

Wireless Home automation System Using Android Application

Bihola Kajal¹, Vaghela Aayushi², Patel Romil³

¹ Department of Information Technology, Sigma Institute of Engineering

² Department of Information Technology, Sigma Institute of Engineering

³ Department of Information Technology, Sigma Institute of Engineering

⁴ Asst. Prof. Department of Information Technology, Sigma Institute of Engineering

Abstract — The project presents the overall design of home automation system with low cost and wireless system. This system is design to assist and provide support in order to fulfill the needs of elderly and disabled people in home. Also, the smart home concept in the system improves the standard living of the home. The switch mode is used to control the home appliances. The main control of the system implements wireless technology to provide remote access from smart phones. The switch status is synchronized in all control system where by every user interface indicates the real time existing switches status. The system intended to control electrical appliances and devices in house with relatively low cost design, user friendly interface and ease of installation.

Keywords: - Home automation system, Arduino UNO, On/Off switch mode, PIR Sensor, Android application.

I. INTRODUCTION

The terms “Wireless home automation system” has been introduced the concept of networking appliances and devices in the house. Home automation system is becoming popular nowadays and enters quickly in this emerging market. However, end users, especially the disable and elderly people due to the complexity and cost, do not always accept this system. Home automation system centralized control of lighting, appliances & other system, to provide improved comfort and energy efficiency. The project forwards the design of home automation system using arduino board, relay board, PIR sensor and Wi-Fi adapter. The android OS in any phone connected to network can access the status of the home appliances via an application. It presents the design and implementation of automation system that can monitor and control home appliances via android phone.

II. LITERATURE SURVEY & REVIEW

The wireless home automation system provides facility to elderly and disables people of controlling home appliances. This system can be used to monitor and control the use of electrical energy and home appliances to facilitate the customer [1]. So by our system we can provide them to use the device by wirelessly [2]. A home automation system involves a complete and total control of unlimited number of appliances [2]. The application of our system is very useful when people who forget to do simple things like turn ON or OFF devices at their home, they can do that without their presence by clicking the particular button in our android application through mobile phones. So we have used PIR sensor to detect their presence and notify them with application.

The objective of this project is to develop a device that allows for a user to control multiple home appliances from both indoor and outdoor using an android mobile phone. From which we can wirelessly control the home appliances from particular range [3]. A user interface technology is known by Android's support for the on the Android enabled mobile phone offers system. A PIR sensor is connected to the microcontroller which is used for sensing the human presence. In our system, PIR sensor is attached with arduino from which it can sense and notify to the user [4]. The Arduino UNO provides an inexpensive and easy way to create devices that interact with their environment using sensors. So from the relay board we can attach as many appliances we want to attach [6].

Relay board is used for controlling home appliances like light fan etc. from which it is connected with Arduino UNO. Several issues affecting wireless home automation systems such as lack of robustness, compatibility issue and acceptability among the elder and disabled people who cannot even control the appliances. [9]. Android is a platform which develops and deploys android based applications on mobile devices supporting it. From which we can operate the system. We have to control the ON and OFF switch mode of the home appliances of a system involving hardware to devices but no wired connection to that place is available.so wirelessly we can operate our home automation system. [8].

