

## HOME AUTOMATION SYSTEM USING WI-FI MODULE

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### ABSTRACT

*The main aim of conducting this project is to control a maximum of electrical appliances by just using a WI-FI technology. The devices can be switch on/off using a smartphone through wifi(ES88266). Today is a world of advance ubiquitous mobile applications which are used exhaustively to save time and energy. These applications ease day-to-day life of a common man. Based on these technologies and applications we designed a Home Automation System. In this project we propose design and prototype implementation of home automation system that uses Wi-Fi technology and Android operating system. An attractive market for Home Automation System is for busy families and individuals with physical limitations. Users can control electrical appliances in home or office via smart phones. The controlling device for the automation in this project is the microcontroller (Arduino uno R3). The proposed system consists of two main components; the first part is the server (web server), which presents system core that manages, controls, and monitors users' home. Users and system administrator can locally (LAN) or remotely (internet) manage and control system code. Second part is hardware interface module, which provides appropriate interface to sensors and actuator of home automation system.*

**Keywords**— arduino uno, algorithm, wi-fi module, programming, flow chart

### 1. INTRODUCTION

Home automation can be defined as a system implemented at a residential place whereby the intention is to make the place intelligent so that energy is conserved and security is maintained. It makes the life of the residents flexible, healthy and comfortable. Initially systems were developed in this regard but those systems had to be deployed on Internet and heavy machineries like a big Personal Computer. These systems have their own disadvantages. For example, system-implementing ZigBee has too low bandwidth for the data communication whereas the GSM implementing system has too large bandwidth for the data communication. Thus, there is wastage of the essential bandwidth, which goes without being used. The other systems, which were in use, are, for example Java Based Systems and SMS based systems. Java Based Systems still use web pages, which is a disadvantage if data intranet or Internet is off. SMS based system is more costly since it requires data transfer from the real time service provider. This Wi-Fi protocol has some upper hand benefits like its range is in the radius of 150-200m. The mobile application can also extend the security of the system via an implementation of the password protected application.

## 2. OBJECTIVES

- A. To implement home automation system using advanced technology.
- B. Use of smart phone to control any kind of home appliances from remote location.
- C. Controlling application real time from different location.
- D. Power saving and improving efficiency.

### A. To Implement Home Automation System Using Advanced Technology

Recent development in technologies such as WI-FI and BLUETOOTH has given a wide range of scope for automation. Moreover with the development of technologies such as Internet Of Things (IOT) has added more efficiency of this system. Thus giving users, an opportunity to control their home appliances from far of places.

### B. Use Of Smart Phone To Control Any Kind Of Home Appliances From Remote Location.

The home automation using Wi-Fi module and smart phone can be installed with ease. Now a days smart phones are important part of our day to day life. The app used for home automation can be easily downloaded from the android app market.

### C. Helpful For Everyone.

Now we are living in 21st century where automation is playing important role in our day to day life. It allows us to control any household appliances like Light, door, fan, etc. It also provides emergency system to be activated.

### D. Power Saving And Improving Efficiency

The home automation system reduces the power loss through smart switching of electrical appliances and thus improving the efficiency.

## 3. SCOPES

The project aims to design a device to control the home appliances that can be controlled wirelessly via an application. An application which runs on android devices. This system can be used in wide range of areas. This system includes many different features which can be applied in the following fields:-

- The automation system can be used in home, firms, small offices to the big malls.
- The system can be used real time from remote location to control electrical appliances.
- Access to the appliances over internet or intranet connections..
- Helps in the development of better technological infrastructure.
- Memory can be used to store the appliance status during power failure.

