Wireless Controlling of Remote Electrical Device Using Android Smartphone

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Abstract: *In today's world technology plays a crucial role as it simplifies the human life therefore it is also center of interest for many researchers. Controlling the home appliances and electronics gadgets wirelessly through Smartphone technology can make humans life easier. That is, through this paper, we target to control the devices with our android smartphone. In other words, the smartphone application's interface will enable the user to control that device using Wi-Fi module. The smartphone application will connect to an electronic chip(Arduino) to which an LED will be connected. The mode of connection will be Wi-Fi module which we have planned to use.*

Key Words: Smartphone, LED, Arduino, Wi-Fi module.

1. INTRODUCTION

In today's world we all are surrounded with electronic device. This device need wires for installation more over for remote locations long wires are needed which is more expensive than the use of a mobile network that can perform the same task without this wire i.e. by using wireless connection. The Global system for mobile communication (GSM) was initially designed for voice; it can be used to serve other purposes than talking. GSM can be used as the communication via to receive signals captured by machines in remote places, and also to send control signals to remote machines.

In this paper we have planned to develop an application which would enable the users to control electronic devices using smartphone provide they should be in same network. The main idea is that the user should be able to control the devices from any location within the same Wi-Fi range.

Why use a wireless electric controlling System?

The traditional wired electric control is a great system, but it can be difficult to control the areas of access [1]. Often the range of a wired network cannot reach has a physical limitation. Concept of remote controlling is also very prominently and is used in home security systems, surveillance systems, intrusion detection mechanisms etc. [1].

Also, if we have a large organization or building with several electrical appliances installed. Every electrical appliance has its own control switch using which a person can turn ON or OFF the appliance. Suppose, the user needs to turn ON or OFF the appliances of all or several rooms which might be located far away from each other, it would be little difficult and time consuming [1]. This might be aggravated with the fact that the user needs to control i.e. turn ON or OFF the appliances immediately for some necessary, urgent reason or may be, he/she needs to do that every day, routinely, in order to save electricity bills and the money incurred on their bills.

It would be easier and conveniently for user to control several electrical appliances by just sitting at one place, whenever needed, under any circumstances, it would bring a lot of convenience which would reduce the time spend or invested in other constructive tasks. In large building or a large penthouse or a bungalow this could be very time consuming, only to turn ON or OFF the electrical appliances, a one stop solution would definitely useful for users to save their time and energy spent on just moving around. Also, in critical situations, it is highly essential that instead of manually moving around to control the appliances, the user should be able to do that quickly and easily just by sitting at one place. For ex: Suppose, there is a fire in the premises or some unlawful activity which might be going to happen. In this situation user has this power to turn OFF all the devices, as the situation might demand, the event could be effectively.

II. HARDWARE DESIGN AND INTERFACING

Arduino is a microcontroller which can be used for making computers that can sense and control more of the physical world than your desktop computer. It is a open-source platform. Also, there is software platform Arduino in which one can code and embed in Arduino chip easily. We can use this software to develop code that can take inputs from a variety of devices, and also send controlling signals to devices like variety of lights, motors, and other physical outputs. We can create Arduino projects that are stand-alone, or they can communicate with software running on your computer. The Arduino programming language is an easy to understand and learn

Components used:

1. Micro-controller (Arduino)
2. DC fan
3. 12V dc battery
4. Bread Board
5. Jumper Wires
6. Wi-Fi Module

III. PROPOSED METHODOLOGY

As we know that the technology is advancing by leaps & bounds and mobile technology has become an integral necessity in our lives today. We wish to get everything done right from the place where we are. Be it Banking, News, Chatting, Networking, Talking, Locating someone, etc. We cannot imagine certain significant tasks without the mobile technology.

Embedded systems have become a buzzword in the last years, but embedded systems and processors have been around for much longer than that. Embedded systems are now commonly coupled with Wi-Fi modules which increase the scope and enhance the application areas to a greater extent.

Wi-Fi module can be used as the communication via to receive signals captured by machines in remote places, and also to send control signals to remote machines. This can reduce installation of long wires to reach remote places which is more expensive than the use of a mobile network that can perform the same task. Of course, suitable sensors and actuators are needed for the mentioned examples and others. Some automatic Wi-Fi module is also needed, but long wired installation is not necessary

The features include low cost, low power and small size. Also, the robustness for the interferences has made Wi-Fi a highly versatile and attractive. To further enhance this idea, I have planned to develop a mobile application which would be able to control an electronic device remotely. I have planned to interface the mobile technology with electronics. That is, through this application, we target to control a fan or robocar from any place in the world. We can easily assume & correlate this idea with controlling the home appliances in our homes through mobile.

