ELECTRIC SWITCH ON/OFF SYSTEM USING ANDROID APP VIA WI-FI

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Abstract - *Mobile devices are the part of our day-to-day life from last few years. Consequently, providing facilities and security are becoming increasingly prominent features on mobile devices. In this paper, we have to developed a home automation system that interfaces with Android mobile devices. The mobile device and system can communicate with each other from long-range via Wi-Fi. The mobile application can be loaded and interfaces with system from any compatible device. Commands to ON/OFF electrical equipment like lights, fans, air conditioners etc at home or any organization can be sent easily and quickly from the mobile devices via a simple and comfortable GUI application, which is easy to use for the any normal users. The system then acts and respond to these commands by taking actions per commands and gives the result to the user. The user can also see the result on Android mobile application from anywhere. Therefore, it's a good choice to design a home automation for luxurious life.*

Keywords: *Android Mobile Phone, Wi-Fi, ARDUINO Microcontroller.*

1. Introduction :

In now a day's, development and changes of technologies is happens daily as well as continuous improvement of people's living standards are increasing. The mobile phones are the inspirable part of human lives today. The mobile phone is the most important part of human lives today. With the help of this smart gadgets human can do many works with or without internet like here we can make our home as well as organization smarter or more luxurious. The phone based on Android system is rapidly developed, so at it's I/O developers conference, Google showed a sneak preview of it's Android Home Project, which will extend the Android platform into household objects.

Here we proposed a new technology, so that mobile phones can be used to communicate with and control electrical switches like Fans, A.C. , Lights etc using Android App Wi-Fi module. The transmitter of Wi-Fi transmits the data given by the application using radio waves technology. The Wi-Fi works on radio waves technology, as the data to be passed through Wi-Fi is converted into the electromagnetic signal which is then sent using the antenna. This signal is passed to the Arduino controller. The Arduino further operates the received information and performs operations. This controller can be connected to the Relays of different switches to pass the current after generating the magnetic field. In future, we can use router for a wide range access like for the Smart City projects. New appliances can be added anytime to the system, which provides for the reliability of the system.

2. Literature survey :

For this proposed Seminar, following IEEE papers were studied as part of literature survey. **Exploiting Bluetooth on Android mobile devices for Home Security Applications,**

which Uses Techniques like Arduino controller And Bluetooth. In this project by using Android application user can control home security systems like Door.

After that **Home appliances control system based on Android smart phone was introduced at May-2014** which **preferred Techniques like** PIC Controller and Bluetooth. Smart Home System for Disabled People Via Wireless Bluetooth gives money wise concept by using GPRS as the medium to control and monitor home appliances. A user logs into the smart phone interface, and clicks the buttons gently to send message commands which will be transmitted to home information Centre through the GSM network. Then the PIC processor recognizes the specified command, and controls the home appliance switches in the wireless radio frequency manner to achieve remote control of appliances ultimately.

Exploiting Bluetooth on android mobile devices for home security application present the information about mobile devoice has been integrated into our everyday life. Home automation and security are becoming increasingly prominent features on mobile devoices the mobile devoice and security system communicates via Bluetooth because a short-range-only communication system was desired. With the help of android mobile we can control task such as locking the doors, turning on/off lights remotely. According to kaue, home automation can be useful to those who need to access home appliances while away from their home and can improve the lives of the disabled

3. System Design :

Fig 1 illustrates the overall control function of the system. The projected system works using the smart phone Android application , which is the main source for giving the instruction to the Wi-Fi module.
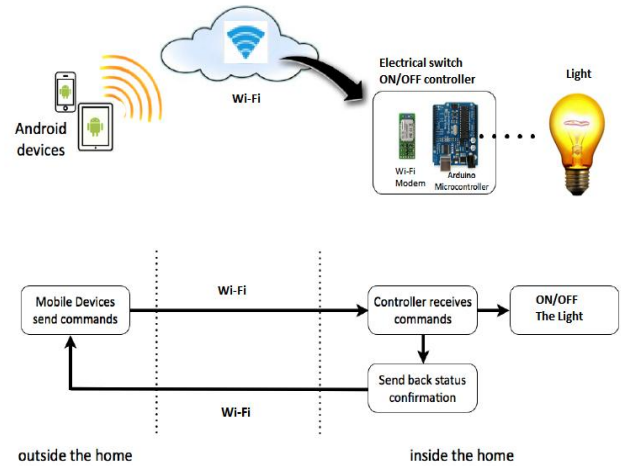

Fig. 1: System Architecture

In this proposed system, From user side, user can select the option, which switch he/ she wants to ON/OFF from their Android smart phone App. This command goes to the Wi-Fi module. Wi-Fi modules transmitter convert it into signals and send that command to the receiver of the Arduino Uno microcontroller. After that controller activates that particular I/O pin on the board and send input to the Relay. In that Relay, which has already 230V power supply , after receiving current it generates electromagnetic field in coil and passes the 12V current to switch ON the light. User can select the option from anywhere in remote access area network, which is near about 100 m from Wi-Fi module . It generates HIGH frequency i.e. 0 for switch ON and LOW frequency i.e.1 for switch OFF the electrical supply.

