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Wireless Home Automation System using Android

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ABSTRACT: This paper presents the overall design of Home Automation System (HAS) with wireless remote control to increase the range of accessing equipment. Automatic systems are being preferred over manual system. Home automation will increase the work efficiency and comfort of human being in daily life. This concept provides support in order to fulfill the needs of elderly and disabled in home. Using this system we can remotely access the equipment in our house. For system design, we are using Atmega 32 microcontroller, LCD display and wireless module ESP-8266 and which is operated remotely by android smart phone. The system intended to control electrical appliances and devices in house with relatively low cost design, user-friendly interface and ease of installation.

KEYWORDS: Microcontroller, LCD, HAS, ESP-8266, Android, telenet

I.INTRODUCTION

With advancement of technology things are becoming simpler and easier for us. Automation is the use of control system and information technologies to reduce the need for human work in the production of goods and services. Automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience. Automatic systems are being preferred over manual system. Through this project we have tried to show automatic control of a house as a result of which power is saved to some extent.

Due to the advancement of wireless technology, there are several different of connections are introduced such as GSM, WIFI, ZIGBEE, and Bluetooth. Each of the connection has their own unique specifications and applications. Among the four popular wireless connections that often implemented in HAS project, wireless Esp-8266 module is being chosen to increase the range with compare to bluetooth. Android, by Google Inc. provides the platform for the development of the mobile applications for the Android devices. There are so many android applications available in google play store or we can design android application according to our requirement. Here, we are using telenet apk to send signal from android phone to microcontroller.

II.SYSTEM OVERVIEW

Figure 1 shows the block diagram of home automation system. In this system we are using smart phone with specific application which are used to connect with wifi device. Wifi device is connected to microcontroller. So, mobile will connect microcontroller with wifi module and we can send signal from mobile to microcontroller through wifi module. Microcontroller gets power from power supply unit. In this system we used three relay for driving three different load of home. Relay driver IC is used to control these relay operation. When signal is send from mobile to operate one of the load to microcontroller, microcontroller send the signal to relay driver IC and it will turn on or turn off the specific load. LCD is used to display the status of device which is on or off.

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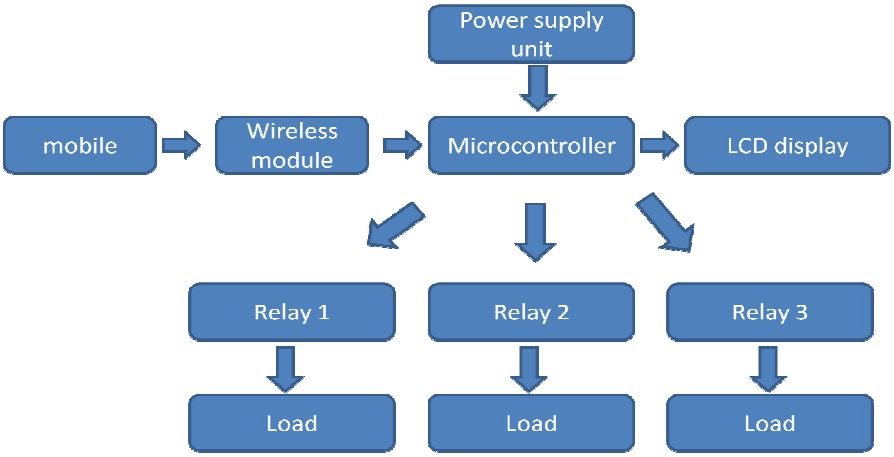

Fig. 1 Home automation system

III.COMPONENTS

Major components used in this system are microcontroller-ATMEGA32, ESP-8266(wifi module), Liquid crystal display(LCD), relay driver IC(ULN2803) and relay.

1) Microcontroller-ATMEGA32

Microcontroller is a programmable device which contains a microprocessor, memory, input-output ports etc which can be compared with the microcomputer. Microcontroller is a single chip computer. As microcontroller is a low cost programmable device. It is used in the automatic control application. Here, ATMEGA32 is used for this system. PIN diagram of this microcontroller is shown below in fig 2.

