A

Project Report

On

VOICE COMMAND ROBOT

Submitted to

RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES, RK VALLEY

in partial fulfillment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

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This is to certify that the project report entitled **"VOICE COMMAND ROBOT"** a bonafide record of the project work done and submitted by

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DECLARATION

We hereby declare that the project report entitled **"VOICE COMMAND ROBOT"** submitted to the Department of **ELECTRONICS AND COMMUNICATION ENGINEERING** in partial fulfillment of requirements for the award of the degree of **BACHELOR OF TECHNOLOGY**. This project is the result of our own effort and that it has not been submitted to any other University or Institution for the award of any degree or diploma other than specified above.

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ABSTRACT

This project was created in such a way that voice instructions are used to control the robot. For required duties, an android application with a microcontroller is employed. Bluetooth technology facilitates the connection between the android app and the automobile. The robot is operated by the user\'s spoken orders or buttons on the application. The two dc servo motors attached to the microcontroller on the receiver side aid the robot\'s movement. The Bluetooth RF transmitter converts the commands from the application into digital signals at a range of about 100 metres to the robot. The data is deciphered by the receiver and supplied to the microcontroller, which controls the DC motors to perform the required job. The goal of a Voice Controlled Robotic Vehicle is to complete a task by listening to the user\'s commands. For the user to operate the robot smoothly, a prior preparation session is required. A code is used to give instructions to the controller in the same way. The project \"Voice Controlled Robotic Vehicle\" has numerous uses both now and in the future. In the future, improvements can be added to the project to make it more effective. The project has a wide range of applications, including military, home security, rescue missions, industry, and medical support. Using the given resources, we were able to create a rudimentary model of a voice-controlled robotic car. Because this project is simple to implement, this robot is advantageous to human life. The Voice Control Robot is beneficial for monitoring and assisting disabled persons. It is simple to use because it operates with basic voice commands. It is effective in locations where humans are unable to reach. As a result, we can employ this robot to spy on people. It has the potential to be utilised for surveillance. For security purposes, we can incorporate a web cam into this robot. The voice recognition software is highly sensitive to background noise and has a high accuracy for identifying a voice command.

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1

INTRODUCTION

1.1 ROBOT

Most people think of robots in humanlike terms — communicating and doing things like people would. But this specific subset of robots is actually not very common. A robot can be defined as a mechanical device that is capable of performing a variety of tasks on command or according to instructions programmed in advance. Engineers design robots to perform complex tasks more easily and with greater accuracy. Robot is a system that contains sensors, control systems, manipulators, power supplies and software all working together to perform a task. Designing, building, programming and testing a robots is a combination of physics, mechanical engineering, electrical engineering, structural engineering, mathematics and computing. In some cases biology, medicine, chemistry might also be involved. Some everyday examples of robots include:

• automatic car washes

• vending machines

• automatic doors

• robotic arms used in manufacturing remote control cars and trucks

• automatic teller machines (ATMs)

Fig 1.1 : ROBOT HAS FOUR MOTORS AND FOUR UNSTEERED WHEELS

A robot has these essential characteristics:

• Sensing: First of all your robot would have to be able to sense its surroundings. It would do this in ways that are not unsimilar to the way that you sense your surroundings. Giving your robot sensors: light sensors (eyes), touch and pressure sensors (hands), chemical sensors (nose), hearing and sonar sensors (ears), and taste sensors (tongue) will give your robot awareness of its environment.

• Movement: A robot needs to be able to move around its environment. Whether rolling on wheels, walking on legs or propelling by thrusters a robot needs to be able to move. To count as a robot either the whole robot moves, like the Sojourner or just parts of the robot moves, like the Canada Arm.• Energy: A robot needs to be able to power itself. A robot might be solar powered, electrically powered, battery powered. The way your robot gets its energy will depend on what your robot needs to do.

• Intelligence: A robot needs some kind of "smarts." This is where programming enters the pictures. A programmer is the person who gives the robot its 'smarts.' The robot will have to have some way to receive the program so that it knows what it is to do.A study of robotics means that students are actively engaged with all of these disciplines in a deeply problem-posing problem-solving environment.