That is, how great & convenient would it be, if we are able to control our home appliances from any part of the world through mobile technology? In order to develop this application, the mobile application will connect to an electronic chip to which a fan or robocar will be connected. The mode of connection will be Wi-Fi module which we have planned to use.

This project will have two parts namely: Mobile Part and Electronic Part. The mobile part will have an interface through which we would be able to turn ON/OFF the fan remotely from any part of the world or move forward, backward, left or right through the robocar. The electronics part will consist of a chip and Wi-Fi module to which a fan or robocar will be connected.

Once the user presses ON button on the mobile handset, the fan will turn ON or enable. Otherwise, if the user presses OFF, the fan will go off and be disabled. This can be achieved by mounting a shield on the chip which will enable it to obtain an IP that would eventually help the connection between chip, WIFI module & mobile. This concept is also very prominently used in home security systems, surveillance systems etc. There would be three parts: Electronics Part, Web Part and Mobile Part.

1.Electronics Module:

This module would consist of a small electronic board name Arduino that we would program in C/Arduino. In addition to many other components, this board consists of a programmable microcontroller. On the top of this (base) board, we would be mounting a Wi-Fi module which would give us the freedom to connect it to a system which would act as the remote server in our project. We assume that the remote server would be in an ON state always and connected to internet. Now we can connect Arduino and our mobile phone to the Wi-Fi. When we ON/OFF the devices the signal is sent to electronic devices via Wi-Fi to Arduino and Arduino to electrical devices.

2. Mobile Module:

We need to download an android application named Blynk.

Steps for configuring Blynk App:

1. First download it from Google Play Store and install it in Android mobile phone.

2. After this, it is required to create an account. You can use your Gmail account.

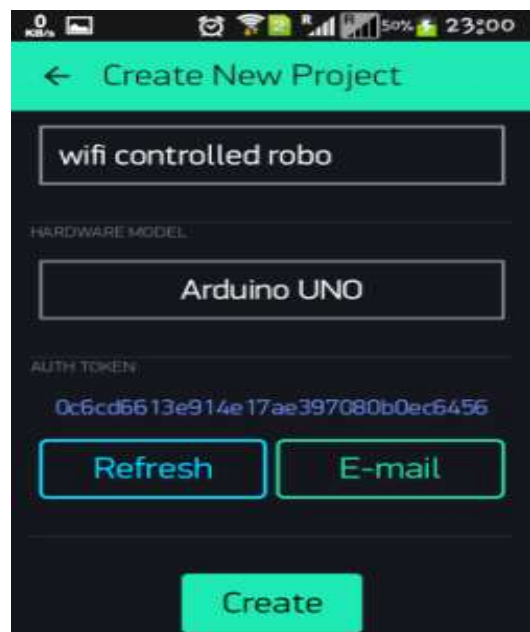3. Select Arduino Board and enter a name for your project.

Fig a. Project creation in Blynk

4. After you enter details it will display Auth Token Code we can simply mail it to our Email Account and then copy and paste in Arduino sketch (Program Code).

5. Enter received Auth Token Code in Arduino sketch.

6. Then click on create button in Blynk app.

7. Now Select the Joystick Widget, Click on Joystick, Configure the Joystick (see the Video at the end) and hit the back button.
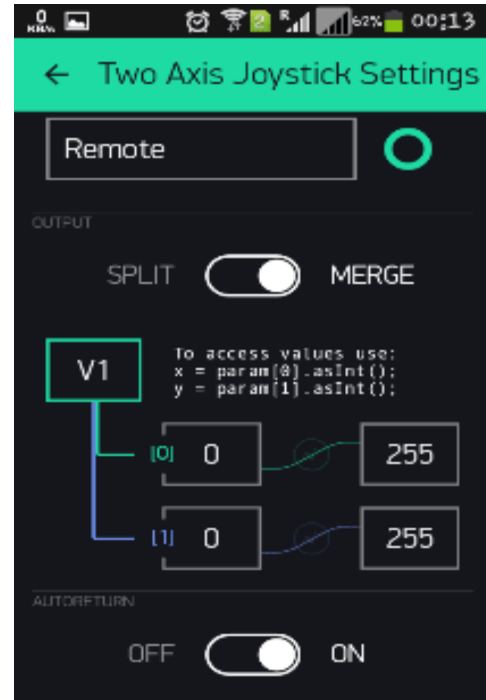