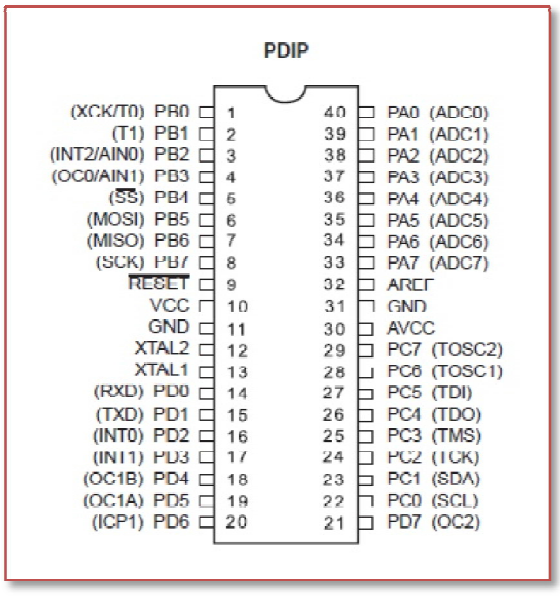

Fig. 2 PIN diagram of ATMEGA32

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2) Wifi module(ESP8266)

ESP8266 is serial device which connects to microcontroller serially. For that AT command is used. Our mobile phone will connect to microcontroller via ESP8266. In mobile, android .apk is available for this wifi module. Using this .apk, mobile phone will connect to wifi module and we able to operate system with our smart cell phone. Here, telnet.apk is used.

IV. SOFTWARE DEVELOPMENT FOR HOME AUTOMATION SYSTEM

The system programming is written in C language and keil is used as a software platform. Algorithm for home automation system:

1) Start
2) Initialize LCD, UART and Wifi
3) Read data from wifi
4) If number pressed from cell phone is 0, all relays are off and displayed L1, L2 and L3 off.
5) If number pressed is 1, Relay 1 is on and displays L1 on.
6) If number pressed is 2, Relay 1 is on and displays L2 on.
7) If number pressed is 3, Relay 1 is on and displays L3 on.

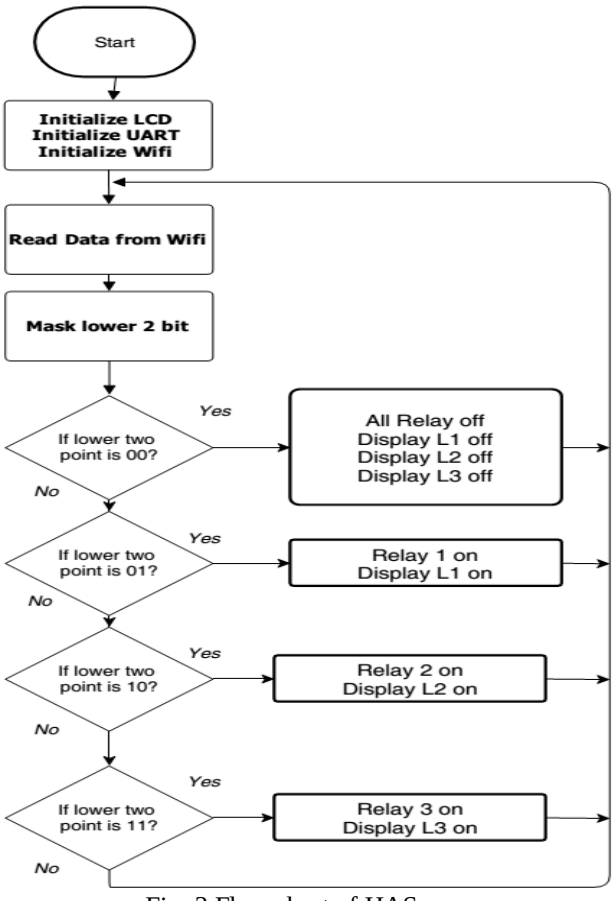

Fig. 3 Flow chart of HAS

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IV.SIMULATION & HARDWARE

Simulation is prepared for home automation system. Here, we used ATMEGA32, LCD, three relays, power supply unit and relay driver IC-ULN2803