VOICE COMMAND ROBOT

The principle this toy concept was based on was voice recognition technology. The car operates by having a voice receiver box on it where it receives your voice commands. The car has a 50 foot radius from where it is initially place on the ground. The child interacts with the car by shouting out commands like "faster", "slower", "right", "left", and "stop".

The child will be able to feel like they are in full control of the car by doing this, thus giving them the sense of being important. The child programs their own voice into the receiver so that only they can operate the car. The car has an emergency shut down when it reaches the boundary of the 50 foot radius. The child must also be within that 50 foot

radius when shouting commands in order for the car to initiate the desired command. The car is relatively cheap to produce because it's exterior is made of plastic. The voice recognition technology also is very cheap these days, and since the receiver only has to have a few words programmed into it, the cost is also reduced. As long as the car is not dropped from a 3 story window, the child would have no problem with its durability. It can withstand crashes against curbs and other such similar obstacles. There is no choking hazard risk in regards with this toy. The on/off switch is located in a safe area where the child's hands won't be near any moving parts. Also, there won't be any sharp edges on the car that can inadvertently cut the child.

CHAPTER-2

COMPONENTS

2.1 ARDUINO

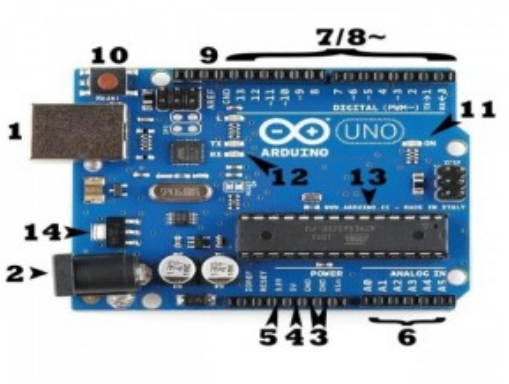


Figure 2.1: Arduino Uno

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, usedto write and upload computer code to the physical board. What's on the board?

• Power (USB / Barrel Jack) Every Arduino board needs a way to be connected to a power source. The Arduino UNO can be powered from a USB cable coming from your computer or a wall power supply that is terminated in a barrel jack. In the picture above the USB connection is labeled (1) and the barrel jack is labeled (2).

• Pins (5V, 3.3V, GND, Analog, Digital, PWM, AREF) GND (3) : Short for 'Ground'.There are several GND pins on the Arduino, any of which can be used to ground your circuit. Analog (6) : The area of pins under the 'Analog In' label (A0 through A5 on the UNO) are Analog In pins. These pins can read the signal from an analog sensor and convert it into a digital value that we can read. Digital (7) : Across

from the analog pins are the digital pins (0 through 13 on the UNO). These pins can be used for both digital input (like telling if a button is pushed) and digital output (like powering an LED). PWM (8) : You may have noticed the tilde (~) next to some of the digital pins (3, 5, 6, 9, 10, and 11 on the UNO). These pins act as normal digital pins, but can also be used for something called Pulse-Width Modulation (PWM). AREF (9) : Stands for Analog Reference. Most of the time you can leave this pin alone. It is sometimes used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.• Reset Button The Arduino has a reset button (10). Pushing it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino. This can be very useful Is your code doesn't repeat, but you want to test it multiple times.

• Power LED Indicator

Just beneath and to the right of the word "UNO" on your circuit board, there's a tiny LED next to the word 'ON' (11). This LED should light up whenever y ou plug your Arduino into a power source. If this light doesn't turn on, something is wrong.

• TX RX LEDs

TX is short for transmit, RX is short for receive. These markings appear quite a bit inelectronics to indicate the pins responsible for serial communication. In our case, there are two places on the Arduino UNO where TX and RX appear -- once by digital pins 0 and 1, and a second time next to the TX and RX indicator LEDs (12).

• Main IC

The black thing with all the metal legs is an IC, or Integrated Circuit (13). Think of it as the brains of our Arduino. This can be important, as you may need to know the IC type (along with your board type) before loading up a new program from the Arduino software.

• Voltage Regulator: The voltage regulator (14) is not actually something you can (or should) interact with onthe Arduino.

