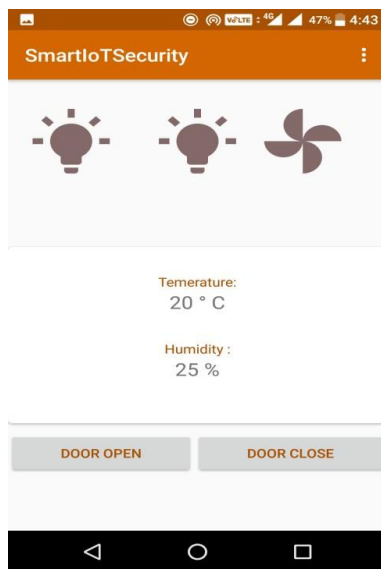


Fig 8: Controls on App

Door of the house gets opened and closed based on DOOR OPEN and DOOR CLOSE commands.

Fans are controlled using commands FAN ON and FAN OFF.

Lights are controlled using LIGHT! ON LIGHT1OFF LIGHT2 ON LIGHT2OFF.

## VII. CONCLUSION

The outcome for this project is a prototype with a simple home automatic system which can control home AC appliances with a touch of a finger and is equally capable of monitoring the House. On the front end, there is an android app to control the home appliances and PCB board to which many home appliances are connected. Then on the backend, there is raspberry which has been programmed to control the status of GPIO pins and thereby controlling the appliances, and capture pictures using camera module and sends to the server. The results of this project have been up to the mark as expected when the project began initially. The user can remotely control the appliances and watch the pictures of wanderers on the same mobile app. Hence, the target we set were successfully reached on time effectively. An array of home appliances that are controlled over the internet with the help of a mobile app and the facility to stream the video live, as well.

This project is a successful outcome of continuous and tireless effort from all the project members, supervisors, college faculty, colleagues and other helping hands. This project has been a really great experience and opportunity to learn and to experiment. Moreover, the authors got the chance to closely experiment and learn about what goes into designing and developing home automation systems. We are very much delighted that we explored this topic as our major project title and in a way, created a version of home automation system of our own, and to be closely related with the technology that is of a great interest of study and research today and is sure to revolutionize the way of living of people in the days to come.

## VIII. FUTURE SCOPE

Future enhancement is by interfacing various sorts of sensors, we can program the automatic controlling of the appliances. As for example, using temperature sensors to log the current temperature of a room, we can control the automatic turning ON/OFF of the heater or fan. Likewise, for the continuous streaming of video, we can set up our own video server. This is surely to cost a lot. We could also interface Arduino to raspberry pi so that we can increase the number of appliances that can be controlled remotely.

## REFERENCES

- [1] Das, S.R., Chita, S., Peterson, N., Shirazi, B., and Bhadkamkar, M., "Home automation and security for mobile devices", IEEE International Conference on Pervasive Computing and Communications Workshops, pp. 141-146, 21-25 March 2011, Seattle, WA..
- [2] Dickey, N., Banks, D., and Sukittanon, S., "Home Automation using Cloud Network and Mobile Devices", Proc. Of IEEE Southeastcon, pp. 1-4, 15-18 March 2012, Orlando, FL.
- [3] Reinisch, C., Kastner, W., Neuschwandtner, G., and Granzer, W., "Wireless Technologies in Home and Building Automation", Proc. of 5<sup>th</sup> IEEE International Conference on Industrial Informatics, Vol. 1, pp. 93-98, 23-27 June 2007, Vienna.
- [4] Maiti, A., and Sivanesan, S., "Cloud Controlled Intrusion Detection and Burglary Prevention Stratagems in Home Automation Systems", 2nd Baltic Congress on Future Internet Communications (BCFIC), IEEE, pp. 182-186, 25-27 April 2012, Vilnius.