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ANDROID BASED REMOTE CONTROLLER FOR HOME AND OFFICE AUTOMATION

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ABSTRACT

In this paper, as the world gets more and more technologically advanced, we find new technology coming in deeper and deeper into our personal lives even at home. Home automation is becoming more popular around the world and is becoming a common practice. This Paper presents the overall design of Home Automation System (HAS) with low cost and wireless remote control. This system is designed to assist and provide support in order to fulfill the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home.This paper puts forth the equipment which enables users to control their home appliances using their Android phone. Due to the advancement of wireless technology, there are several different of connections are introduced such as GSM, WIFI, ZIGBEE, and Bluetooth.

KEYWORDS: Android Phone; Bluetooth; Arduino; Relay circuit; Electrical Appliances.

INTRODUCTION

The present day's technology is all about the automation and wireless control of all the equipment used in industries, factories and households. Any equipment that can be controlled wirelessly is more easily maintained and it responds very fast comparing to the manual operation of the equipment. It increases safety as well as speed of operation in times of failure or damage. So here we present a design which uses wireless technology for switching of electrical appliances. This project uses the application of wireless communication i.e. Bluetooth, GSM network for the wireless control of the electrical appliances.

The main aim of the design provided in this project is to develop a device to have wireless control of home electrical appliances. The device can be made sure to be available at a low cost so that everyone can afford it. This is basically a device built for home appliances control system that can provide remote access to house hold electrical appliances at low cost and in efficient way. The electrical devices connected in the home, office or any place, consume electrical power, and there is an absolute necessity of saving of power as per present day situations. So it is necessary to control electrical devices more effectively and efficiently at anytime from anywhere. So this project is built for the sole purpose of efficient control of electrical appliances. One such application can be used for control of electrical appliances which results in effective and efficient use of electrical power reducing the loss. This area has yet to be explored in major parts of the world. So we would like to take this opportunity to put forward a cost effective method for the wireless switching of the electrical appliances.

As a reason of drastic developments in the field of wireless communications these days, the applications of this technology can be used in various sectors for making daily tasks comfortable and easy.

SYSTEM ARCHITECTURE

The Arduino is a small microcontroller board with a USB plug to connect to the computer and a number of connection sockets that can be wired up to external electronics, such as motors, relays, light sensors, laser diodes, loudspeakers, microphones, etc.They can either be powered through the USB connection from the computer or from a 9V battery. They can be controlled from the computer or programmed by the computer and then disconnected and allowed to work independently. Although Arduino is an open-source design for a microcontroller interface board, it is actually rather more than that, as it encompasses the software development tools that you need to program an Arduino board,

