Home Automation Using Arduino Uno

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Abstract- Technology may be a never ending method. To be able to style a product exploitation this technology which will be useful to the lives of others may be a immense contribution to the community. This paper presents the look and implementation of a low value but nonetheless versatile and secure mobile phone based mostly home automation system. the design is predicated on a Arduino uno R3 & Bluetooth and also the home appliances area unit connected to the input/ output ports of this board via relays. The communication between the mobile phone and also the Arduino is thru hc 05 bluetooth module. this technique is meant to be low value and scalable permitting style of devices to be controlled with minimum changes to its core. secret protection is being employed to solely permit authorised users from accessing the appliances reception

I. INTRODUCTION

Wireless technologies are getting additional standard round the world and also the consumers appreciate this wireless life-style which provides them live of the renowned "tied to rope" that tends to grow beneath their table . currently with the assistance of arduino uno r3 ,hc-05 Bluetooth module and relays digital devices for a network during which will|we will|we are able to} connect our regular appliances and devices can communicate with one another . Nowadays, home automation is one amongst of} the foremost talked project recently in every a part of the planet .Bluetooth has the most important application in these comes recently. operative over unaccredited, globally accessible frequency of 2.4GHz, it will link digital devices among a variety of 10m to 100m at the speed of up to 3Mbps betting on the Bluetooth device category. With the assistance of this vast technology I propose a home automation system based mostly of Bluetooth technology .

There are few problems concerned once planning a home automation system. The system ought to be ascendable in order that new devices will simply be integrated into it. It ought to offer a user- friendly interface on the host aspect, in order that the devices will be simply setup, monitored and controlled. This interface ought to conjointly offer some diagnostic services in order that if there's any drawback with the system, it will be half-track down. what is more the system ought to be quick enough to appreciate the true power of wireless technology. Finally the system ought to be price effective so as to justify its application in home automation..

Home Automation
Home automation in something that alter us to use our home's lighting, heating & cooling and residential appliances additional handily and with efficiency.

It is aforesaid even you'll start your home appliances from a far off or from an android device like in our case, the house is claimed to be home machine-driven. every technology has its own distinctive options and advantages, this makes some additional suited to specific applications, while alternative is see for all general home automation installations.

There are few problems concerned once planning a home automation system:

System ought to be scalable: in order that appliances can be superimposed simply

User friendly interface: therefore its straightforward for an everyday person to use it.

Cost Effective: therefore an everyday person can purchase it tha use the technology

Fast: The time interval ought to be quick.

Diagnostic services: If it faces any error its straightforward to seek out it and proper it simply

The projected technique presents the planning and implementation of a strong, low value and user friendly home automation system exploitation Bluetooth technology. the planning of projected technique relies on Arduino board, Bluetooth module, sensors and smartphone application. Bluetooth module HC-05 is interfaced with Arduino board and residential appliances ar connected with Arduino board via relay. Smartphone application is employed for serial communication between smartphone and Bluetooth module that is additional connected with Arduino board. projected technique has ability to not solely remotely manage the appliances however it additionally monitors the sensors. these days most of typical home automation systems are designed for aged, disabled individuals or for any special purpose. The projected technique isn't solely appropriate for aged and disabled folks however it additionally provides a general purpose home automation system, which might simply implement in existing home. an unhearable sensing element is employed for water level detection and soil wet detector is employed for automatic irrigation system to supply additional ease and facilities to users. The projected system has 2 main components hardware and software system. The hardware half consists of 3 main hardware elements smartphone, Arduino board and Bluetooth module. software system part contains Arduino integrated development environment (IDE) and Bluetooth terminal smartphone application that is employed for wireless communication between smartphone and Arduino board. inaudible and soil wet detector also are utilized in this technique to supply additional ease and facilities to the users. Fig. one illustrates diagram of projected home automation system and therefore the flow chart is pictured in Fig. 2.