2.2 MOTOR DRIVER SHIELD

Figure 2.2:a)Motor driver **b)Pin Configuration**

This is a motor driver IC that can drive two motor simultaneously. L293D IC is a dual H-bridge motor driver IC. One H-bridge is capable to drive a dc motor in bidirectional. L293D IC is a current enhancing IC as the output from the sensor is not able to drive motors itself so L293D is used for this purpose. L293D is a 16 pin IC having two enables pins which should always be remain high to enable both the H-bridges.

• L293D Pin Configuration

Pin Number	Pin Name	Description
1	Enable 1,2	This pin enables the input pin Input 1(2) and Input 2(7)
2	Input 1	Directly controls the Output 1 pin. Controlled by digital circuits
3	Output 1	Connected to one end of Motor 1
4	Ground	Ground pins are connected to ground of circuit (0V)
5	Ground	Ground pins are connected to ground of circuit (0V)
6	Output 2	Connected to another end of Motor 1
7	Input 2	Directly controls the Output 2 pin. Controlled by digital circuits
8	Vcc2	Connected to Voltage pin for running motors (4.5V to 36V)
9	Enable 3,4	This pin enables the input pin Input 3(10) and Input 4(15)
10	Input 3	Directly controls the Output 3 pin. Controlled by digital circuits
11	Output 3	Connected to one end of Motor 2
12	Ground	Ground pins are connected to ground of circuit (0V)
13	Ground	Ground pins are connected to ground of circuit (0V)
14	Output 4	Connected to another end of Motor 2
15	Input 4	Directly controls the Output 4 pin. Controlled by digital circuits
16	Vcc1	Connected to +5V to enable IC function

DC MOTORS

A DC motor is an electrical machine that converts electrical energy into mechanical energy. In a DC motor, the input electrical energy is the direct current which is transformed into the mechanical rotation.Two major parts required for the construction of dc motor:

1) Stator – The static part that houses the field windings and receives the supply.

2) Rotor – The rotating part that brings about the mechanical rotations.

DC motor working is based on the principle that when a current carrying conductor isplaced in a magnetic field, the conductor experiences a mechanical force

2.3 BLUETOOTH MODULE

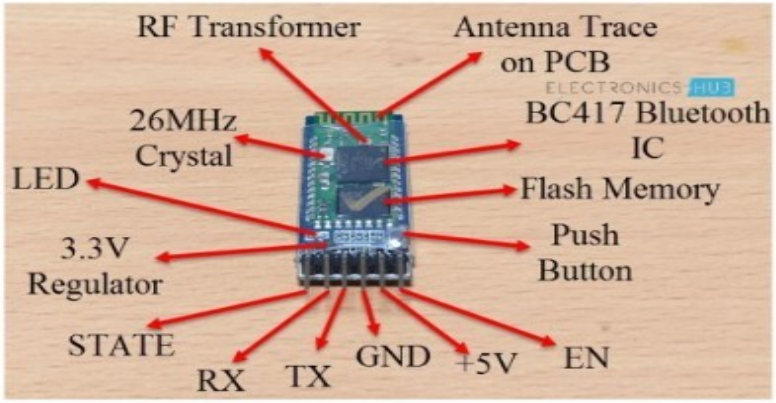


Figure 2.3: Bluetooth Module

Bluetooth Communication is a 2.4GHz frequency based RF Communication with a range of approximately 10 meters. It is one of the most popular and most frequently used low range communication for data transfer, audio systems, handsfree, computer peripherals etc.If you take a look around the electronics DIY and hobbyists community, HC-05 Bluetooth Module is the device of choice for implementing Bluetooth Communication based projects. HC-05 Bluetooth Module is a simple Wireless Communication device based on the Bluetooth Protocol.This module is based on BC417 Single Chip Bluetooth IC that is compliant with Bluetooth v2.0 standard and with support for both UART and USB interfaces.Generally, the HC-05 Bluetooth Module, or the HC-05 Sub Module, to be precise, comes with the BC417 IC along with a flash memory. Such Modules come assurface mount board and several third-party manufacturers use these board to build a more complete system with necessary pins and components.

Pin Description

•EN:It is the enable pin. When this pin is floating or connected to 3.3V, the module is enabled. If this pin is connected to GND, the module is disabled.

•+5V:This is the supply pin for connecting +5V. As the Module has on-board 3.3Vregulator, you can provide +5V supply.

•GND:It is the ground pin.•TX:It is the Transmitter pin of the UART Communication.

