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Voice Assistant Home Automation Using Arduino

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ABSTRACT

The essential aim of this project is to extend a home automation system the usage of an Arduino board with Bluetooth being remotely controlled through manner of way of Android smart telecall smartphone. As technology is advancing so houses are also getting smarter. Modern houses are progressively transferring from conventional. switches to centralized control system, regarding far-flung controlled switches. Presently, conventional wall switches located in one-of-a-type factors of the house makes it difficult for the client to go near them to perform. Even greater it becomes greater difficult for the elderly or physical handicapped people to do so. Remote controlled home automation system gives a most contemporary-day solution with smart phones. In order to benefit this, a Bluetooth module is interfaced to the Arduino board at the receiver surrender while on the transmitter surrender, a GUI software program on the mobility telecast smartphone sends ON/OFF commands to the receiver in which hundreds are associated. By touching the preferred region on the GUI, the hundreds can be grown to end up ON/OFF remotely via this technology. The hundreds are operated through manner of way of Arduino board via Relay.

1. INTRODUCTION

Nowadays, we've faraway controls for our tv units and different digital systems, that have made our lives actually easy. Have you ever questioned approximately domestic automation which could provide the ability of controlling tube lights, fanatics and different electric home equipment at domestic the use of a faraway manage in this venture, we are able to manage the AC domestic home equipment via way of means of sending Voice Command from our telecast smartphone. We will use a Bluetooth module in our venture that enables to attach and speak with a telecast smartphone wirelessly. Also, we are able to use a Bluetooth app on our telecast smartphone, that's assisting to ship our voice Command from our clever tele call smartphone to the venture.

2. METHODOLOGY

A. Proposed System

Here we've managed 4 one-of-a-kind domestic home equipment via way of means of voice Command. The key additives of this venture are Arduino, Bluetooth module, Relay module, a telecast smartphone, and Android App. At first, we've hooked up the app on our telecast smartphone, which's without difficulty to he had withinside the play store. This app gets our Voice command and sends it to the Bluetooth module wirelessly. The Arduino decodes this command from the Bluetooth module. Then Arduino sends a command to the Relays to govern the house home equipment. Here we've used 4 domestic home equipment that are switched on/off via way of means of 8 one-of-a-kind voice instructions.

Analysis: A home monitoring and automation system modified into moreover studied, it modified into carried out through manner of way of the usage of Arduino Uno and Digital KIT. Although this system referred to as lower cost system but it is an entire lot luxurious than Bluetooth base home automation system. A low cost and wireless controlled automation system are the format for home automation. Bluetooth technology modified into used to provide far-flung controlled wireless get right of entry to client.

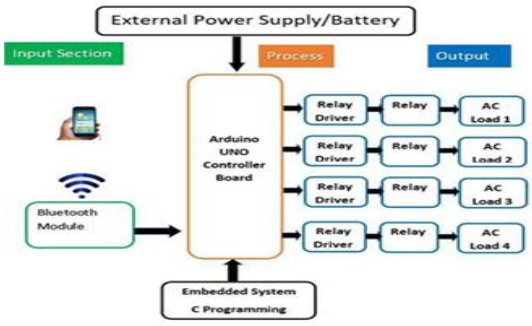

Figure 2: Block Diagram of Voice Assistant Home Automation Using Arduino

3. SYSTEM DESCRIPTION

At first, we want to select eight one-of-a-kind sorts of Voice Commands to govern four devices. Particular voice. Instructions are used to govern a tool. For example, the turn on "light" command is used to Turn ON the Light, and the "turn off light" command is used to Turn OFF the Light. These Voice instructions are utilized in Arduino code. The listing of voice instructions is below, that's utilized in Arduino code: Bluetooth module HC 05 and Arduino Uno are used for hardware implementation.

Table1: Control Specification

Voice Commands	Device status	Control relay (relay pin)
Turn on light	Light on	Relay-1(IN1)
Turn off light	Light off	Relay-1(IN1)
Turn on fan	Fan on	Relay-2 (IN2)
Turn off fan	Fan off	Relay-2 (IN2)
Turn on TV	TV on	Relay-3(IN3)
Turn off TV	TV off	Relay-3(IN3)
Turn on pump	Pump on	Relay-4 (IN4)
Turn off pump	Pump off	Relay-4 (IN4)
Turn on all	All device on	Relay-1, Relay-2, Relay-3, Relay-4,(IN1, IN2, IN3, IN4)
Turn all off	All device off	

When we ship a voice command via the App, then the Bluetooth module gets that command and passes it to the Arduino. Now Arduino compares this command with the predefine Commands (which might be described in Arduino code). If this command fits then Arduino sends a command to perform the relay module. For example, whilst we ship the "turn on light" voice command via the app. Then the Arduino receives this command via the Bluetooth module. Then the Arduino sends Low (0) enter voltage to the Input-1 (IN1) pin of the relay module. Now the relay is in on mode. So, the tool (mild) may even activate, that is linked to the relay-1 of the relay module. At the identical time, the D1 (Device 1) is ON. When we ship the "turn off light" voice command via the app. Again, the Arduino receives this command via the Bluetooth module. This time the Arduino sends a High (5v) enter voltage to the Input-1(IN1) pin of the relay module. Now the relay is in Off mode. So, the tool (mild) may even flip off, that is linked to the relay-1 of the relay module. At the identical time, the D1 (Device 1) is OFF In this manner, we will manipulate all relays of the four channel Relay module via the voice command.