Fig b. Widget Box of Blynk

Fig c. Joy Stick component add in project

Fig d. Joy Stick setting for project

8. After it press Play button at the right top of screen.

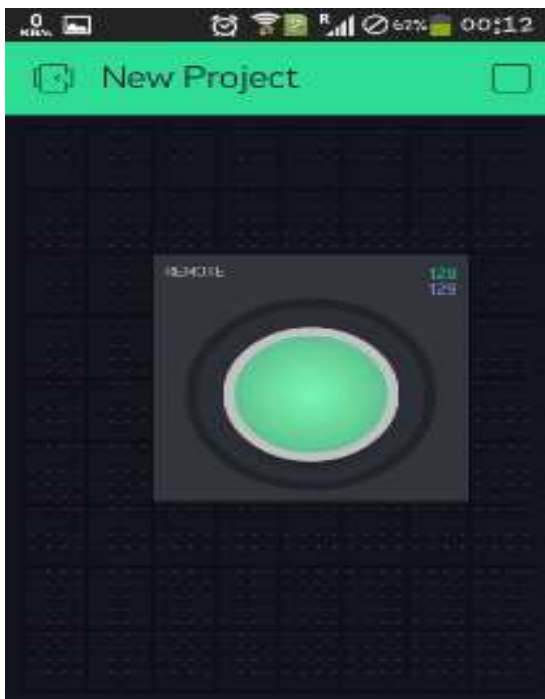Note: Do the same thing for controlling Fan.
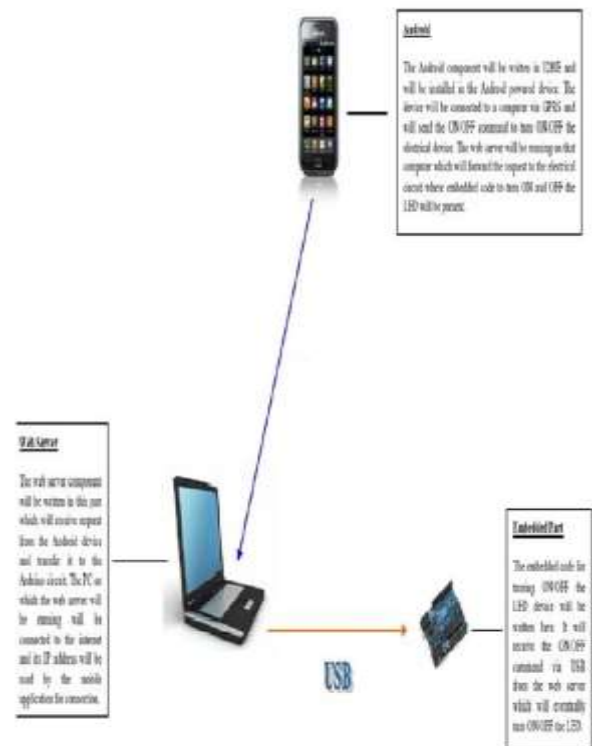
IV. DIAGRAMMATIC REPRESENTATION

Fig e. Working of project

V. FUTURE SCOPE

Although the application is developed on a cutting-edge technology, it holds a great scope of improvement & enhancement as mentioned below:

1. We can further strengthen this application to control a real time electrical device.
2. The instruction from Android handset can check if GPRS feature is enabled. In case, it is not, it can automatically enable it.
3. This application can be enhanced to control multiple electrical devices at the same time at different geographical locations
4. We can improve this application so that one electrical device could be controlled from multiple locations through different Android handsets
5. For different types of electrical devices, we can customize this application for handling different types of operations. For ex: for fans, we can develop a module that controls the speed of the fans also in addition to turning them ON/OFF
6. We can build artificial intelligence in this system so that it can be used as a home security system and does tasks like measuring room temperature and in case of a fire, should turn ON water sprinklers and also inform nearest fire station through Call/SMS or buzzer alarms.
7. We can use an LCD screen to display the fan speed on the screen.

VI. CONCLUSION

1. This application would enable a user to control an electrical device effectively using Wi-Fi module
2. This application will empower the users to save time and energy
3. Since it involves Wi-Fi, the user would be able to control the device from anywhere in the house
4. It would facilitate the home-based security applications through remote controlling of any electrical device
5. This application can also be used to measure room temperature & humidity with some minor additional hardware.

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