III. PROPOSED METHODOLOGY

3.1 System Flow

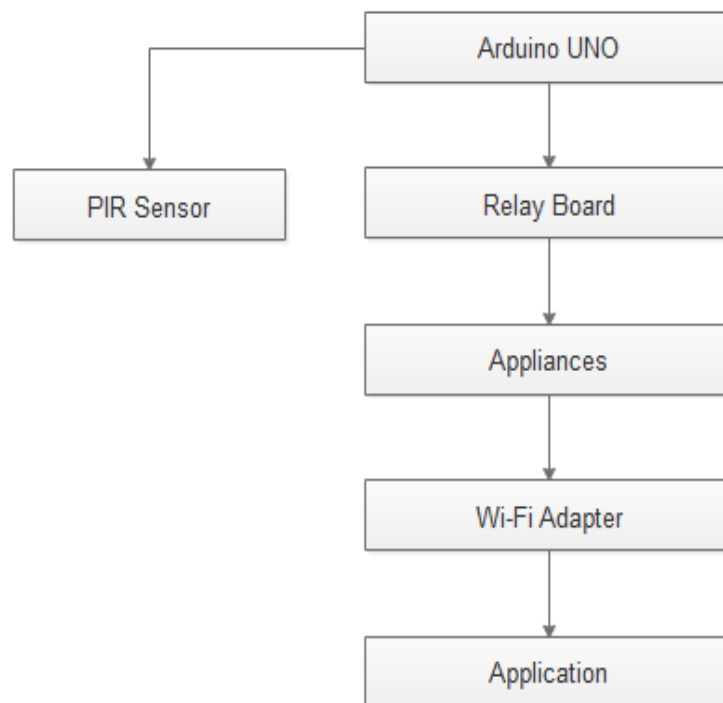


Figure 3.1 System Flow

The wireless home automation system is an integrated system to facilitate the elderly and physically challenged people with an easily operated home automation system that operates through an android application. The system flow diagram of the proposed system is shown in figure.

The main component of our wireless home automation system is the arduino UNO. It is the main core of our system. The arduino UNO is the Microcomputer in which the embedded code for the different modules is done. The arduino UNO is connected with the relay board, sensors and the Wi-Fi adapter. The relay board is connected with the multiple appliances of any home or office places. It is connected with the light and fan or the other devices which are used in our day to day life while the sensor that is PIR sensor is used for sensing the motion of human when he/she enters or leaves the room. Whenever PIR sensor detects any movement it turns on the lights which are connected with it.

The next component is the Wi-Fi adapter connected through the arduino UNO and a network layer provided between the application and the home automation system. When a command is passing from the application to the arduino, it firstly detects the Wi-Fi module, it sends the signal back to application and provides a medium in between them to connect. Now, the android base application using the different packages are built in up. In which the switch mode commands are made up which control the home appliances by on/off commands. By using application, Person can control appliances through a minimum range of area.

Thus, the application controls the appliances from the ON/OFF through a Wi-Fi module and can instruct the command. So, by this way a whole wireless home system is connected and works by its system flow and can communicate and control all the appliances of the household.

IV. RESULTS



Figure 4.1 Arduino UNO

Arduino comes with simple integrated development environment (IDE) which runs on a PC and allows user to write programs for Arduino in C or C++ language. The Arduino microcontroller is based on the ATmega 328. It has 14 digital input/output pins and 6 analog inputs. Arduino works on 5V D.C and has clock speed of 16 MHz.



Figure 4.2 Relay

A relay is an electrically operated switch. The relays used in the system are 5V-5 pin relay. The Single Relay Board can be used to turn lights, fans and other devices on/off while keeping them isolated from your microcontroller.



Figure 4.3 Wi-Fi Module

The ESP8266 Wi-Fi Module uses TCP/IP stack which can be connected with any microcontroller. It is use to establish connection between devices. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.



Figure 4.4 PIR Sensor

Passive Infrared sensor is an electronic sensing device that senses infrared light emitted from entities in its field of view and used to detect motion in its range. It is activated only in the security mode to detect any unwanted motion at the entrance. If any unwanted movement is detected then it will signal the microcontroller to take necessary steps.

