

ABSTRACT

The idea of conserving electricity means that used whenever necessary and avoid wasting it. This means doing simple things like turning OFF lights when any person left the room, etc. One of the biggest motivation for the people is conserving electricity in their homes which is the accumulated savings in their energy bills at the end of the year. So there is a need to conserve the electricity. The main objective of this paper is to control the fan and light using bluetooth module via Arduino. Now a days most of energies are wasted due to the unplug of fans and lights when it is not in use. This is happened because most of the switches are located far away from the users. In order to avoid this situation, we have proposed a low-cost system using Bluetooth which help users to controls the fans and lights within certain distance from them.

KEYWORDS: Arduino UNO, Bluetooth, Ardudroid Software.

INTRODUCTION

In present scenario, electricity scarcity is the one of the major problem which the people are facing in everyday life. Resources should be used economically to conserve them for future use since they are limited and will expire on one day [1]. So we need to conserve energy daily to conserve our energy. To overcome the situation a system is to be proposed such that the electrical appliances should be turned OFF when not in use. It is difficult for the user to switch OFF the electrical appliances when the switches are located far away from them. So a system is needed to operate the electrical appliances from a distance. All of us need to conserve energy but the great deal is finding out the best ways to conserve energy and save power. Many methods were proposed for this conservation strategy. But here a system is proposed at low-cost to unplug the fans and light when it is not in use.

PROPOSED SYSTEM**Block Diagram:**

This paper propose a system in which the electrical appliances like fan and light are operated at a suitable distance with the help of Bluetooth module and Arduino. The block diagram of the proposed system is shown in figure 1. Bluetooth module is connected with the Arduino which interfaces the mobile phone with the Arduino. The Arduino controller is programmed such that the fan and the light are controlled based on the data sent by the mobile phone to the Arduino through the Bluetooth interfacing module.

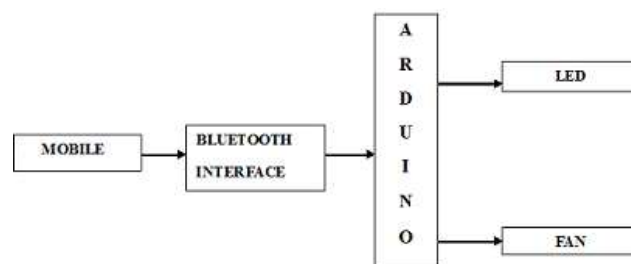


Figure 1: Block diagram of proposed system

Bluetooth (CH 05):

It is wireless technology standard for exchanging data over short distances (using short wavelength radio waves) from a fixed and mobile devices and building personal area networks ranges approximately 10 meters (30 feet). It is more capable module to use with Arduino [2].

Arduino:

Arduino is an open source platform used for building electronic projects. It consists of both the programmable circuit board and a piece of software or IDE that runs on a computer used to write and upload computer code to the physical board.

Fan:

In this module we are using a 12 volt cooling fan for which a adapter is used for power supply.

LED:

A light emitting diode is a two-lead semiconductor light source. It is PN junction diode which emits light when activated. There are various colors of LED'S available.

IR Sensor:

The transistor section includes an IR sensor which transmits continuous IR rays to be received by an IR receiver module and IR output terminal of the receiver varies depending upon its receiving of IR rays [3][4].

HARDWARE DESCRIPTION**Arduino**

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board we can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package[5].

Features of The Arduino UNO Board

- Arduino is a USB interface like a serial device. The board directly plug in to the computer so it is easy and comfortable to interface with the computer.
- It is an open source device and very easy to debug the problem so it is more advantages between the large community peoples. In order fast up for application it has 16Mhz clock [6].
- It has inbuilt in voltage regulation in order to manage power inside and can be directly powered by USB without any external power.
- This board has 13 digital and 6 analog pins to connect the hardware with the external environment. With the help of these pins we can directly plug in the real-world data.
- This board has a ICSP connector which is necessary to re bootload our chip and has 32 KB of flash memory for storing our code.
- An onboard LED and reset button is attached in order to make debug process easy.

Bluetooth Module

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It has the footprint as small as 12.7mmx27mm.

Modes of Bluetooth Module

The module has two modes of operation, Command Mode where we can send AT commands to it and Data Mode where it transmits and receives data to another Bluetooth module. The DATA mode is the default mode used in various applications. Baud Rate: 9600 bps, Data : 8 bits, Stop Bits: 1 bit, Parity : None, Handshake: None

Passkey: 1234

Device Name: HC-05

Before applying power to the module connect the key pin to high this put the module into command mode at 38400 bauds. If the KEY pin is high this will configure the current baud rate.

WORKING METHODOLOGY

Interfacing Of Bluetooth Module With Arduino

The JY-MCU module communicates with the Arduino via a serial connection. It has four pins that we will be using:

- The Arduino 5v pin is connected to Vcc, and ground pin is the GND connected to the Arduino ground pin. To send the data from the module to the Arduino TXN pin is used and to receive RX which is pin 1 of Arduino is used[7].

