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HOME AUTOMATION WITH ANDROID UNDER IOT CONCEPT

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***Abstract*— Internet of things (IoT) is nothing but network of electronic gadgets, devices and physical objects. Any particular house or building consists various electronic appliances. This paper presents the complete design of Home Automation System with low cost android phone and wireless communication through internet. As we are living in 21st century where internet is playing vital role in human life. Internet allows us to share information, to access things remotely. Internet can be used to control home appliances from anywhere in the world. Home automation provides ease of living. The main goal of this system is to access home appliances and status of home by using android phone. Android is the best OS platform for ease of use. Also android of user-friendly OS. After getting command microcontroller (AVR atmega328) then processes the received data and gives response through internet.**

Keywords*— *IoT, AVR atmega328, Home Automation, Smart home, Android OS, Driver Circuit.

1. INTRODUCTION

Home automation system has become very much popular now a days, its popularity has been increasing rapidly in recent years due to simplicity through smartphone and connectivity.

The aim of this System is to provide those with special needs with a system that can respond to commands from android device through internet and control the on/off status of electrical devices, such as lamps. The system should be reasonably cheap, easy to configure, and easy to run. It also gives information about environmental parameter of home such as temperature, humidity.

In this project android app provides user interface to control various appliances and to get status of home.

Android App generates codes for each command and transmit to microcontroller through internet. Then microcontroller processes the received data and switches the respective appliances using connected driver circuits. Driver circuit consists SSR (Solid State Relay) and SSR drives appliances.

2. BLOCK DIAGRAM

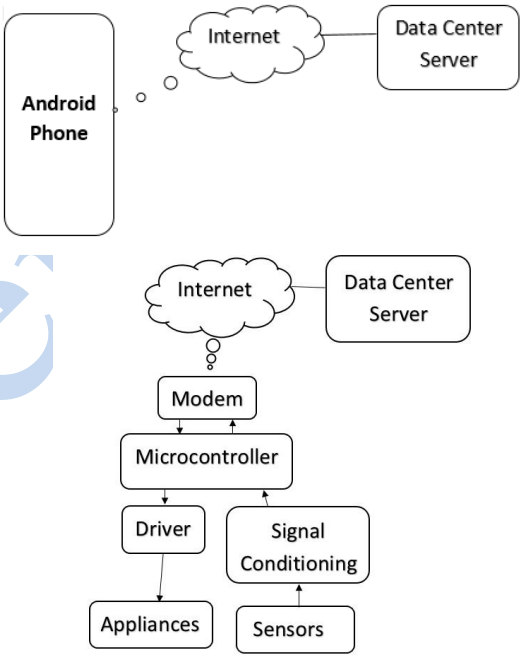

Fig 2.1

Android device: android phone
Ethernet modem
Microcontroller: AVR Atmega328
Driver circuit: Relays
Sensors: Temperature sensor, Pressure Sensor.

3. HARDWARE DESIGN

A. Internet modem

In this project we are using another android phone as a terminal. That means one phone communicate with another phone through internet same as whats app or any another messenger.

After getting command from user phone to remote phone. Remote phone is connected to microcontroller via

Bluetooth, so same command is carry forward to microcontroller.

B. AVR Atmega328

In this project we have used arduino uno board. It is a microcontroller development board with microcontroller ic ATmega328.

Fig. 3.1

It has 14 digital input/output pins. Out of which 6 can be used for PWM signals, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an UART and a reset button.[1]

C. Driver Circuit

Basically for Driving high voltage relays or power MOSFETS are used. We used SSR, and to drive relay we used ULN2003 driver ic.

4.SCHIMATICS

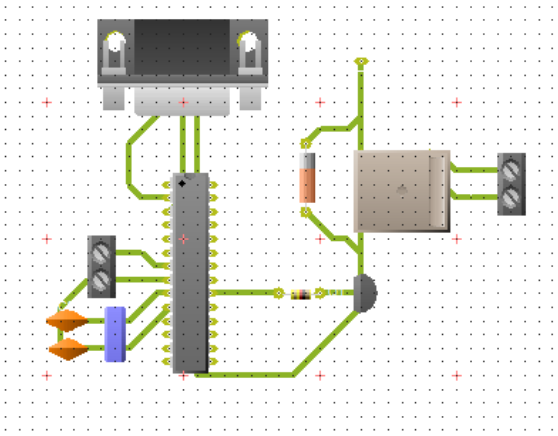

Fig. 4.1

5. SOFTWARE DESIGN

Software design is divided into three sections

1. Main function of the system designed in Atmega328 microcontroller
2. Designing of Android application
3. Design of server

A. Embedded programing for Atmega 328

Basically data is transmitted or received by microcontroller as well as android phone through internet. Embedded programming basically consists the logic behind command interpretation which are received from remote phone. After receiving any command, it will get processed by microcontroller and then microcontroller will take appropriate action.

e.g. if I want to turn on lights, then I will press "lights on" button, certain code will get send to server through internet. As system is connected to server, it will receive that code. After checking that code, particular light will turned on.