II. HARDWARE DESCRIPTION AND IMPLEMENTATION

The projected home automation system contains four hardware elements smartphone,Relay boards Arduino board and Bluetooth module. Smartphone is employed to speak with Arduino board employing a smartphone application and Bluetooth technology. during this analysis work Bluetooth module 8Cchannel 5v relay board, HC 05 and Arduino Uno are used for hardware implementation.

A. Arduino Uno R3

The Arduino Uno R3 could be a microcontroller board supported a removable, dual-inline-package (DIP) ATmega328 AVR microcontroller. The R3 is the third, and latest, revision of the Arduino Uno.It's 20 digital input/output pins (of that 6 is used as PWM outputs and 6 is used as analog inputs),), a sixteen mhz resonator, a USB connection. Programs is loaded on to that from the easy-to-use Arduino computer program. The Arduino has an in depth support community, that makes it a really straightforward thanks to start operating with embedded electronics. Use USB cable or power it with a AC-to-DC adapter or battery to induce started.

B. 8Channel 5v Relay Board

8-Channel 5V Relay Module.This is a 5V 8-Channel Relay interface board, Be able to management varied appliances, and alternative equipment's with giant current. It are often controlled directly by Micro-controller (Raspberry Pi, Adriano) .as you'll see in figure 3 the semantics of 1 relay is shown. in 8 channel we've got 8 such relays.
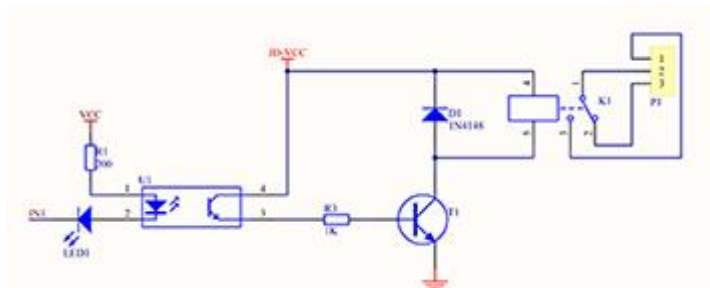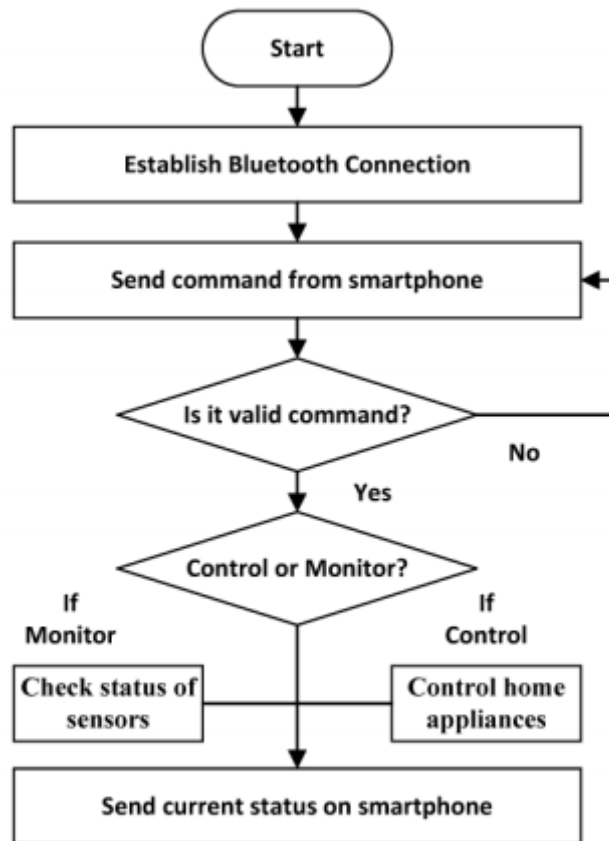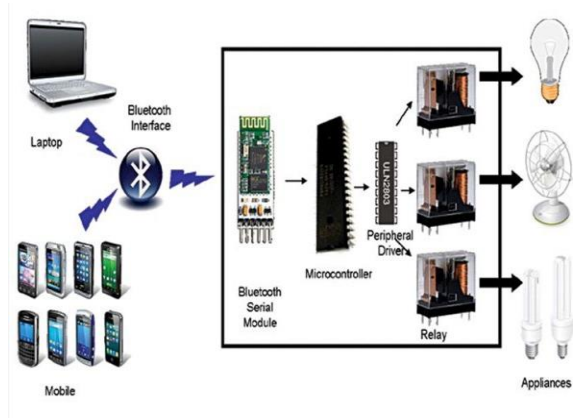

