Project 2

Voice-controlled home automation

Aim: Voice commands in the android app will be converted into the string and this string will be sent to Arduino through Bluetooth and according to commands, Arduino will activate a particular relay which will further turn ON/OFF the devices in the home

Description:

For this project, here assuming 2 relays. One relay for light and another relay for fan. For communication between microcontroller and commander her using Bluetooth. So, commander can use their mobile Bluetooth to communicate with microcontroller to gives the commands. Connection of relay, light and fan with microcontroller are shown in proteus software output fig 6. In code, already defined commands for user for control status of fan and light.

Fig 1. Home automation

Components:

1. Arduino uno

Fig 2. Arduino uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

2. Bluetooth module (HC-05)

Fig 3. HC-05

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC.

3. Relay

Fig 4. Relay

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

4. Breadboard

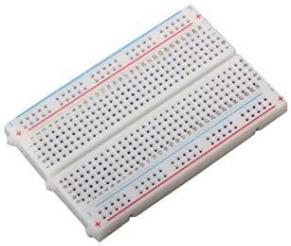

Fig 5. Breadboard

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. These holes let you easily insert electronic components to prototype (meaning to build and test an early version of) an electronic circuit, like this one with a battery, switch, resistor, and an LED (light-emitting diode).

5. Jumpers

Fig 6. Jumpers

A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering

Procedure:

Step 1: Parts Required

Required components are given in components section. One unit of all components required and some jumper wires.

Step 2: Connect the components

Connect the components and wire as shown in below fig 7.
Link : https://www.tinkercad.com/things/a0aZG6y5V3G-home-automation/editel?sharecode=WznsHyXk72ynF7IZzGj2atslRW74-qBDHrjGR1zta5U