B. Android Application Development

Android Application is interface between human and system. The Android application is designed using MIT AppInventor2.

App Inventor for Android is web application provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT).

It allows newbie to computer programming to create software applications for the Android operating system (OS).[2]

C. Design of server

Web server is nothing but a storage media for storing data over internet or cloud. Web server is necessary because as we want to send command through internet, first that command will get stored in web server and then accessed by remote system.

To make it possible we are going to use the web server provided by MIT APP INVENTOR. "appinvtinywebdb" it is a free web database. And it can be used to store particular data in it.[3]

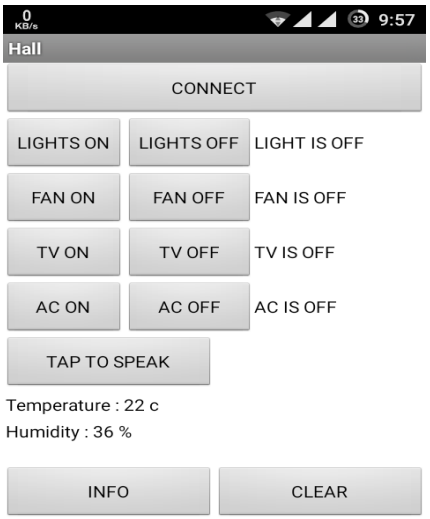

Fig. 5.1

Fig. 5.1 illustrates the Android application i.e., installed in the Android device which has Android OS installed in it. The application is simple to use, user can turn on and off the appliances that are connected to main control board by clicking buttons.

6. RESULTS

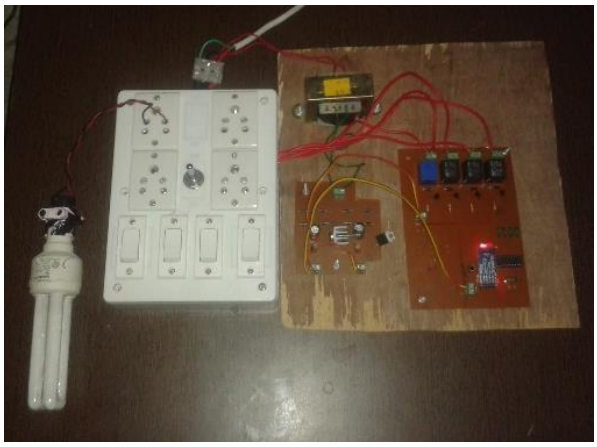

Fig 6.1

It shows hardware part.Which contains power supply section,Microcontroller section, driver section and electric board. Here on electric board one DPDT switch is provided to switch the mode.[4]

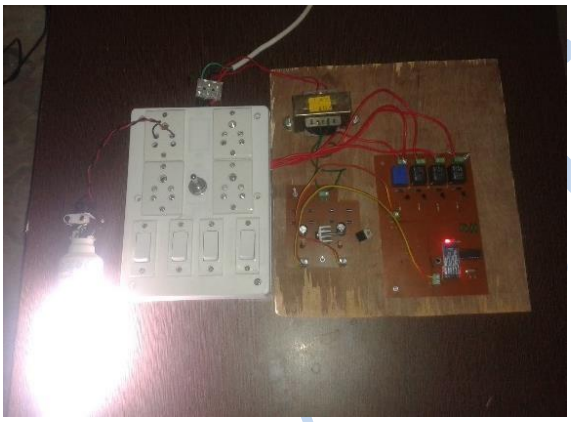

Fig. 6.2

There are two modes

1. Automatic i.e. swithching through mobile
2. Manual i.e. traditional switching method.

In hardware four sockets are provided in which 1st is for lights, we can change it as per convenience.[4]

7. APPLICATIONS AND ADVANTAGES

1. This project can be used for industrial purpose.
2. We can control device from a long distance without any electrical contact.
3. Faster operation and efficient.
4. User does not need to carry separate remote or any other controlling unit.

8. FUTURE WORK

This project can be further extended for industrial purpose, and it may lead to the situation like no need to visit site all the time.

9. CONCLUSION

IoT improves efficiency of any work and reduces human efforts. We found that real time switching is delayed, as it depends on internet speed.

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