## 4. SOFTWARE AND PROGRAMMING USED

- Eclipse Android SDK(Software Development Kit)
- Arduino ID
- Embedded C/C++

- Java & XML

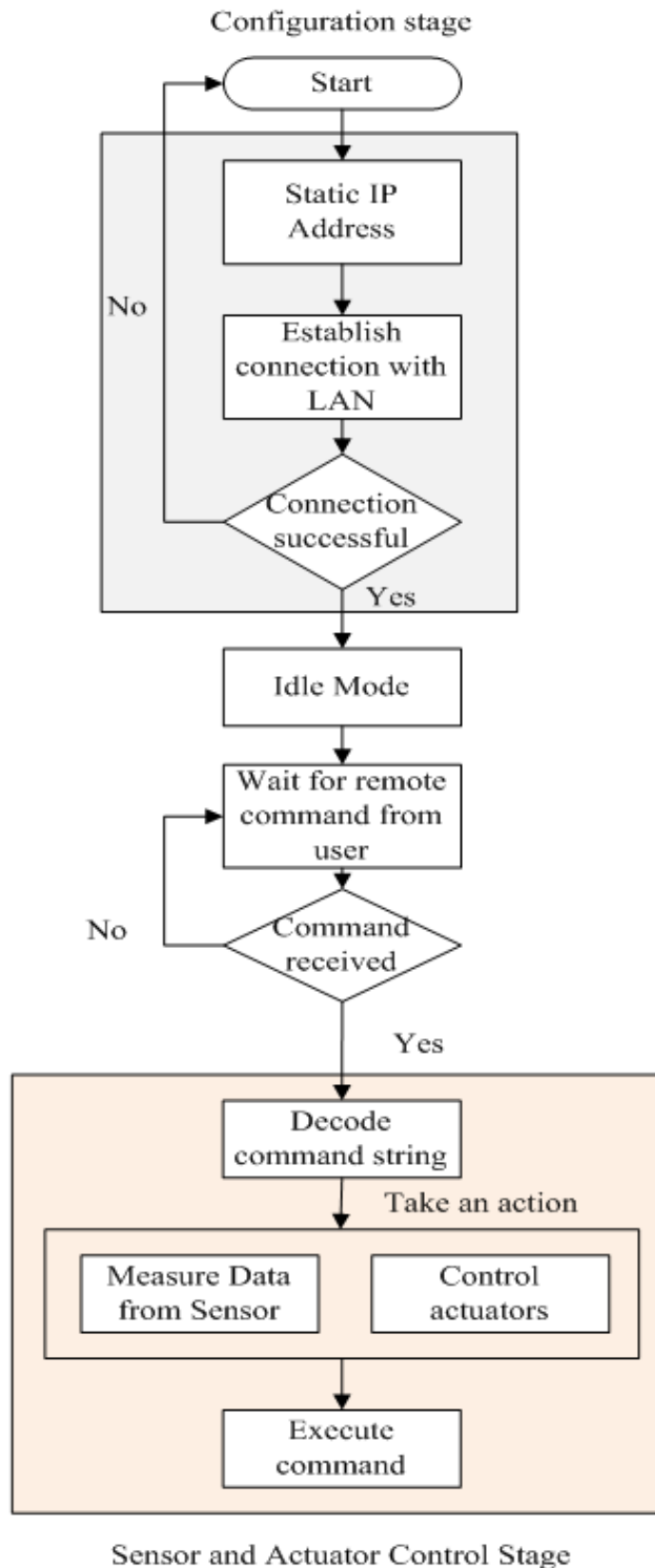
#### 4.1 ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. An Arduino board consists of an 8-bit Atmel AVR microcontroller with complementary components to facilitate programming and incorporation into other circuits. An important aspect of the Arduino is the standard way that connectors are exposed, allowing the CPU board to be connected to a variety of interchangeable add-on modules known as **shields**. Official Arduinos have used the megaAVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. A handful of other processors have been used by Arduino compatibles. Most boards include a 5 volt linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants), although some designs such as the LilyPad run at 8 MHz and dispense with the onboard voltage regulator due to specific form-factor restrictions. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external programmer.

At a conceptual level, when using the Arduino software stack, all boards are programmed over an RS-232 serial connection, but the way this is implemented varies by hardware version. Serial Arduino boards contain a simple inverter circuit to convert between RS-232-level and TTL-level signals. Current Arduino boards are programmed via USB, implemented using USB-to-serial adapter chips such as the FTDI FT232. Some variants, such as the Arduino Mini and the unofficial Board uno, use a detachable USB-to-serial adapter board or cable, Bluetooth or other methods. (When used with traditional microcontroller tools instead of the Arduino IDE, standard AVR ISP programming is used.

The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The Diecimila, now superseded by the Duemilanove, for example, provides 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs. These pins are on the top of the board, via female 0.1 inch headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board provide male header pins on the underside of the board to be plugged into solderless breadboards.

#### 5. FLOWCHART



## 6. ALGORITHM USED

```

char ch;
void blub1On(){
digitalWrite(6,1);
digitalWrite(7,0);
}
void blub2On(){
digitalWrite(8,1);
digitalWrite(9,0);
}
void blub1Off(){
digitalWrite(6,0);
digitalWrite(7,1);
}
void blub2Off(){
digitalWrite(8,0);
digitalWrite(9,1);
}

void setup() {
// put your setup code here, to run once:
pinMode(6,OUTPUT);
pinMode(7,OUTPUT);
pinMode(8,OUTPUT);
pinMode(9,OUTPUT);
Serial.begin(9600);
blub1Off();
blub2Off();
}

void loop() {
// put your main code here, to run repeatedly:
if(Serial.available(>0)
{
ch=Serial.read();
switch(ch)
{
case '1':blub1On();
Serial.print("Bulb1 On");
break;
case '2':blub2On();
Serial.print("Bulb2 On");
break;
}
}
}

```

```
        case '3':blub1Off();
        Serial.print("Bulb1 Off");
            break;
        case '4':blub2Off();
        Serial.print("Bulb2 Off");
            break;
        case '5':blub1On();
            blub2On();
        Serial.print("Both On");
            break;
        case '6':blub1Off();
            blub2Off();
        Serial.print("Both Off");
            break;
    }
}
}
```

## 7. ADVANTAGES

- One of the greatest advantages of home automation systems is that users can protect against break-ins and fires, while enjoying automations for lights, temperature, and more.
- Secures home through automated door locks.
- All the controls will be in users hand .
- Increases convenience through temperature adjustments.
- Saves a lot of time.

## 8.CONCLUSION

This project is based on Android, Arduino and Wi-Fi platform all of which are Free Open Source Software (FOSS). So the overall cost is very cheap and it is affordable by a common person. Looking at the current scenario we have chosen Android platform so that most of the people can get benefit.

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