as well as the board itself. There is a large community of construction, programming, electronics, and even art enthusiasts willing to share their expertise and experience on the Internet. Fig 2.1 shows System Architecture.
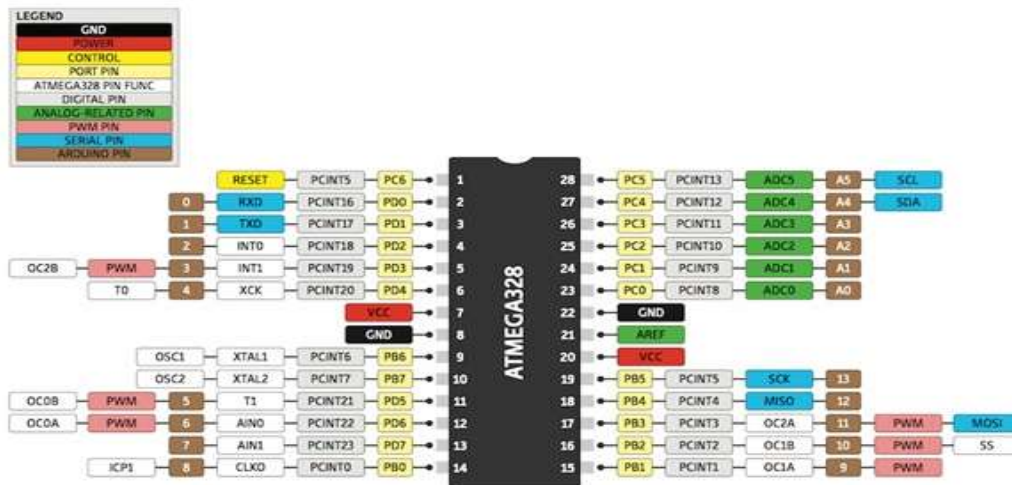
Figure2.1:
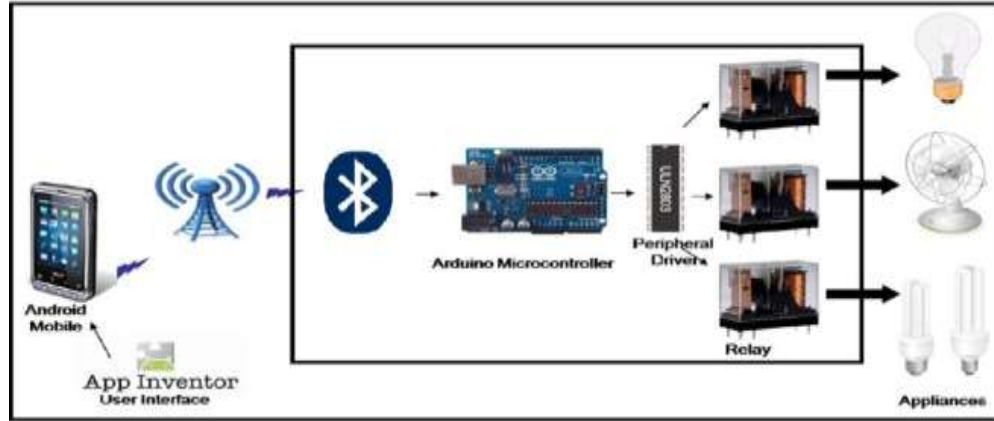
SYSTEM ARCHITECTURE

MATERIALS AND METHODS

The heart of Arduino is a microcontroller. Practically everything else on the board is concerned with providing the board with power and allowing it to communicate with desktop computer.It has everything and more than the first home computers had.It has a processor, a kilobyte of random access memory (RAM) for holding data, a few kilobytes of erasable programmable read-only memory (EPROM) or Flash memory for holding our programs, and it has input and output pins. These input/output pins are link the microcontroller to the rest of our electronics. Inputs can read both digital (is the switch on or off) and analog (is the voltage at a pin).

This enables us to connect many different types of sensors for light, temperature, sound, etc. Outputs can also be analog or digital. So, to set a pin to be on or off (0V or 5V) and this can turn LEDs on and off directly, or use the outputto control higher-power devices such as motors,bulb.They can also provide an analog output voltage. That is to set the output of a pin to some particular voltage, allowing to control the speed of a motor or the brightness of a light, for example, rather than simply turning it on or off.Arduino board, the microcontroller chip itself is the black rectangular device with 28 pins. This is fitted into a DIL (dual in-line) socket so that it can be easily replaced.
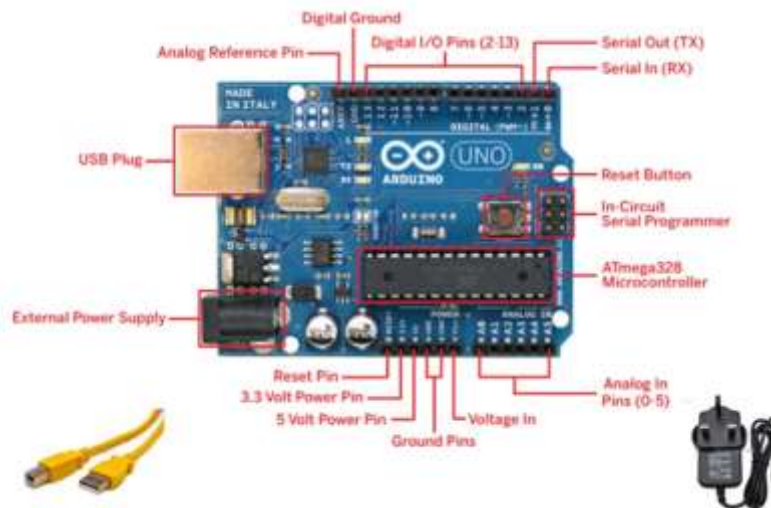
Figure3.1:

PIN DIAGRAM OF ATMEGA328

The 28-pin microcontroller chip used on Arduino Duemilanove is the ATmega328 as shown in Figure 3.1 is a pin diagram showing the main features of ATmega328. The heart, or perhaps more appropriately the brain, of the device is the CPU (central processing unit). It fetches program instructions stored in the Flash memory and executes them. This might involve fetching data from working memory (RAM), changing it, and then putting it back. Or, it may mean changing one of the digital outputs from 0 to 5 volts.

Figure 3.2:

ARDUINO BOARD

Figure 3.2 shows Arduino boardof the various components on the board. Power Supply Directly below the USB connector is the 5V voltage regulator.This regulates voltage (between 7 and 12 volts) is supplied from the power socket into a constant 5V. 5V (along with 3V, 6V, 9V, and 12V) is a bit of a standard voltage in electronics. 3, 6, and 9V are standard, which is a "battery" of two, three, six, or eight cells(1.5V). The 5V voltage regulator chip is actually quite big for a surface-mount component. This is so that it can dissipate the heat required to regulate the voltage at a reasonably high current, which is useful when driving our external electronics.

3.1 POWER SUPPLY:
Basically any electronic circuit runs with a power supply. Here we giving a 5v supply to the various IC's used in the design presented here. We get a 240V supply in our house at any instant. So in order to provide our circuit appropriate supply voltage a different power circuit is to be made based on our requirement. The various steps included in the circuit are shown in fig 3.4. And also various precautions are to be taken for the safety of the electronic circuit designed.

A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to aselectric power converters.

3.2BLUETOOTH
Bluetooth is a standard used in links of radio of short scope, destined to replace wired connections between electronic devices like cellular telephones, Personal Digital Assistants (PDA), computers, and many other devices. Bluetooth technology can be used at home, in the office, in the car, etc. This technology allows to the users instantaneous connections of voice and information between several devices in real time. The way of transmission used assures protection against interferences and safety in the sending of information.Between the principal characteristics, low complexity, low consume power and low cost.

Figure 3.3:
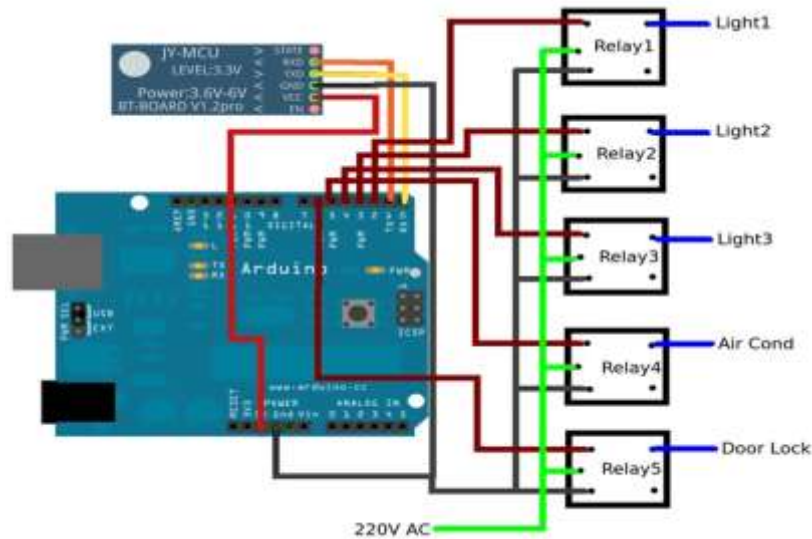
CONNECTION LAYOUT

The Bluetooth is a small microchip that operates in a band of available frequency. Communications can realize point to point and point multipoint.Destined to replace wired connections between electronic devices like cellular telephones. The standard Bluetooth operates in the band of 2.4 GHz. Fig 3.3 shows the Connection Layout of Bluetooth module.Bluetooth technology can be used at home, in the office, in the car, etc. The connections have a maximum range of 10 meters, though using amplifiers it is possible to come up to 100 meters.

