

# Home Automation Based on IOT

<sup>1</sup>P.Thilagavathy and <sup>2</sup>A. Mathi

<sup>1</sup>Assistant Professor,

<sup>1,2</sup>Department of Computer Science and Engineering, Sasurie Academy of Engineering, Coimbatore-641653, India

**Abstract--** Home Automation using cloud network is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. This network uses a consolidation of a mobile phone application and PC based program to provide the means of user interface to the consumer. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. In this paper we have developed a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home. This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC based program to provide a means of user interface to the consumer. The home automation system differs from other systems by allowing the user to operate the system without the dependency of a mobile carrier or Internet connection via the in-home wireless remote. This system is designed to be low cost and expandable allowing a variety of devices to be controlled

**Keywords--** cloud networking, android, multi-touch mobile devices.

## I. INTRODUCTION

Home automation is automation of the home, housework or household activity. Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, and other systems, to provide improved convenience, comfort, energy efficiency and security. The concept of home automation has been around for a long time and products have been on the market for decades, though no one solution has broken through to the mainstream yet. Home automation for the elderly and disabled can provide increased quality of life for persons who might otherwise require caregivers or institutional care. It can also provide a remote interface to home appliances or the automation system itself, via telephone line, wireless transmission or the internet, to provide control and monitoring via a smart phone or web browser. This paper will describe the approach which we are implementing to control various home appliances with Android smart phone.

## II. IMPLEMENTATION

### A. Android

For this home automation and security system we are targeting Android platform since it has huge market and open source. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. The Android OS is based on Linux. Android Applications are made in a Java-like language running on a virtual machine called 'Dalvik' created by Google. The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.

Accessory mode is a feature of Android OS since version 2.3.4 Gingerbread and 3.1 Honeycomb and above.

### B. Software Design

As discussed earlier we are developing Android application. The application consists of main function like light controlling, Door controlling, Smoke detection and Temperature sensing. When the application starts user is first authenticated, if user is authorized he will be navigated to main screen. The main screen has a list of all functions among which user can select any one function which he want to control. After selecting a function he would be able to see a current device to connect to the Arduino which we will later implement as an Android USB accessory. The ADK board provides input and output pins that you can implement through the use of attachments called "shields." With an Android device and the 'Mega ADK', you can use whatever sensors and actuators you require to create your own accessories. This may include a LED outputs, and temperature and light sensors.status of a particular device. If user wishes, he can enable or disable intended device. The system is smart enough to activate alarm when smoke is detected or it is programmed to auto on/off lights during late night hours. If room temperature goes very high or low it can automatically adjust fan/AC as per the temperature. It has voice navigation which is specifically beneficial to blind people.

### C. Android ADK

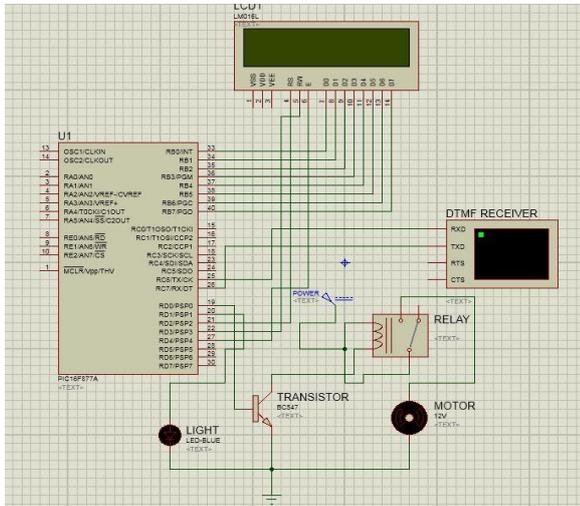
ADK stands for Accessory Development Kit. Android accessory is a physical accessory that can be attached to your Android device. [12] These particular devices perform specific actions. For USB accessories to be supported on a particular device there must be support for the accessory-mode, a special means of connecting over the USB port. This allows data transfer between devices and external peripherals



### D. Block Diagram

Android Device - It is the device through which application interacts with sensors.