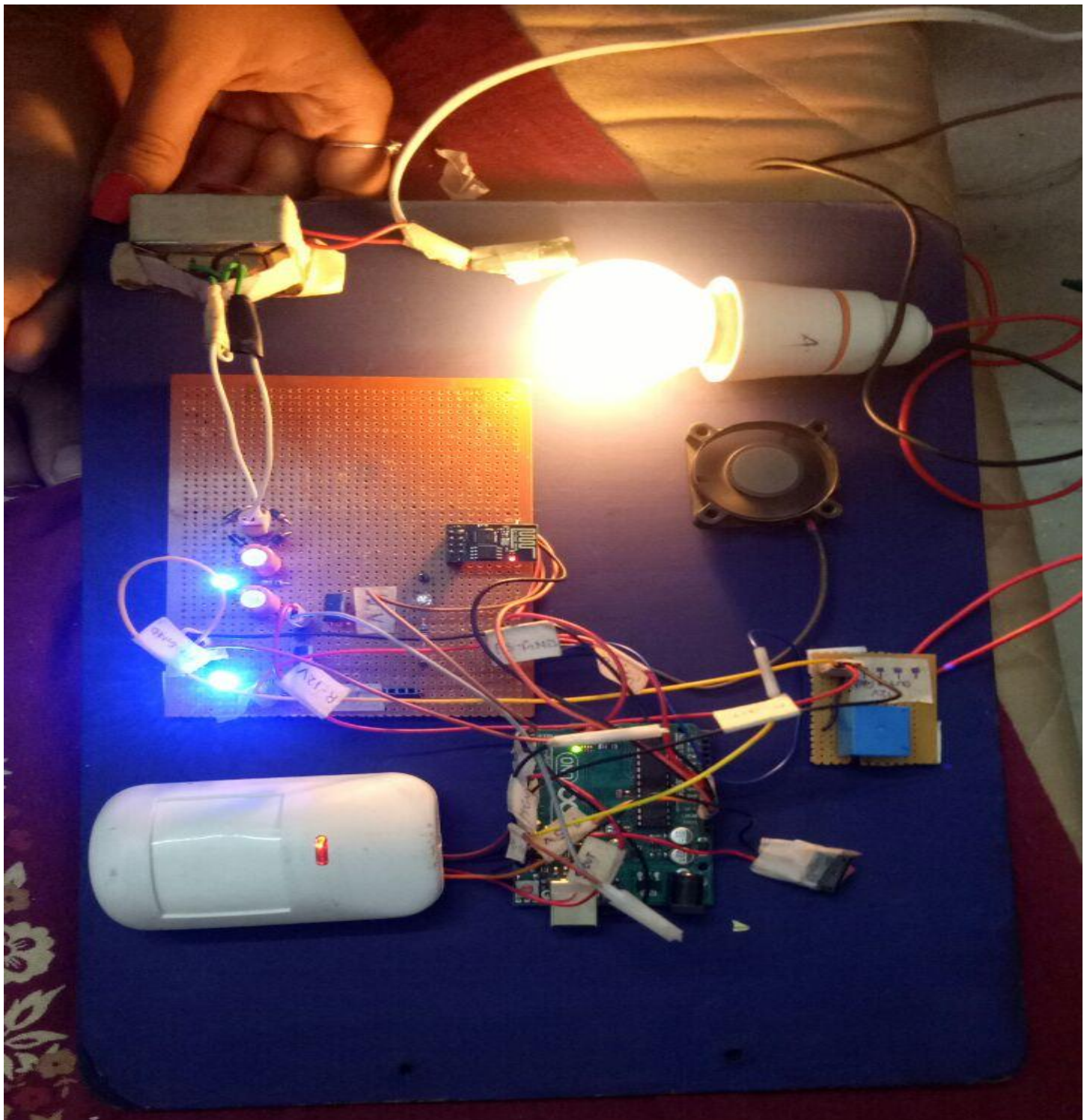


Figure 4.5 Hardware

This is the hardware of wireless home automation system using android application. We have used Arduino UNO as core component of our system. We have also used PIR sensor for security Purpose.