•RX:It is the Receive Pin of UART.

•STATE:This is a status indicator pin. This pin goes LOW when the module is not connected to any device. When the module is paired with any device, this pin goes HIGH. The HC-05 Bluetooth Module can be used in two modes of operation: Command Mode and Data Mode.

Command Mode

In Command Mode, you can communicate with the Bluetooth module through AT Commands for configuring various settings and parameters of the Module like get the firmware information, changing Baud Rate, changing module name, it can be used to set it as master or slave. A point about HC-05 Module is that it can be configured as Master or Slave in a communication pair. In order to select either of the modes, you need to activate the Command Mode and sent appropriate AT Commands.

Data Mode

Coming to the Data Mode, in this mode, the module is used for communicating with other Bluetooth device i.e. data transfer happen

CHAPTER-3

BUILDING A ROBOT

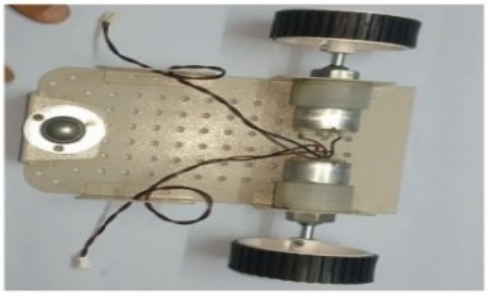


Fig 3.1: Fix the Castro wheels,wheels motors.