3.3FREQUENCY BANDS

The standard Bluetooth operates in the band of 2.4 GHz. This is the frequency of band of the scientific and medical industries 2.45 GHz (ISM*). So the system can be used anywhere due to that the transmitters of radio covers 2.400 and 2.500 MHz and it is possible to select the appropriate frequency. This ISM* is opened for any system of radio and must take care of the interferences of monitors, to controls for doors of garages, the wireless telephones and the microwave ovens (the source with higher interference).Table 1 shows the Comparison ofBluetoothDevice Power.

Table 1 Comparison table forBluetoothDevice Power

Device PowerClass	Maximum Permitted PowermW(dBm)	Range (approximate)
Class 1	100mW(20 dBm)	~100 meters
Class 2	2.5 mW (4 dBm)	~10 meters
Class 3	1 mW (0 dBm)	~1 meter

One of the biggest advantages, the versatility of the design of the Bluetooth technology, is in the easy confection and arrangement of nets between different devices of Bluetooth technology. Bluetooth has been designed to operate in a multi-user environment.

Figure3.4:
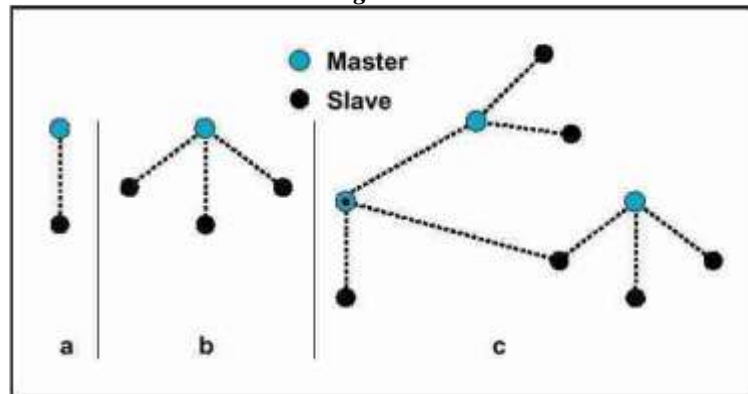
BLUETOOTH CONNECTION MODEL

In the figure 3.4, "a" can observe the simplest Piconet which is constituted by two devices. In the "b" figure have a Piconet constituted by four of these devices. The "c" figure is an example of a Scatternet that possesses three Piconet, one constituted for four units, the other one for two and the last one for 3 units respectively.

The equipments that share the same channel will divide the resources and the capacity of this one. Though the channels have a bandwidth of one 1Mhz, as more users join to the Piconet, minor resources they will have for each user. That is the reason that the Scatternet was introduced to solve the problem of the low bandwidth that every user of a Piconet has if they find great quantity of connected units. The performance, as a whole and individually of the users of a Scatternet is major that the one that has every user when takes part in the same channel of 1 MHz.

Figure3.5:
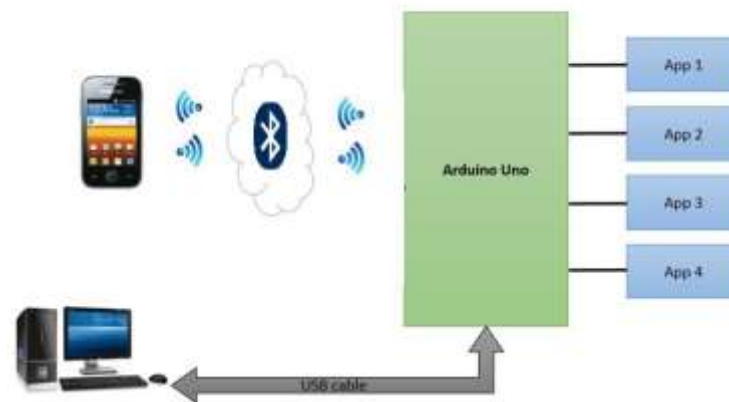
OUT LOOK DESIGN

3.4 ANDROID APP

The AppInventor allows Android Apps to be built and programme highlighted colourful building blocks easy to understand.First user has to add interface elements to their application such as buttons, images and sounds.Then secondly, user has to add logic and actions with plain language instruction blocks that snaps together like a child's building blocks as shown in Fig 3.6.