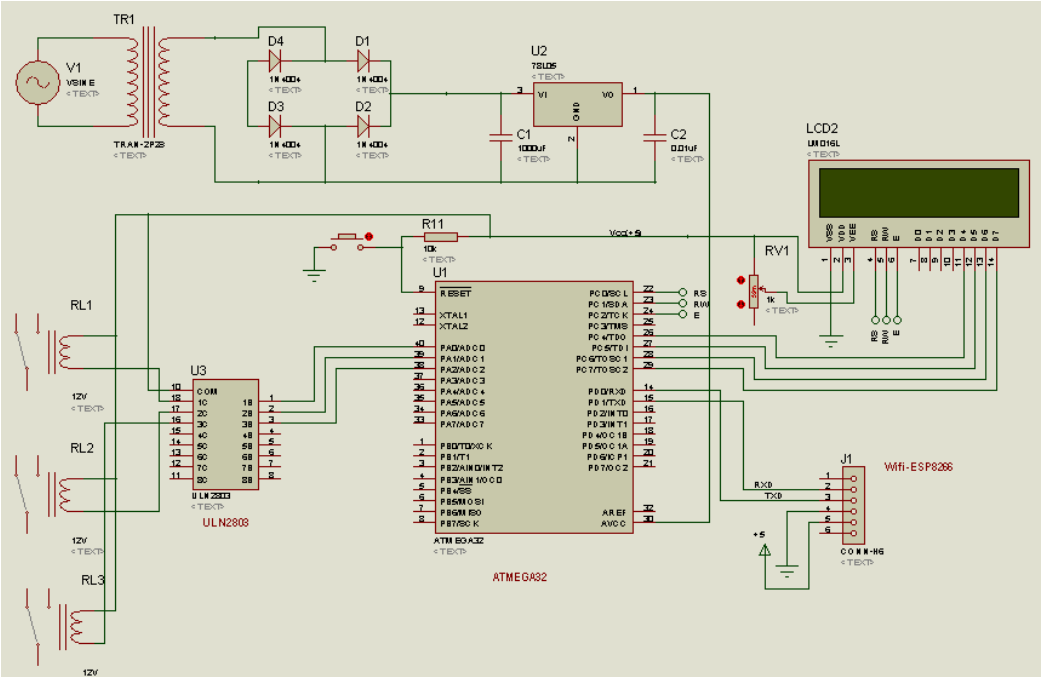

Fig. 4 Simulation

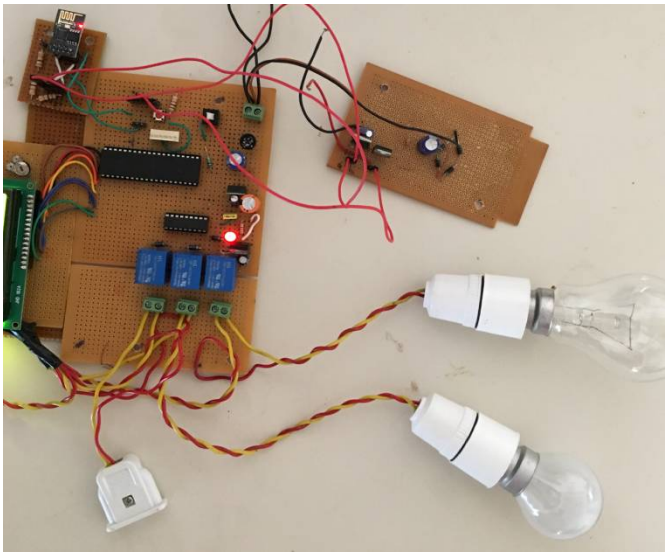

Fig. 5 Hardware of home automation system

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VI.CONCLUSION

Using this system, we can able to operate electrical appliances within 10 meter range. This system is cost effective and easy operated using smart phone. We tested it for three electrical appliances and successfully we operated all the appliances using smart phone within range. We can design this system for all the appliances used in home with some modification.

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