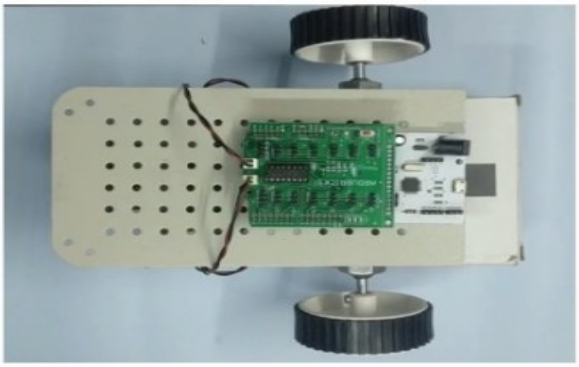


Fig 3.2: Fix Arduino & Motor Driver shield

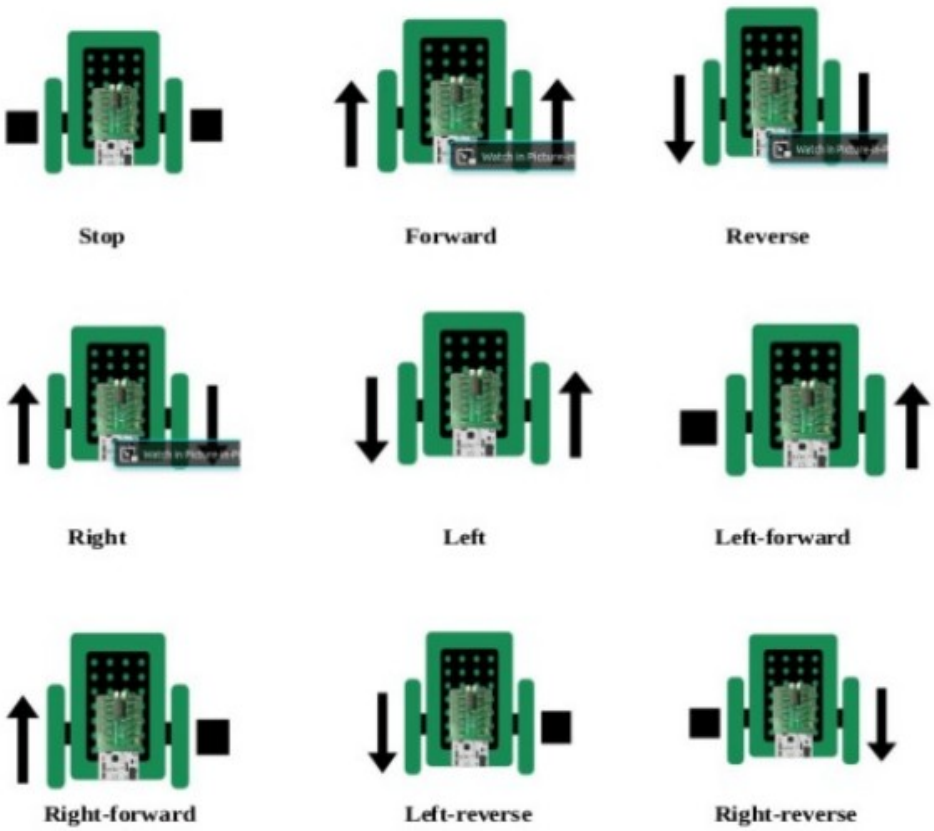


Figure 3.3: Motions of a Robot

S.No	Robot Motion	Left Motor	Right Motor
1	Stationary	Stop	Stop
2	Forward	Forward	Forward
3	Reverse	Reverse	Reverse
4	Left	Reverse	Forward
5	Right	Forward	Reverse
6	Left-Forward	Stop	Forward
7	Right-Forward	Forward	Stop
8	Left-Reverse	Reverse	Stop
9	Right-Reverse	Stop	Reverse

IT SHOWS THE MOTION OF THE ROBOT

S.No	Robot Motion	Left Motor Control pin1	Left Motor Control pin2	Right Motor Control pin1	Right Motor Control pin2
1	Stationary	Low	Low	Low	Low
2	Forward	High	Low	High	Low
3	Reverse	Low	High	Low	High
4	Left	Low	High	High	Low
5	Right	High	Low	Low	High
6	Left-Forward	Low	Low	High	Low
7	Right-Forward	High	Low	Low	Low
8	Left-Reverse	Low	High	Low	Low
9	Right-Reverse	Low	Low	Low	High