Go directly to **ai2.appinventor.mit.edu**, and click the "Create" button from the App Inventorwebsite.Use an existing gmail account or google account to log in to ai2.appinventor.mit.edu.

Figure 3.6:

DESIGNER SCREEN	*LOGICAL BLOCKS SCREEN*

APPLICATION

The project designed is very practical in nature because everything can be controlled with the help of just a mobile phone which is widely available nowadays and also proves to be handy.

Also the project is feasible because the cost of the project is very less as compared to the expensive Wi-Fi based home control systems presently available which require an additional cost of internet services.

CONCLUSION

In tis paper the home automation system has been experimentally proven to work satisfactorily by connecting sample appliances to it and the appliances were successfully controlled from a wireless mobile device. The Bluetooth client was successfully tested on a multitude of different mobile phones from different manufacturers, thus proving its portability and wide compatibility. This project will not only provide convenience to the common man but will be a boon for the elderly and disabled people.

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REFERENCES

[1] Aye Min Soe, MaungMaungLatt, HlaMyoTun, Zaw Min Naing,"Electronic Control System Of Home Appliances Using Speech Command Words",- International Journal of Scientific & Technology Research Volume 4, ISSUE 06, June 2015.

[2] LaxmiSoni, Sarika K. Thorat And SandeepChawda,"PC Controlled Home Appliances" - International Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 4, Issue 5(Version 1), May 2014, pp.51-53.

[3] Pooja S Chinchansure, Charudatta V Kulkarni, "Home Automation System based on FPGA and GSM", 2014, International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, pp. 1 – 5.

[4] S.R.Bharanialankar, C.S.Manikanda Babu, "Intelligent HomeApliance Status Intimation Control and System Using GSM", 2014, International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 4(4), pp.554 - 556.

[5] Bader M. O. Al-thobaiti, Iman I. M. Abosolaiman, Mahdi H. M. Alzaharani, Sami H. . Almalki, Mohamed S. Soliman, "Design and Implementation of a Reliable Wireless Real-Time Home Automation System Based on Arduino Uno Single-Board Microcontroller", 2014, International Journal of Control, Automation and Systems, Vol. 3(3), pp. 11 - 15.

[6] D. Praveen Kumar K. Rahul SreeVidyanikethan C. Prathyush, SreeVidyanikethan, "Automation to Home Appliances throughVoice Command (GSM)"- • ISSN No 2277 – 8179 Volume : 2 | Issue : 5 | May 2013.

[7] Rozita Teymourzadef, Salah Addin Ahmed, Kok Wai Chan, Mok Vee Hoong, "Smart GSM Based Home Automation System", 2013, IEEE Conference on Systems, Process & Control, Kuala Lumpur, Malaysia, pp.306 - 309.

[8] Gerard Rushingabigwi, Liguo Sun, Godfrey Lugoloobi and Frank Mwezi,"An Electric Circuits Remote Switchimg System based on GSM Radio Network", International Journal of Research in Engineering and Technology,vol.3,no.11,2014,pp. 2321- 4708.

[9] Rupam K.S.,Ayub M.,Himaraka K. and Dhiraj K, "Android Interface based GSM Home Security System", proc. of IEEE International conference on Isssues and Challenges in Intelligent Computing Techniques, 2014.pp.196-201.

[10]Morris ME, Adair B, Miller K, Ozanne E, Hansen R, et al., "Smart-Home Technologies to Assist Older People to Live Well at Home", SciJournal of Aging Science, Volume 1, issue 1, 2013.

[11]Ameena Saad Al-Sumaiti, Mohammed Hassan Ahmed, and Magdy M.A. Salama, "Smart Home Activities: A Literature Review", ElectricPower Components and Systems, 42(3–4):294–305, 2014.