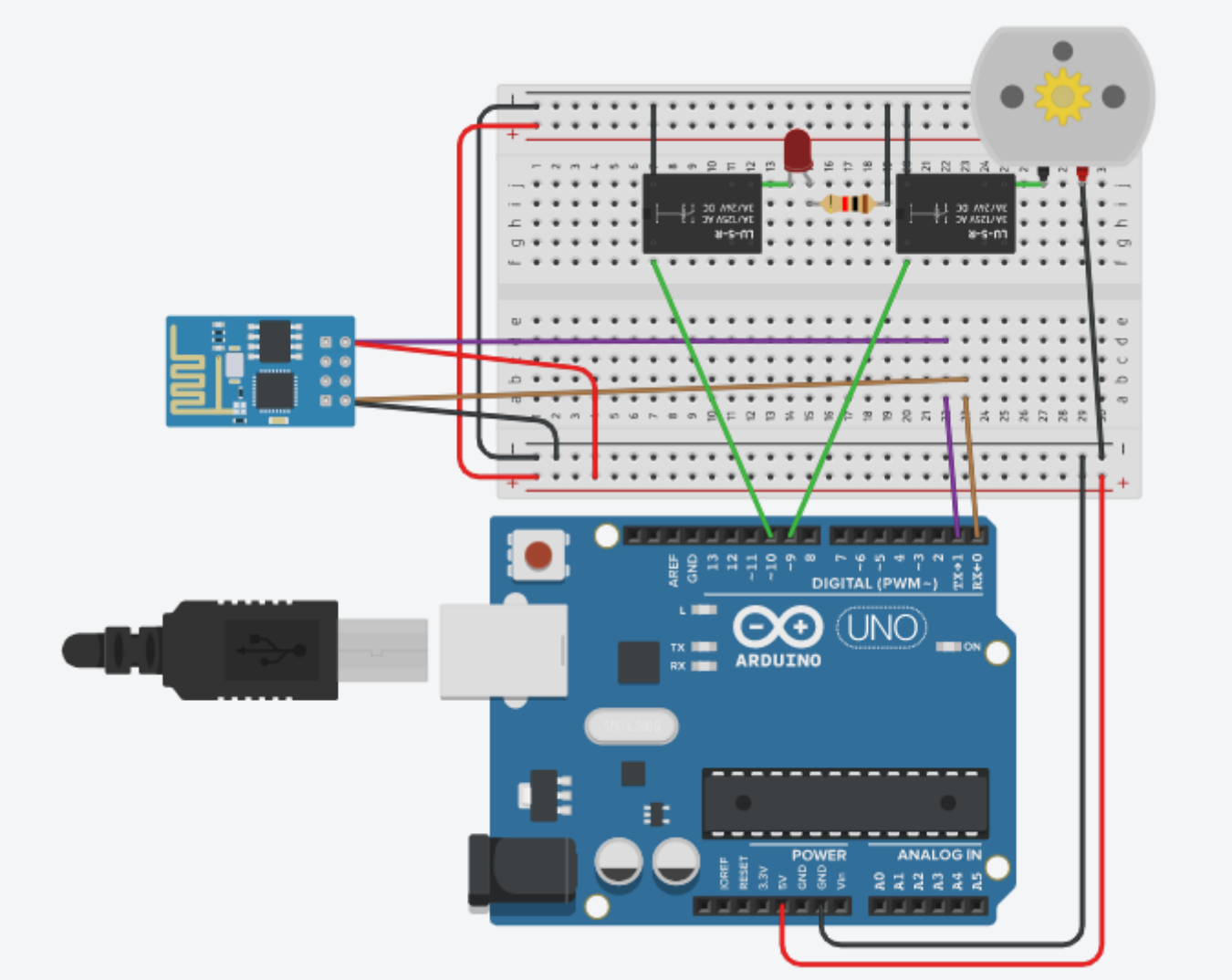

Fig 7. Connections

Step 3: Upload the code

Upload the sketch to your Arduino. Use code which is given in “Arduino code” section. Kindly check the perfect COM port.

Step 4: Configuration of Arduino Bluetooth voice app

Arduino Bluetooth voice app is available on google play store. Download and install this app and follow the instruction given in “configuration of android app”.

Step 5: Commands

After following instruction of configuration of android app. Communication between your phone and microcontroller is establish. Just click on mic button and gives voice command which is given in “Commands for home automation” section.

Pin Connections:

PIN	CONNECTION
9	RELAY FOR LIGHT
10	RELAY FOR FAN
RX	TX (HC05 BLUETOOTH MODULE)
TX	RX (HC05 BLUETOOTH MODULE)

Configuration of Android App:

Here using Arduino Bluetooth voice controller app which is available on google play store and its open source. To download this app link is given in reference.

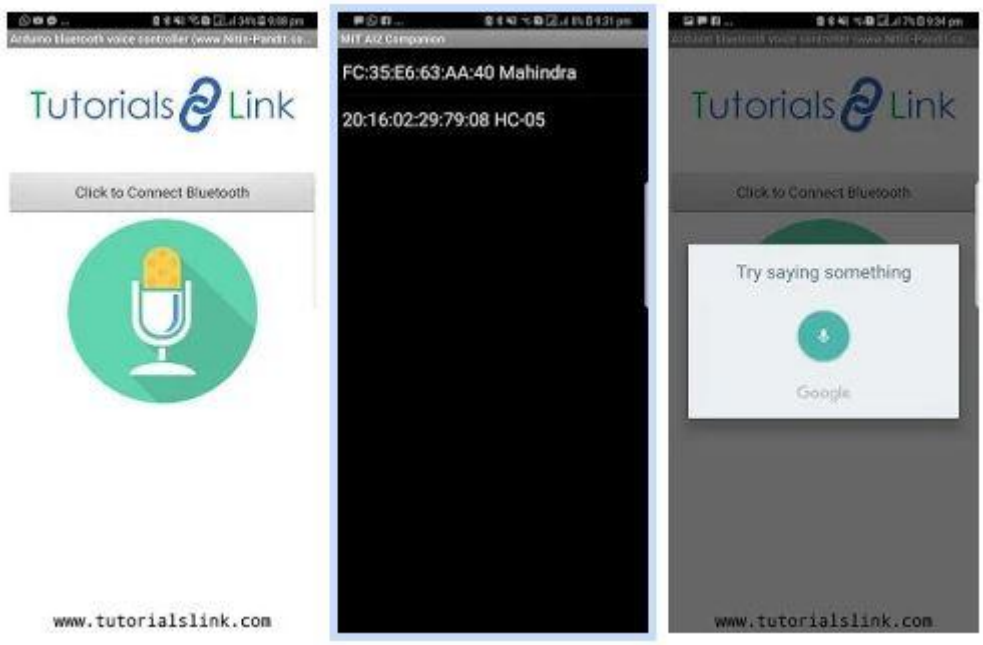

Fig 8. Overview of Arduino Bluetooth voice controller

After downloading is complete, click on “Click to Connect Bluetooth”. Then search for name of HC-05 and click and this. After connection is done, click on mic and send command which is shown below.

Command for home automation:

Voice Commands	Functions
LIGHT ON	LIGHT WILL ON
LIGHT OFF	LIGHT WILL OFF
FAN ON	FAN WIILL ON
FAN OFF	FAN WIILL OFF
BOTH ON	LIGHT AND FAN WILL ON
BOTH OFF	LIGHT AND FAN WILL OFF

Simulation Output of Proteus Software:

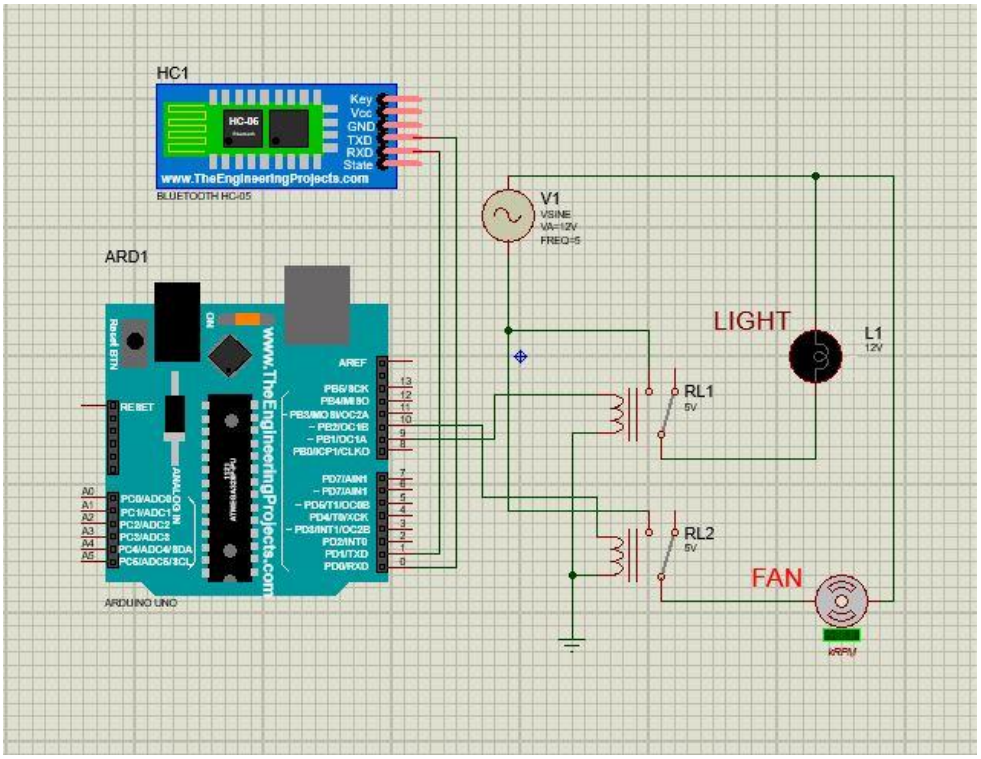

Fig 9. Simulation output 1

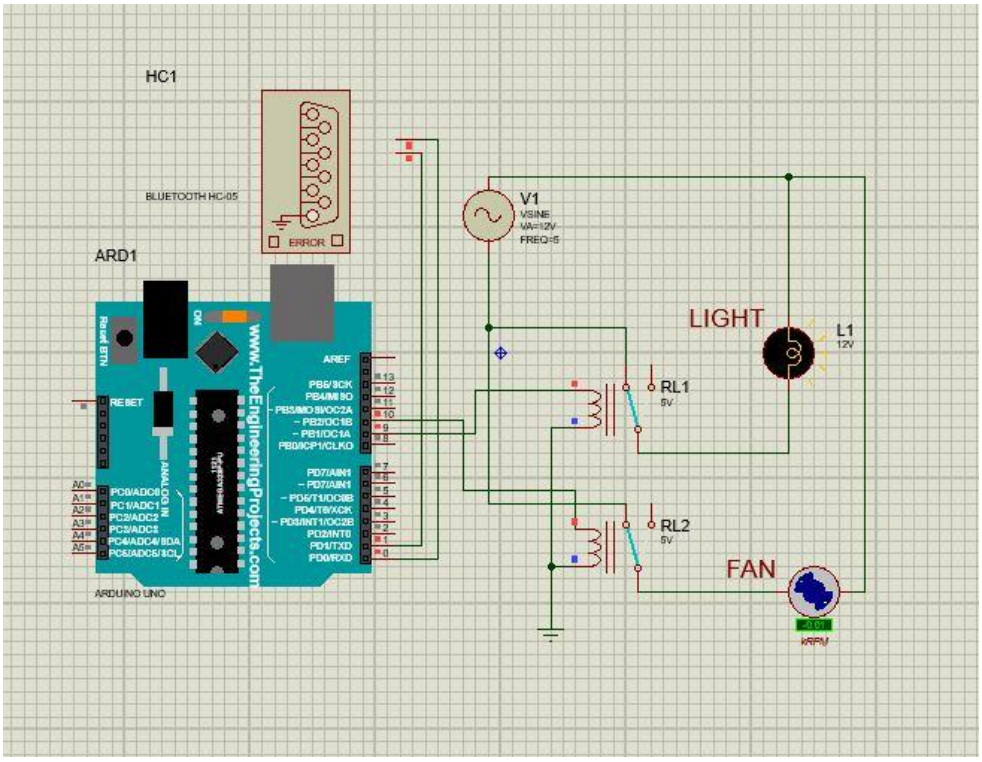

Fig 10. Simulation output 2

References:

1. https://play.google.com/store/apps/details?id=appinventor.ai_nitinpandit_00.Arduino_bluetooth_voice_controller&hl=en_IN