IT SHOWS THE SIGNALLING OF THE ROBOT

CHAPTER-4

CIRCUIT DIAGRAM

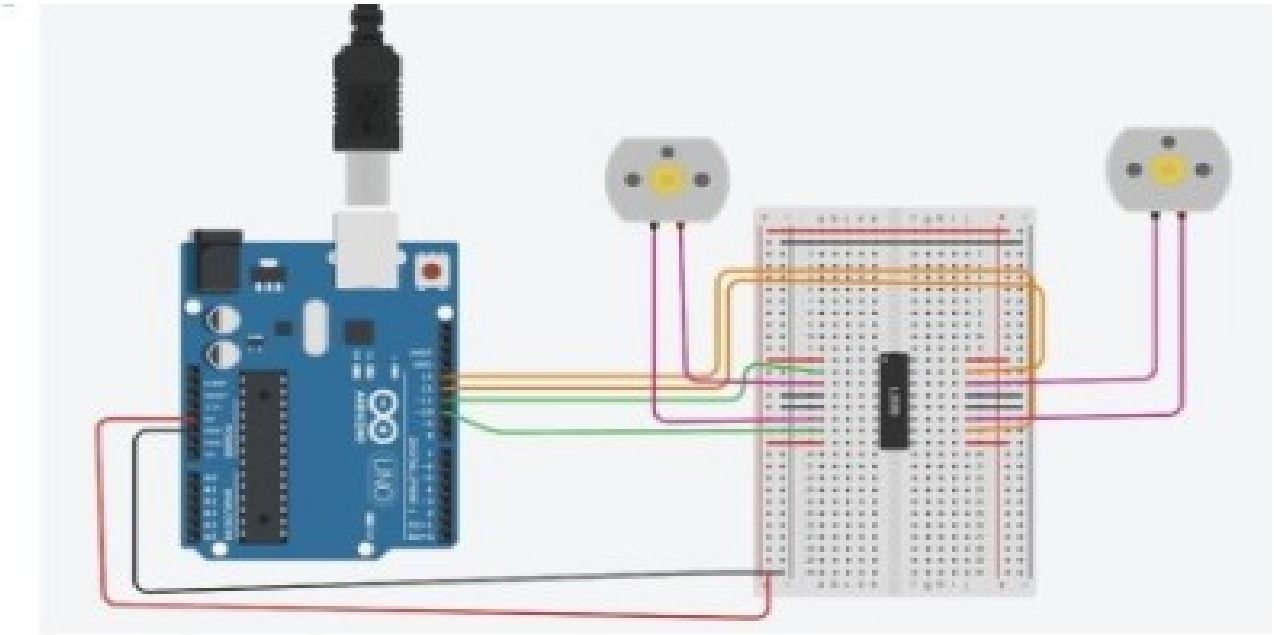


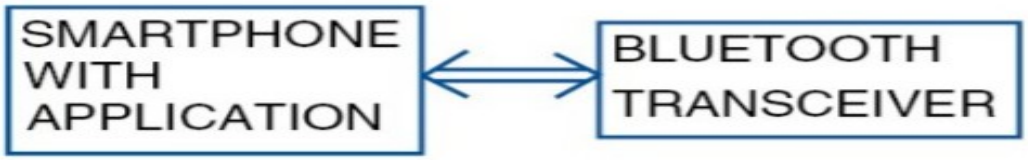
FIG 4.1 SHOWS THE CIRCUIT DIAGRAM

CHAPTER-5

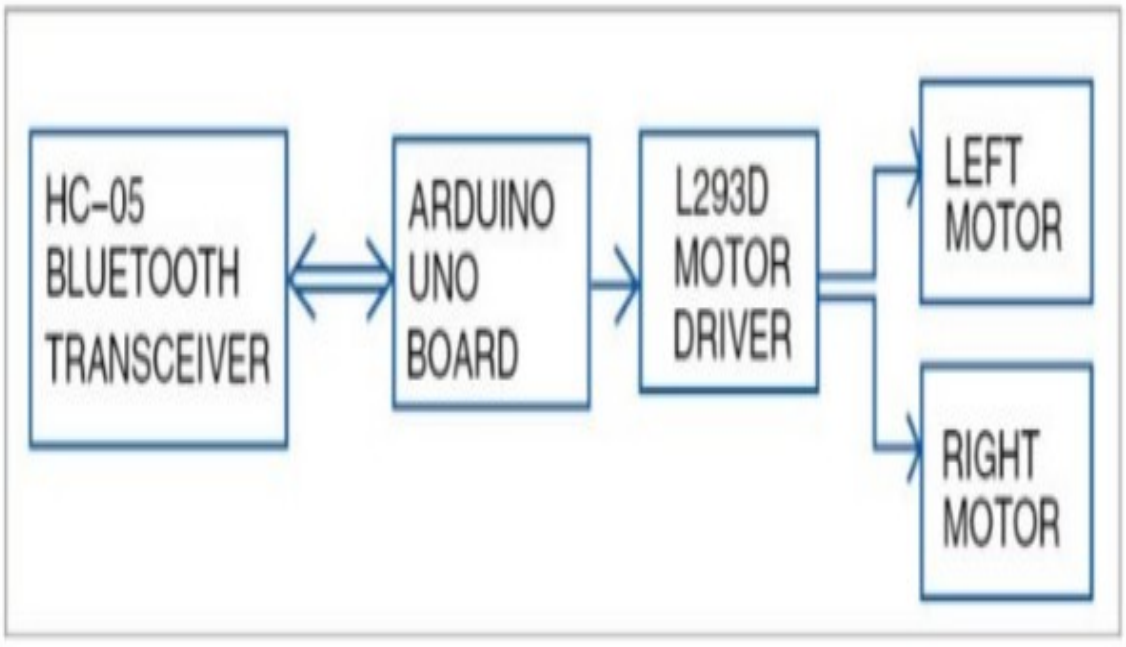
BLOCK DIAGRAM

5.1 Block diagram of Transmitter:

The system consists of a transmitter (Android smartphone) and a receiver (robot). Block diagrams of the transmitter and receiver sides