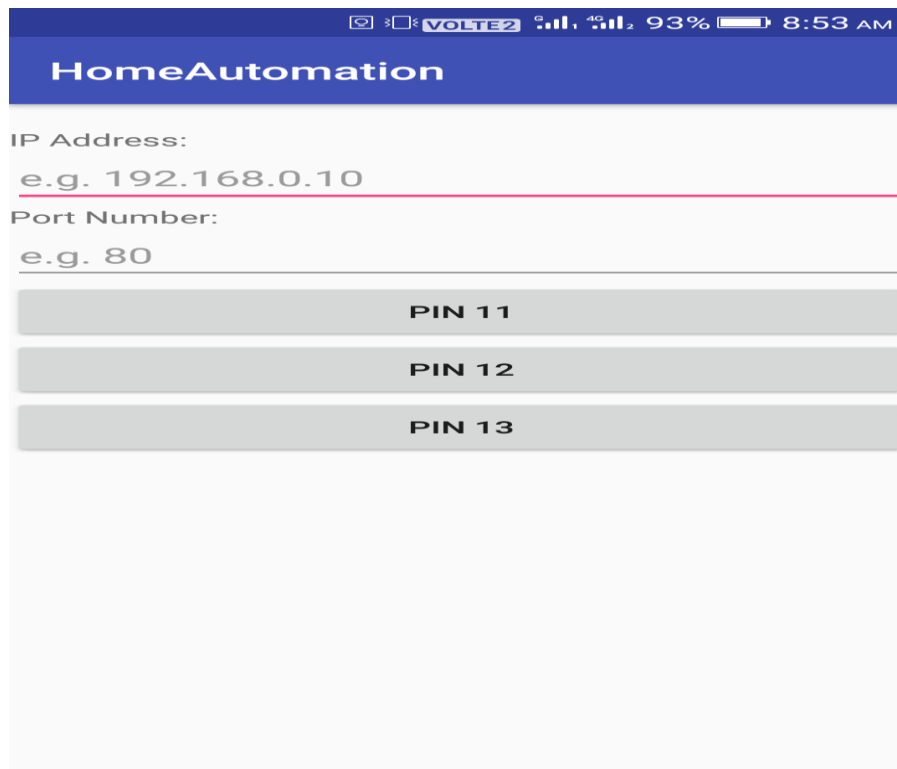


Figure 4.6 Application

We have created android application for our system which will be used for controlling home appliances through android phones.

IV. CONCLUSION AND FUTURE WORK

We conclude that our system will help the disable and elder people for accessing their home appliances. This system is not for only home appliances but also for restaurants, schools, universities, hospitals, etc. Our system is less expensive so, that middle families can easily afford this. In future work we will develop our wireless home automation system which will support other platforms like IOS, web, etc.

REFERENCES

- [1]. Akbar Satria, Muhammad Luthfi Priadi, Lili Ayu Wulandhari and Widodo Budiharto. "The Framework of Home Remote Automation System Based on smartphone". International Journal of Smart Home, Vol. 9, No. 1 (2015), pp. 53-60.
- [2]. Bilal Ghazal1 and Khaled Al-Khatib2, "Smart Home Automation System for Elderly, and Handicapped People using XBee", International Journal of Smart Home, Vol. 9, No. 4 (2015), pp. 203-210.
- [3]. Anandhavalli D, Noorul S. Mubina, Bharathi P "Smart Home Automation Control Using Bluetooth and GSM". International Journal of Informative & Futuristic Research, Vol. 8, Issue 8(2015).
- [4]. V.persis priyanka, Dr. K. Sudhakar reddy "PIR Based Security Home Automation System with Exclusive Video Transmission". International journal of Scientific Engineering and Technology Research, Vol.04, Issue.18, June-2015.
- [5]. Syed mujeeb patel, syed jilani pasha "Home Automation System (HAS) using Android for Mobile Phone". International journal of Scientific Engineering and Technology Research, Vol.04, Issue.25, July-2015.
- [6]. Mukesh Kumar, Shimi S.L "Voice Recognition Based Home Automation System for Paralyzed People". International Journal of Advanced Research in Electronics and Communication Engineering, Volume 4, Issue 10, October 2015.
- [7]. Subhajit Dey , Tamaghna Kundu , Sourav Mukherjee and Mili Sarkar "WEB BASED REAL-TIME HOME AUTOMATION AND SECURITY SYSTEM". International Journal of Electrical and Electronic Engineering & Telecommunications, Vol. 4, No. 3, July 2015.
- [8]. S.Anusha, M.Madhavi, R.Hemalatha "HOME AUTOMATION USING ATmega328 MICROCONTROLLER AND ANDROID APPLICATION". International Research Journal of Engineering and Technology, Vol. 02, Issue: 06, Sep-2015.
- [9]. R.harinath, Dr. S. Santhi "GSM BASED HOME AUTOMATION SYSTEM USING APP-INVENTOR FOR ANDROID MOBILE PHONE". International Journal of Computer Science and Mobile Computing, Vol.4 Issue.4, April- 2015.