3.2 Procedure for Sending Data Through Mobile

- 1.Upload the code to the Arduino UNO where we have attached the Bluetooth HC-05 module.
- 2.After Uploading, the Bluetooth module is checked whether the module is working or not.
- 3.Now, go to the Bluetooth Settings in your phone and pair your phone with the HC-05 Device. The key is 1234.
- 4.After successfully pairing, open the ArduDroid App and connect with the HC-05 module.
- 5.In the next step now we can send instructions to the HC-05 with our app. The figure 2 shows the Bluetooth settings in the phone.

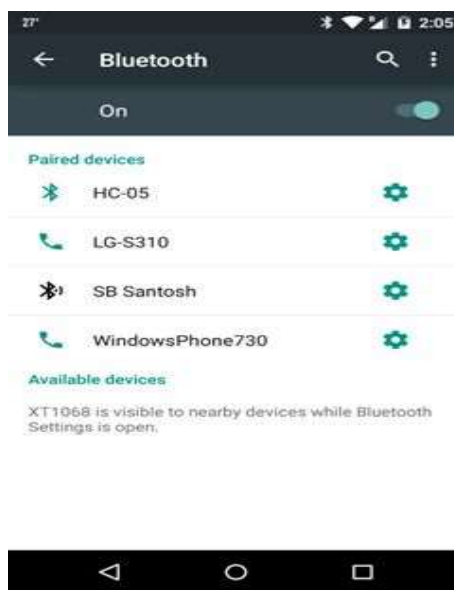


Figure 2. Bluetooth ON

ArduDroid Software

It is a simple android application to help us to control pins of the Arduino from our android phone wirelessly. It is both an android app and an Arduino program[8][9].

This app has been tested and designed for an HC-05 serial bluetooth module. we can use arduroid to send commands to Arduino to control a relay to turn electric gadgets ON or OFF. The figure 3 shows the arduroid software dialog box[10].



Figure 3. Sending data

RESULT AND DISCUSSION

The figure 4 shows the complete circuit diagram of the proposed system.

- (i) If the input is given as '1', the light will turn ON
- (ii) If the input is given as '2', the light will turn OFF
- (iii) If the input is given as '3', the fan will turn ON
- (iv) If the input is given as '4', the fan will turn OFF

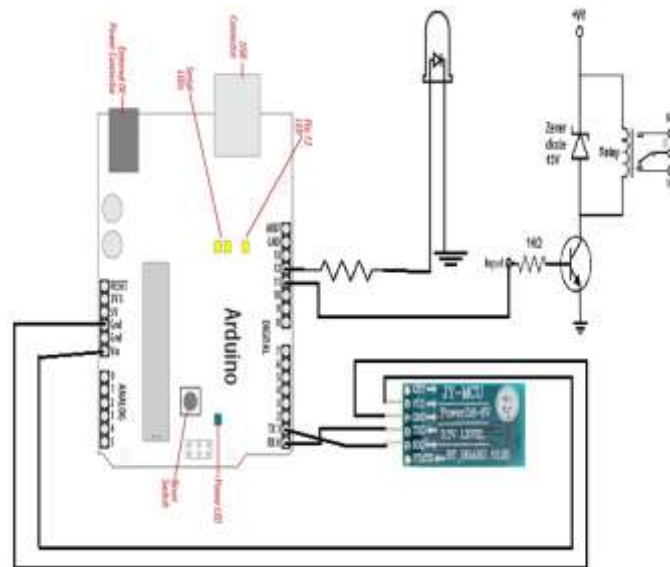


Figure 4. Circuit diagram of the proposed system

The transmitter pin of Bluetooth module is connected to receiver pin of Arduino as shown in the circuit diagram. The receiver pin of Bluetooth module is connected to transmitter pin of Arduino. 12th pin of Arduino is connected to LED. 11th pin of Arduino is connected to FAN. The ground and Vcc of Bluetooth module is connected to the ground and Vcc of the Arduino. The table 1 shows the operating condition of the system. The hardware setup of the system is shown in figure 5

Bluetooth	Data	Operation
SEND	1	LIGHT ON
SEND	2	LIGHT OFF
SEND	3	FAN ON
SEND	4	FAN OFF

Table 1 Condition based on which the light and fan is controlled



Figure 5. Hardware setup

CONCLUSION AND FUTURE SCOPE

Thus, electrical appliances like fans and lights has been automatically operated using Bluetooth module according to the data sent by the mobile to Arduino through the Bluetooth interface. Thus, we can save the energy and electricity. In this we have controlled only the light and fan. In future, we can control many home appliances in addition to the fan and light. We can increase the distance of the Bluetooth range by using Wi-Fi.

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