5.2 Block diagram of Receiver:



CHAPTER-6

INTERFACING THE APP

1) Open the Arduino Controlled Bluetooth Application

2) Connect to HC-05 Bluetooth

3) Then you get a pop up as device connected

4) Select voice control

5) open setting and enter all voice commands as in code

6) Then select microphoen symbol and then give command

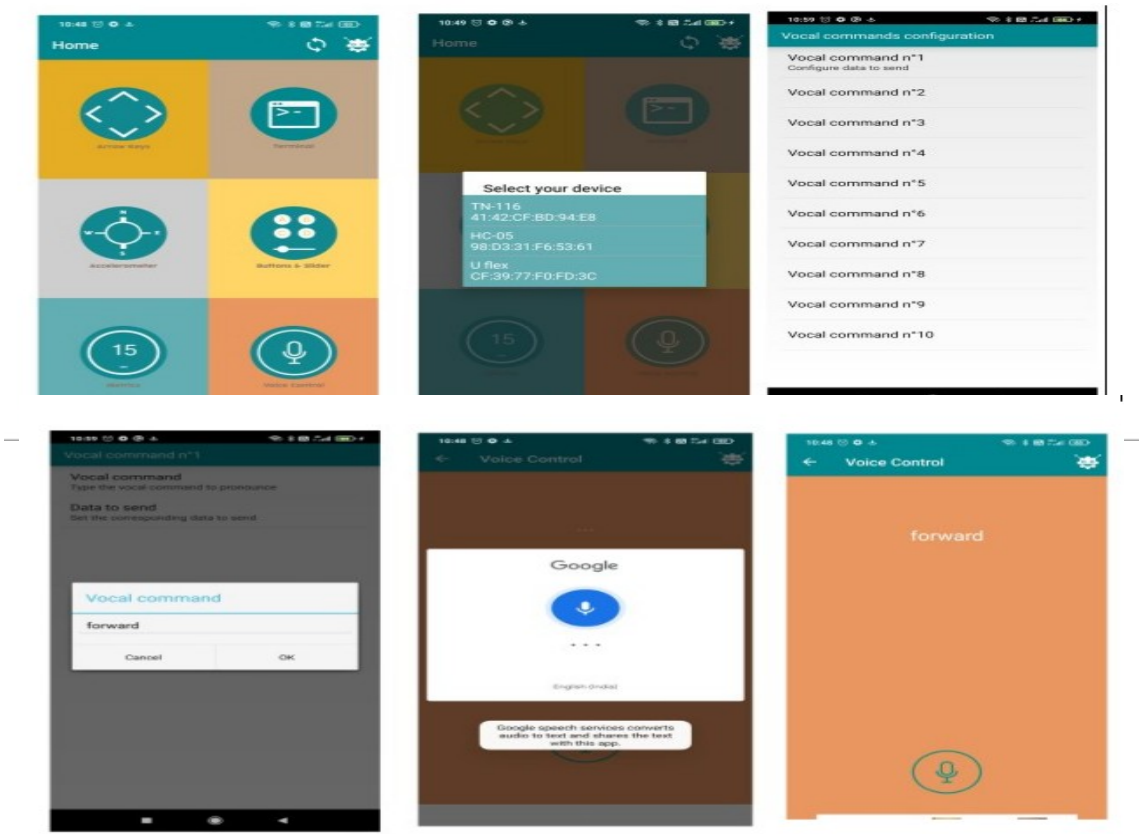


FIG 6.1 APPLICATION WORKING

CHAPTER-7

CODE

```
String readvoice;

void setup(){

Serial.begin(9600);

pinMode(5,OUTPUT);

pinMode(4,OUTPUT);

pinMode(7,OUTPUT);

pinMode(6,OUTPUT);

pinMode(12,OUTPUT);

pinMode(8,OUTPUT);

digitalWrite(5,HIGH);

digitalWrite(6,HIGH);

}

void forward(){

digitalWrite(4,HIGH);

digitalWrite(12,HIGH);

digitalWrite(7,LOW);

digitalWrite(8,LOW);

}
```

```
void reverse(){
digitalWrite(4,LOW);
digitalWrite(12,LOW);
digitalWrite(7,HIGH);
digitalWrite(8,HIGH);
}
void right(){
digitalWrite(4,HIGH);
digitalWrite(12,LOW);
digitalWrite(7,LOW);
digitalWrite(8,HIGH);
}void left(){
digitalWrite(4,LOW);
digitalWrite(12,HIGH);
digitalWrite(7,HIGH);
digitalWrite(8,LOW);
}
void left_f(){
digitalWrite(4,LOW);
digitalWrite(12,HIGH);
digitalWrite(7,LOW);
```

```
digitalWrite(8,LOW);
}
void right_f(){
digitalWrite(4,HIGH);
digitalWrite(12,LOW);
digitalWrite(7,LOW);
digitalWrite(8,LOW);
}
void right_r(){
digitalWrite(4,LOW);
digitalWrite(12,LOW);
digitalWrite(7,LOW);
digitalWrite(8,HIGH);
}
void left_r(){
digitalWrite(4,LOW);
digitalWrite(12,LOW);
digitalWrite(7,HIGH);
digitalWrite(8,LOW);
}
void stop(){
```

```
digitalWrite(4,LOW);digitalWrite(12,LOW);
digitalWrite(7,LOW);
digitalWrite(8,LOW);
}
void run(){
Serial.println(readvoice);
if(readvoice == "forward")
{
forward();
delay(100);
}
else if(readvoice == "back")
{
reverse();
delay(100);
}
else if(readvoice == "turn left")
{
left();
delay(100);
}
```

```
else if(readvoice == "turn left forward")
{
left_f();
delay(100);
}
else if(readvoice == "turn left back")
{
left_r();
delay(100);
}else if(readvoice == "turn right")
{
right();
delay(100);
}
else if(readvoice == "turn right forward")
{
right_f();
delay(100);
}
else if(readvoice == "turn right back")
{
```

```
right_r();
delay(100);
}
else if(readvoice == "stop")
{
stop();
delay(100);
}
}
void loop(){
while(Serial.available()){
delay(10);
char bt=Serial.read();
readvoice += bt;
}
if(readvoice.length()>0){
run();
}
readvoice
```

