HOME AUTOMATION SYSTEM USING ARDUINO

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Abstract: The idea of conversing 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.

*Index Terms-* **Arduino UNO, Bluetooth, Ardudroid Software**

I. INTRODUCTION

In the present day, security systems play an important role in the protection of lives and investment. This is achieved by the incorporation of various subsystems into the security system with a single control unit such as surveillance, intruder control, access control, fire detection, etc. A smart home is one that is equipped with lighting, heating, and electronic devices that can be controlled remotely by smart phone or via the internet. An internet based home automation system focuses on controlling home electronic devices whether you are inside or outside your home . Home automation gives an individual the ability to remotely or automatically control things around the home. A home appliance is a device or instrument designed to perform a specific function, especially an electrical device, such as a refrigerator, for household use. The words appliance and devices are used interchangeably. Automation is today's fact, where things are being controlled automatically, usually the basic tasks of turning ON/OFF certain devices and beyond, either remotely or in close proximity . Automation lowers the human judgment to the lowest degree possible but does not completely eliminate it. The concept of remote management of household devices over the internet from anywhere, any time in the world today can be a reality. Assume a system where from the office desk, the user could view the status of the devices and decides to take control by tuning his TV set to his favourite channel, turns on the cooling system, say the air conditioner, and switches on or off some of the lights. This user could walk back home and only find a very comfortable, pleasant home.

II. PROPOSED SYSTEM

Block Diagram:

This paper proposes 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.
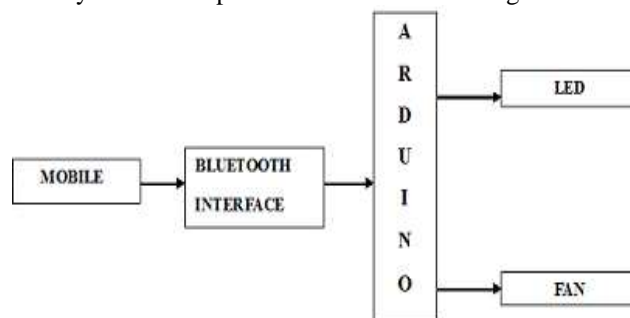
Figure 1: Block diagram of proposed system

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.

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 .

III.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

1.   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.
2.   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].
3.   It has inbuilt in voltage regulation in order to manage power inside and can be directly powered by USB without any external power.
4.   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.
5.   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.
6.   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 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: 123456 ,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.

IV.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.

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 123456.
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.

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.This app has been tested and designed for an HC-05 serial bluetooth module. we can use ardudroid to send commands to Arduino to control a relay to turn electric gadgets ON or OFF.

V. CONCLUSION

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 work we have controlled only the light and fan.

VI.   ACKNOWLEDGMENT

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