

# Home Automation using Arduino and Android interfacing

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**Abstract-** Automation is an important aspect now a day which is used to minimized human efforts. In this paper we are going to show how home automation will done using interfacing of Arduino and Android. In our project we are going to develop a prototype of home automation system which user can use in large scale in housing industry. In our prototype model we are going to show six different modules like controlling light, fan, AC, TV, Person counter (Number of people present in room) etc. using android phone which is a host controller also for security purpose fire alarm and notification system , to reduce energy consumption light intensity module. Communication between appliances and android is done using both wireless and wired techniques. Also we are going to show drawbacks of Bluetooth interfacing as compared to WIFI interfacing. Our Android application will be used for physically challenged people also as end user can control appliances using voice command.

**Keywords-** Android, Arduino, Android, Embedded system, IOT

## I. INTRODUCTION

Automation is nothing but use of different control system for operating appliances with minimum interaction of human. Home automation is a compact version of building automation. It is an automation of home, housework etc. The popularity of home automation has been increasing greatly in recent years due to much higher affordability and simplicity through smartphone and tablet connectivity. The concept "Internet Of Things" has tied in closely with the home automation. In this paper we are going to build a prototype of home automation system. This system consist of centralized controlling of lightning, Fan, TV, AC, Fire Alarm and notification system using host controller. Research in home automation is going on since last 20years but most of the systems which are available in market are one way appliance and carter towards upper class but in our prototype design and controlling of home automation is highly customizable, flexible and low cost. We are going to use Arduino and android platform for interfacing in home automation system. This system will be useful for physically challenged people also as we are going to use speech API.

## II. LITERATURESURVEY

According to our survey, there are very few android based home automation systems that are available in market.

Although there are android based which system present in market but most of the system are not customizable and carter to upper class.

Compared to other system our prototype of home automation system is user friendly having less cost with greater flexibility but maintenance cost of the any system is depend on how user is going to handle component and whole system

### 1. Arduino Mega

Arduino is an Italian technology. It is a brain or central processing unit of home automation system. Sensor's data processing, action triggered by android application will process on and performed by Arduino board.

We are going to use Arduino mega 2560 because it consists of nearly 53 inputs. Main advantage of Arduino is cost of board it less as compared to other platforms, programming language is very simple and easily understandable for new learner and easy to implement.



Figure 1: ArduinoMega

### 2. Android

In first stage our target is development on android platform. Android is widely used open source operating

system. Main advantages of android are widely used, less costly and complex as compared to iOS, User friendly GUI, custom ROM. Android operating system is based on Linux family and uses Java programming language. Android have features like Bluetooth, WIFI so using different modules we can interface android with Arduino. Also application is consist of Webview. Webview is a kind of view or widget that displays webpages in android application. Webview makes turns your application to web application. Using webview accessing of data through sensor is easier than normal application.

### 3. Bluetooth HC-05

In our system we are going to show only one module using Bluetooth interfacing. Also we also the disadvantages of using Bluetooth. For interfacing we are going to use BluetoothDevice, BluetoothAdaptor, BluetoothConnect method in android programming

### 4. Ethernet Shield

WIFI is a popular networking technology that uses radio waves for high speed internet and network connection wirelessly. In our project we are going to use Arduino Ethernet Shield to create web server. Communication between Android and Arduino can be done using dynamic IP address allocation or Static IP address allocation but in our system we are using static IP address allocation method

#### A. Software Design

Our Android application can control household appliances like Fan, Light, TV, AC etc. It will provide fire alarm and notification system for safety and security. It will also provide information about temperature, motion, intensity of room and it will also give number of people present in the room.

## II. BLOCK DIAGRAM

#### Our System Consists –

1. Arduino Mega - It is a central processing unit. Programming of Arduino will be done on Arduino IDE.
2. Android - Android is a host controller which is used to trigger or performs some actions.
3. Sensors - We are going to use different sensors like obstacle (for person count), motion, DHT11, LM35 temperature sensor
4. Relay Board - Relay board is going to use for volt conversion.

5. Cables - For connecting purpose.
6. HC-05/Ethernet shield – For interfacing between android and Arduino

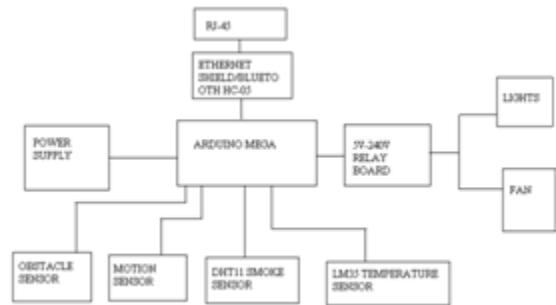


Figure: Block Diagram of Home automation using Arduino and Android

## III. MODULES

Following are the modules of our Home Automation System

1. Light control using android
2. Fan control using android
3. Light intensity
4. Temperature and humidity display
5. Fire alarm system
6. Person Counter

## IV. FUTURE WORK

Areas which we are going to work in future –

1. We are establishing this system using android platform but in future we will work on windows OS, iOS.
2. Improving safety and security in home.
2. We are going to provide more flexibility.
3. User can access home appliances from remote location also.
4. Improvisation of hardware reliability
5. Use of simple voice commands.

## V. CONCLUSION

In this paper we have discussed the prototype of home automation system. This paper gives the basic idea of controlling various appliances from android phone using application as well as voice command. We are going to use open source platforms like Arduino, Android which reduces overall cost of the project. Our Prototype can be used on large scale and also helpful for physically challenged people. Our system is customizable, flexible, less costly and cater towards all classes. We have discussed basic prototype of the system but deployment will be done in future.

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