Figure 3

Fig. 2. Flow chart of proposed home automation system

C. HC-05 bluetooth Module

HC-05 module is a simple to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial association setup. The HC-05 may be a terribly cool module which might add two-way (full-duplex) wireless practicality to your comes. you'll be able to use this module to speak between 2 microcontrollers like Arduino or communicate with any device with Bluetooth practicality sort of a Phone or laptop computer. Serial port Bluetooth module is absolutely qualified Bluetooth V2.0+EDR (Enhanced data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive
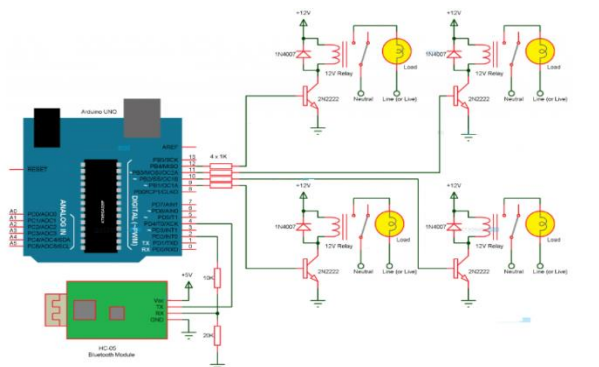
Frequency Hopping Feature). There are several automaton applications that are already out there that makes this method a lot easier. we are able to additionally assemble the default values of the module by victimisation the command mode So if you searching for a Wireless module that might transfer information from your laptop or transportable to microcontroller or the other way around then this module may be the proper alternative for you.

D.Implementation

As you'll see within the fig 4 diagram output from the arduino uno r3 is connected to relay board and it works sort of a switch to the 220 Vconnected appliances . The Bluetooth antenna in our module picks up the packets sent from the mobile phone. later, these packets containing the appliance standing commands are pipelined through ATmega168 microcontroller and therefore the designed analogue electronic equipment in keeping with the definition of every output.

III. SOFTWARE ARCHITECTURE

In we will use two software Arduino Integrated Development Environment (IDE) and MIT APP INVENTER are used.

A. Arduino IDE

IDE stands for Integrated Development Environment, entire programming for proposed system is done in Arduino IDE tool.

| Setup	Loop for the code	Main code for switching the device low and high

`void setup(){`
`Serial.begin(9600);`
`pinMode(bulb,OUTPUT);`
`pinMode(AC,OUTPUT);`
`pinMode(light,OUTPUT);`
`pinMode(Computer,OUTPUT`
`}`
	`void loop(){`
	
	`if(Serial.availab`
	`le()>0)`
		`if (light == 0 && Received == '1') %if off turns it on`
		`  {`
		`    digitalWrite(lamp,HIGH);`
		`    light =1;`
		`    Received=0;`
		`  }`
		`if (light ==1 && Received == '1') %if on turns it off`
		
		`  {`
		`    digitalWrite(lamp,LOW);`
		`    light=0;`
		`    Received=0;`
		`  }`

Baud rate is ready to 9600 bits per second for serial communication between Arduino board and smartphone. Arduino IDE command "Serial. Available 0" is employed to receive information serially from smartphone and "Serial.printlnO" command is employed to transmit information serially from Arduino board to smartphone