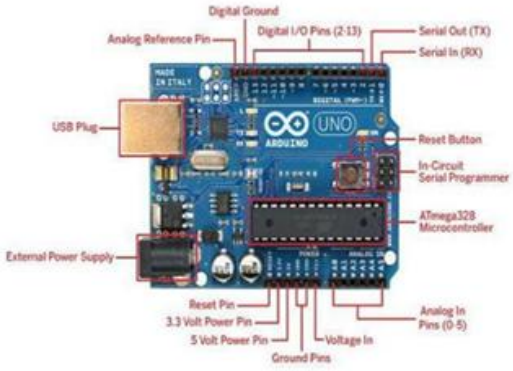

Figure3: Relay Module

Hardware: The proposed home automation system contains three hardware components telecast smartphone, Arduino board and Bluetooth module. Smartphone is used to talk with Arduino board the usage of a telecast smartphone software program and Bluetooth technology. In this research artwork

A. Arduino Uno

The Arduino UNO is a state-of-the-art board of Arduino. Here UNO way 'one' in Italian. It modified into named as UNO to label the number one release of Arduino Software. It modified into moreover the number one USB board released through manner of way of Arduino. It is considered due to the fact the powerful board applied in various projects. Arduino.cc developed the Arduino UNO board. Arduino UNO is based mostly on an ATmega328P microcontroller. It is simple to use in assessment to extraordinary boards, along with the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and extraordinary circuits. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, an energy jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based mostly on IDE, which stands for Integrated Development Environment.

Figure1: Arduino Uno

B. Bluetooth module HC-05

Bluetooth era is an excessive velocity low powered wi-fi era hyperlink this is designed to attach telephones or different transportable gadget together. The Bluetooth module has six pins -Enable, VCC, Ground, Transmit Data. (TxD), Receive Data (RxD) and State. The Enable and State pin are unused and so now no longer linked withinside the circuit. The VCC and Ground pins are linked to the not unusual place VCC and Ground. The TxI) and RxD pins of the module are linked to the pins 10 and eleven of the Arduino. It is performed with the aid of using embedded low fee transceivers into the devices. It helps at the frequency band of 2.45GHz and might assist as much as 721KBps together with 3 voice channels. This frequency band has been set apart with the aid of using global settlement for the usage of industrial, clinical and scientific devices (ISM). rd-well matched with 1.0 tool. Bluetooth can join as much as "eight devices" concurrently and every tool gives a completely unique 48bit deal with from the IEEE 802 standard with the connections being made factor to factor or multipoint.

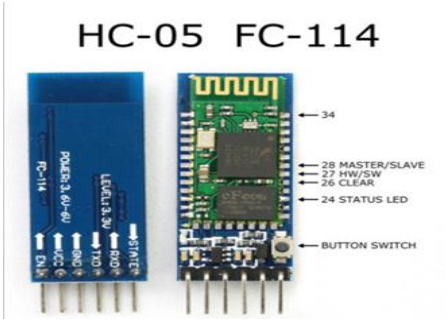

Figure3: Bluetooth Module

C. *Channel Relay Board*

The 12V 2A relays are used to alternate the AC domestic gadget ON or OFF with inside the project. The relays are associated with the pins 9, eight, 7 and six of Arduino board via BC547 transistor circuits associated in a now no longer unusual place emitter configuration. The section twine from the AC supply is supplied at the COM terminal of the relays. When a HIGH properly judgment is obtained at the interfaced microcontroller pins, the COM element switches from NC to NO element in which a relay short-circuits the section with the independent twine switching the supply to the gadget ON. The LEDs are associated parallel to the relay circuit with pull-up resistors in series. These LEDs offer seen hint of the ON/OFF repute of domestic gadget.

Figure4: Channel Relay Board

System Architecture:

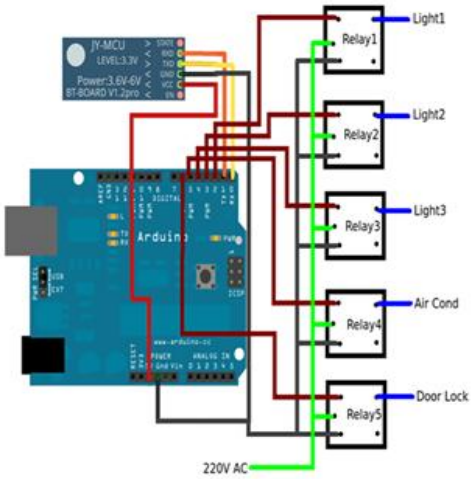

Figure5: Circuit Diagram

4. RESULTS AND DISCUSSION

Figure6: Turn Off All Lights

Figure7: Turn On All Lights

The purpose of the system is to use mobility telecast smartphone is in-constructed Bluetooth facility for automation. Different hardware and software program application unit of the system are described. The complete software program software program application has been designed the usage of Android, the usage of C Language. The HAS furnishes a brilliant paradigm for any Automation System based mostly on Android Mobile Phone and Bluetooth.

CONCLUSION

In this paper we have got brought the format and implementation of a low cost, flexible and wireless technique to the residence automation. The system is secured for get right of entry to from any client or intruder. The clients are predicted to acquire a pairing password for the Arduino BT and the mobility telecast smartphone to get right of entry to the residence domestic gadget. This affords a protection from unauthorized clients. This system can be used as a test bed for any domestic gadget that requires on-off switching packages without any internet connection.

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