USB Connector - It is the hardware port in the kit through which the USB device is attached to the embedded kit.



be plugged into and out of power sockets at different intervals depending on the time of the day. All this requires an individual to manually attend to each of the devices independently from time to time. All such monitoring and control can be done without necessarily being around or inside the home. Some devices if not controlled properly consume a lot of energy which leads to extra expenditure on electricity. Therefore we propose to design an internet based home automation system which will enable one to remotely manage his/her appliances from anywhere, anytime.

#### IV. PROPOSED SYSTEM FEATURE

As we enter the 21st century, the interaction between humans and computer is breaking old barriers and entering a new realm. In the highly technology driven world of today's mobile phones have become a part of our Lifestyles. Mobile phones are not just communication tool. Our project tries to derive solution providing better control on home appliance with help of cell phone. The Existing System consists of physical appliances in our home that are been controlled through switches. These devices can be switched ON & OFF manually whenever needed. This system is less secured and prone to electrical hazards. Also the wastage of electricity tends to be a major factor of concern. The proposed project is conceived networking our mobile phone to all appliances via a smart logic circuit. The proposed system consists of Smart Logic Circuit connected to the appliances. Status of all home appliances could be controlled by user from remote location with help of user's mobile phone. The proposed home automation system can control the following appliance:

1. Lights on/off/dim
2. Fan on/off
3. On/off different appliance
4. Leakage of gas

#### V. SOFTWARE DESIGN

##### A. Front End Design

HTML is a format that tells a computer how to display a web page. The documents themselves are plain text files with special "tags" or codes that a web browser uses to interpret and display information on your computer screen. HTML stands for Hyper Text Mark-up Language; an HTML file is a text file containing small mark-up tags. The mark-up tags tell the Web browser how to display the page. An HTML files must have an htm or html file extension.

##### B. Database Storage

The system generates forms to collect data and stores the responses in a database. The system is very flexible since the data can include HTML, allowing the system to perform additional processing using JavaScript or other HTML techniques.

#### VI. IMPLEMENTATION SETUP

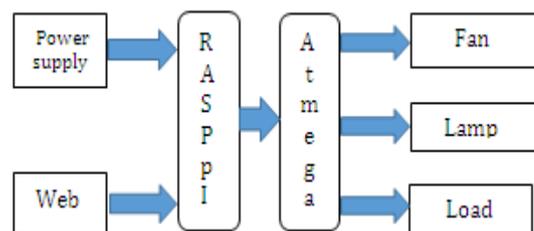


Figure 2: Sequence of activities in WHAS

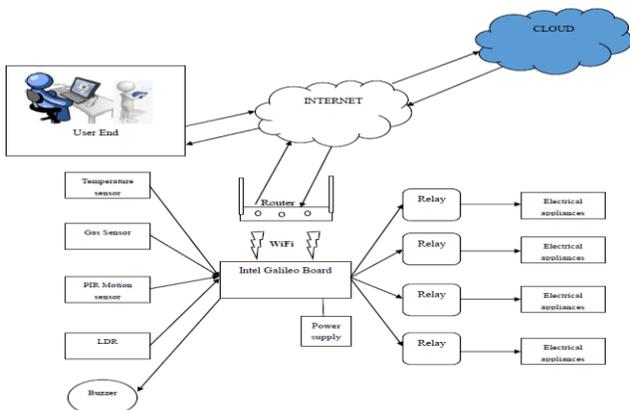
Android Accessory Development Kit (ADK) - ADK allows Android Phone to act as USB Device where as the "Arduino-Mega2560 ADK" will act as USB Host. This allows communication between Android Powered Devices (like phone, tablet) and external Hardware like industrial controls. Embedded Device - It consists of individual embedded kits along with respective sensors

#### E. System analysis:

##### a. Proposed System

The markup tags tell the Web browser how to display the page. An HTML files must have an html file extension. **EEPROM Storage:** EEPROM computing is the practice of using remote servers on the internet to manage, store and process data instead of using a personal computer. Cloud computing is a general term that is better divided into three categories: Infrastructure-as-a-Service, Platform-as-a-Service, and Software-as-a-Service. IaaS (or utility computing) follows a traditional utilities model, providing servers and storage on demand with the consumer paying accordingly. PaaS allows for the construction of applications within a provider's framework, like Google's App Engine. SaaS enables customers to use an application on demand via a browser. A common example of cloud computing is **Gmail**, where you can access your stored data from any computer with internet access. Here we are using Gmail for the storage of the data