B. MIT App Inventor
• MIT App inventor is an intuitive, visual programming surroundings that permits everybody to make totally useful apps for smart phones and tablets. Those new mit App inventor will have a straightforward initial app up and running in less than half-hour. And what's a lot of, our blocks primarily based tool facilities the creation of advanced, high-impact apps in considerably less time than ancient programming environments. The mit App inventor project seeks to democratize software package development by empowering all individuals, to move from technology consumption to technology creation fig 5.
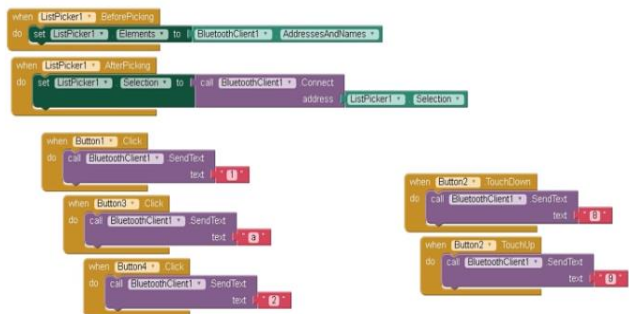
An android app referred to as arduino bluetooth management is employed for wireless communication between the phone and arduino boards through HC-05 . it's ability to transmit American Standard Code for Information Interchange knowledge serially from smartphone to Arduino board exploitation Bluetooth module. ASCII {standard Code for data Interchange} (American

Standard Code for Information Interchange) is that the commonest format for text files in computers and on the web. In an American Standard Code for Information Interchange file, every alphabetic, numeric, or special character is pictured with a 7-bit binary range (a string of seven 0s or 1s). 128 attainable characters area unit outlined.according to the planned technique user are able to connect eight home appliances..

IV.   CONCLUSION

In this paper we've introduced style and implementation of a low price, flexible and wireless solution to the house automation. The system is secured for access from any user or interloper. The users are expected to accumulate pairing secret for the Arduino BT and also the mobile phone to access the house appliances. This adds a protection from unauthorized users. this method is used as a workplace for any appliances that needs on-off switch applications with none web association. the complete practicality of the house automation system was tested and also the wireless communication between the mobile phone and Arduino BT was found to be restricted to.

Figure 6 shows the complete project . Connection are done accordingly .power to arduino relay board and bluetooth HC05 is provided from 12v ac to dc converter.figure 7 shows the working of the project from the application used.
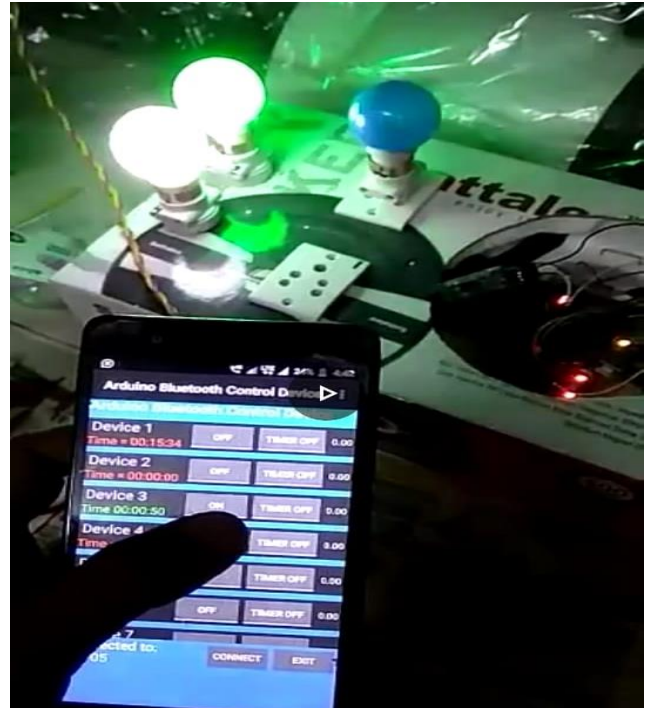

Figure 6

Figure 7

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