Following are the software and hardware requirements for the system to be developed :

3.1Software Design

3.1.1Wi-Fi on Android Mobile Device :

Wi-Fi is a local area wireless computer networking technology that allows electronic devices to connect the network and intended to replace cables on devices such as a phones and other mobile devices. The first version of the Wi-Fi IEEE 802.11 protocol was released in 1997, and provided up to 2 Mbit/s link speed. This was updated in 1999 to permit 11Mbit/s link speed. Wi-Fi technology features long range security, high power consumption which increases

battery life of mobile devices. The Wi-Fi signal range depends on the frequency band, radio power output, antenna gain and types as well as modulation technology. An access point compliant with either 802.11b or 802.119, using stock antenna might have a range of 100 m. The same radio with an external semi parabolic antenna might have a range over 20 miles. A Wi-Fi signal occupies 5 channels in 2.4 GHz band, large apartments complexes or office building can create problems in access of Wi-Fi network.

1)   3.1.2 Android application :

Android is an Operating System for smart phone devices on which we can run our application. Android provides healthy array of connectivity options including Wi-Fi , Bluetooth and wireless data over a cellular connection. Android provides access to a wide range of useful libraries and tools that can be used to build rich applications. To design our system we use Android latest version **5.0.2** , also named as lollipop, which supports Application of our system without creating any problem. It is a design with increased use of grid-based layouts, responsive animations and transitions, padding, depth effects such as lighting and shadows. It provides some major new platform features for developers, with over 5,000 new APIs added for use by applications.
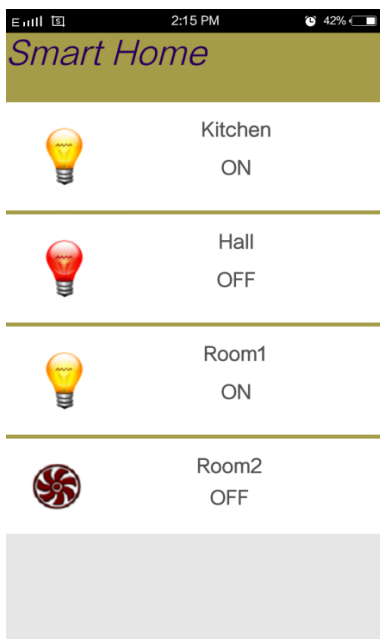
Fig 2 : Android App

3.2Hardware Design

2)   3.2.1 Arduino UNO

The Arduino Uno is a microcontroller board based on the AT mega 168 or 328. It has 14 digital input/output pins and 6 Analog input/ output pins. here we use 8 to 13 pins for input/ output. It needs 5V operating voltage and 7 to 12V input voltage. It simply connect with a DC battery to get started. It also having a reset button, to reset all previous connections.
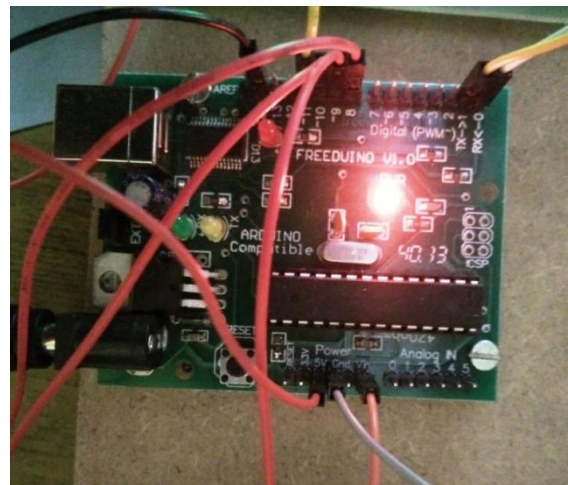
Fig 3 : Arduino UNO With connections