##### b. Proposed block diagram



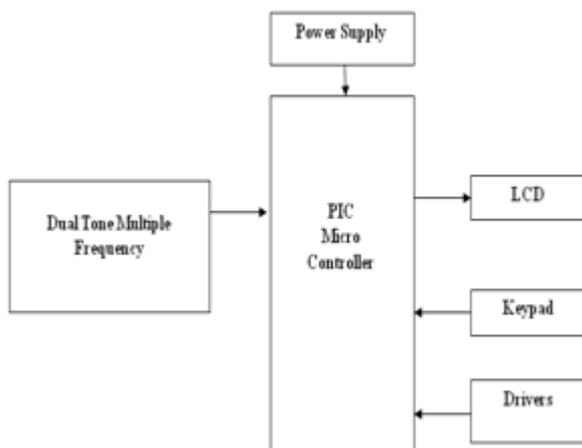
#### III. PROBLEM DEFINITION

Many people are always on the move from place to place due to business demands. Some people can spend a couple of days away from their home leaving all their household appliances without any kind of monitoring and control. Some devices are left plugged into power sockets whereas others are supposed to

Figure 2 illustrates the sequence of activities in the WHAS. When the connection is established it will start reading the parameters of sensors like fan, tube light, gas sensor etc. The threshold levels for the required sensors are set as t1, t2, and t3 etc. The sensor data are sent to the web server and stored in the cloud. The data can be analysed anywhere any time. If the sensor parameters are greater than the threshold level then the respective alarm a1, a2, a3 etc. will be raised and the required actuation is done for the controlling of the parameters. A model house is built for the home automation system and is as shown in the figure . Light 1 will turn on automatically when light sensor detects the darkness. A cooler/Fan will turn on when the room temperature exceeds the set threshold and in turn reduces the room temperature. The gas sensor LM35 is placed in the kitchen to detect any gas leakage, if any leakage is detected the alarm in the hall is raised. Relay is used to switch the electrical appliances like light, fan etc. The Intel Galileo is placed in store room or garage. The Raspberry PI B is connected with WiFi or LAN for the connectivity with internet

## VII. EXISTING SYSTEM

This system is designed to provide control of home appliances through landline by dialing the designated number for the particular load. Dialing can be done from the home phone or a call made to the home number from outside. This system is designed without engaging a programmable microcontroller but is based on digital logic using DTMF technology (Dual Tone multiple frequency) which receives the command from the landline phone to develop digital output.



## CONCLUSION

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data, like temperature, gas, light, motion sensors, but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor parameters in the cloud (Gmail) in a timely manner. This will help the user to analyze the condition of various parameters in the home anytime anywhere

## FUTURE WORK

Using this system as framework, the system can be expanded to include various other options which could include home security feature like capturing the photo of a person moving around the house and storing it onto the cloud. This will reduce the data storage than using the CCTV camera which will record all the time and stores it. The system can be expanded for energy monitoring, or weather stations. This kind of a system with respective changes can be implemented in the hospitals for disable people or in industries where human invasion is impossible or dangerous, and it can also be implemented for environmental monitoring.

## References

- [1] Das, S.R., Chita, S., Peterson, N., Shirazi, B.A., Bhadkamkar, M., "Home automation and security for mobile devices," IEEE PERCOM Workshops, pp. 141-146, 2011
- [2] S.D.T. Kelly, N.K. Suryadevara, S.C. Mukhopadhyay, "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes", IEEE, Vol. 13, pp. 3846-3853, 2013
- [3] R. Piyare and M. Tazil, "Bluetooth based home automation system using cell phone," in Consumer Electronics (ISCE), 2011 IEEE 15th International Symposium on, 2011, pp. 192-195.
- [4] Al-Ali, Member, IEEE & M. AL- Rousan, "Java-Based Home Automation System R." IEEE Transactions on Consumer Electronics, Vol. 50, No. 2, MAY 2004