CHAPTER-8

8.1 APPLICATIONS

This system can be implemented in various applications such as:

1) Indoor assistive robots which will navigate around to pick up objects from one place and place them at another using speech commands technique.
2) Surveillance applications to send live feed from camera and track down an objects.
3) Industrial Robots
4) On board digital assistants for automobiles.

8.2 ADVANTAGES

The way of robots is being utilized in the work environment, they can furnishorganizations and employees with various favorable advantages.

- Mundane Tasks are Reduced. ...
- Safety. ...
- Reduction in Labor. ...
- Consistency. ...
- Precision. ...
- Increased Output. ...
- Flexibility

CHAPTER-9

RESULT

The android smart phone's microphone is used to recognise human voices. Using the Android operating system and Artificial Intelligence software, this voice is processed and transformed into English words. Speech recognition is a multidisciplinary subfield of computational linguistics that explores approaches and technology that allow computers to recognise and convert spoken language into text. Automatic speech recognition (ASR), computer voice recognition, and speech to text are some of the other names for it (STT). It blends languages, computer science, and electrical engineering expertise and study. Speech recognition has a long history in terms of technology, with multiple waves of key advancements. Advances in deep learning and big data have recently improved the field. The improvements are proven not only by the increasing number of academic articles published in the subject, but also by the widespread industry acceptance of a range of deep learning approaches in the design and deployment of voice recognition systems around the world.The android smart phone's microphone is used to recognise human voices. Using the Android operating system and Artificial Intelligence software, this voice is processed and transformed into English words. Speech recognition is a multidisciplinary subfield of computational linguistics that explores approaches and technology that allow computers to recognise and convert spoken language into text. Automatic speech recognition (ASR), computer voice recognition, and speech to text are some of the other names for it (STT). It blends languages, computer science, and electrical engineering expertise and study. Speech recognition has a long history in terms of technology, with multiple waves of key advancements. Advances in deep learning and big data have recently improved the field. The improvements are proven not only by the increasing number of academic articles published in the subject, but also by the widespread industry acceptance of a range of deep learning approaches in the design and deployment of voice recognition systems around the world.

CHAPTER-10

CONCLUSION

The project \"Voice Controlled Robotic Vehicle\" has numerous uses both now and in the future. In the future, improvements can be added to the project to make it more effective. The project has a wide range of applications, including military, home security, rescue missions, industry, and medical support. Using the given resources, we were able to create a rudimentary model of a voice-controlled robotic car. Because this project is simple to implement, this robot is advantageous to human life. The Voice Control Robot is beneficial for monitoring and assisting disabled persons. It is simple to use because it operates with basic voice commands. It is effective in locations where humans are unable to reach. This robot is modest in size. This robot can be used to spy on people. It has the potential to be utilised for surveillance. For security purposes, we can incorporate a web cam into this robot. The voice recognition software is accurate and sensitive to background noise, allowing it to distinguish a voice command.