3)   3.2.2 Wi-Fi Module

The module is based on the Institute of Electrical and Electronics Engineers 802.11 standards. It supports transparent transmission mode and multiple network protocols. The Wi-Fi module is embedded based on the universal serial port, Ethernet, wireless network interface between the conversions. The modules integrate all of the RF components required, removing, the need to perform expensive RF design and test. It simply connecting sensors and switches to the module I/O pins or UART interface.
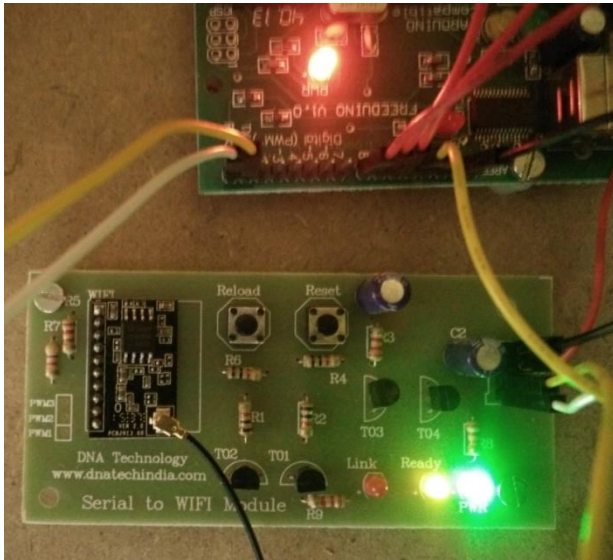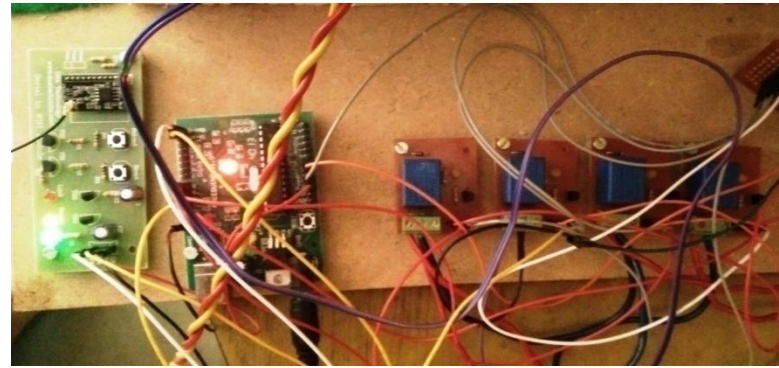
Fig 4 : Wi-Fi Module

4) 3.2.3 Relays :

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch. Relays are used where it is necessary to control a circuit by a low-power signal. Relays control power circuits with no moving parts, instead using a semiconductor device to perform switching protect electrical circuits from overload or faults in modern electric power systems .
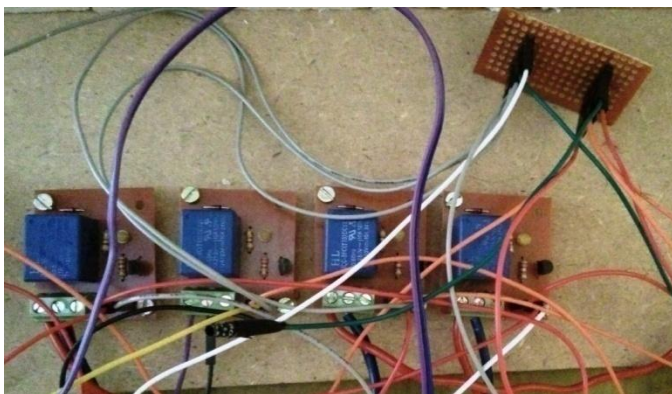

Fig 5 : Relays

Above all hardware module can be connected to each other for passing the signals in our experimental setup as shown in following fig. :

Fig : Overall modules connectivity

4.   Applications and Future Challenges:

Followings are the applications of Electric switch ON/OFF using Android App via WI-FI :

4.1 Operating Doors

To operate doors from the smart phone via Android Application. It provide facility to unlock door without carrying keys so it also increase the security.

4.2 In Gardens

In garden, this system helps to control each sprinkler in your lawn separately from anywhere. So it helps to control over water supply which harmful for lawn.

4.3 Operating water Motors

This system helps to automatically turn the water motor from your smart phone device using Android app via Wi-Fi. It also helps to turn ON/OFF water recalculate.

5. Conclusions :

In this paper presenting a new system is design. By using Android application via Wi-Fi, electronic switch like Lights, Fans, A.C etc ON/OFF control system can be designed. Anyone can operate this system because of its user friendly GUI from anywhere in remote access area network at home or organizations. As per the securities point of view, we

provide access code for the Wi-Fi. So the system helps user to reduce efforts and making home or organization more intelligent and life luxurious.

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