ADVANCED ACADEMIC CENTER

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TITLE

TOY CAR USING BLUETOOTH AND VOICE RECOGNITION

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INSTITUTE OF ENGINEERING AND TECHNOLOGY
AUTONOMOUS

Advanced Academic Center

(A Center For Inter-Discilinary Research)

This is to certify that the project titled

"TOYCAR USING BLUETOOTH AND VOICE RECOGNITION"

is a bonafide work carried out by the following students in partial fulfilment of the requirements for Advanced Academic Center intern, submitted to thechair, AAC during the academic year 2019-2020.

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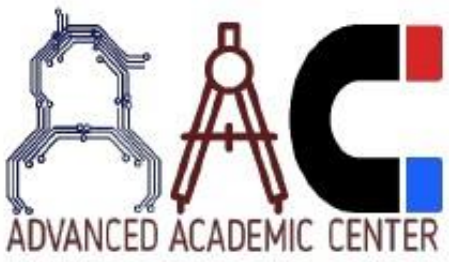

ACKNOWLEDGMENTS

We express our deep sense of gratitude to our respected Director , Gokaraju Rangaraju Institute of Engineering and Technology for the valuable guidance and for permitting us to carry out this project.

With immense pleasure, we record our deep sense of gratitude to our respected principal, for permitting us to carry out this project.

We are thankful to Associate Dean ,Advance Academic Centre for providing us appropriate ecosystem required for the project to complete.

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ABSTRACT

Voice controlled toy car is a mobile robot which is controlled by some specified voice commands. The mobile application is capable of identifying five commands which are“Stop”,”Forward”,”Back”,”Left”,”Right”. In this embedded systems project , we make a 4-WD robotic car which we can control using voice through a mobile application. Application listens and sends the instruction to the Arduino using Bluetooth and then Arduino performs the specified operation. Voice recognition application is not 100% accurate. The application is sensitive to the surrounding noises. It sometimes misinterprets the voice commands given to the car.

SUMMARY

We the students of ECE, M.Sanjana , K.Sahithi and IT, D.Varsha are studying B.Tech second year in GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY .The title of our project is TOY CAR AS AI BOT.

The toy car we made is controlled using Bluetooth and google voice recognition software. The hardware setup used consists of motors, chassis, wheels, breadboard, 9V battery, arduino, L293D motor driver integrated circuit, Bluetooth.

Firstly assemble the motors, chassis and wheels to build the toy car. Stick the breadboard to the chassis of toycar. Stick a 9V battery to the breadboard and connect the positive and negative terminals to extreme ends of the breadboard. Provide 9V to supply pin of the arduino. Plug the L293D motor driver IC on the bread board.

Connect the L293D IC 1,8,9,16 pins to 9V battery and 4,5,12,13 pins to ground. The D2, D3, D4,D5 pins of arduino are connected to 2,7,10,15 pins of L293D IC respectively. The motor positive ends are connected to 3,11 pins of L293D IC and negative terminal are connected

to 6,11 pins of L293D IC. Connect the HC05 bluetooth TX, RX, Vcc, GND pins to D0, D1, 5V, GND pins of arduino.

Dump the code in arduino using IDE. Install google API "Arduino Bluetooth controller" using google playstore. Open the app and connect to HC-05.Open voice control section in the app and tap to give the

commands as left,right,forward,backward and stop.

By giving the command using voice controller the car moves as the given direction.

INTRODUCTION

Speech signals are the most important means of communication in human beings. Almost every conversation to interact is done by means of voice signals. Sounds and various speech signals can be converted into electrical form using a microphone. Voice recognition is a technology which is used to convert the speech signals into a computer text format. This voice recognition technology can be used to control and generate speech acknowledgement using some external server. Robotvoice has the ability to understand thousands of voice commands and perform required action. The voice recognition is a bit difficult task because each person has his own accent. For that, Robot voice uses Bit Voicer Server which supports 17 languages from 26 countries and regions.

COMPONENTS USED:

- Arduino UNO+cable
- Bluetooth module
- 3 tyre bot frame
- 2 tyres 360degree wheel
- 2 dc motor
- 9V battery+cable
- Battery holder+battries(AA)
- IC –Motordriver
- Wires

ARDUINO

Over the years Arduino has been the brain of thousands of projects, from everyday objects

to complex scientific instruments. Arduino is an opensource electronics platform based on

easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

BLUETOOTH

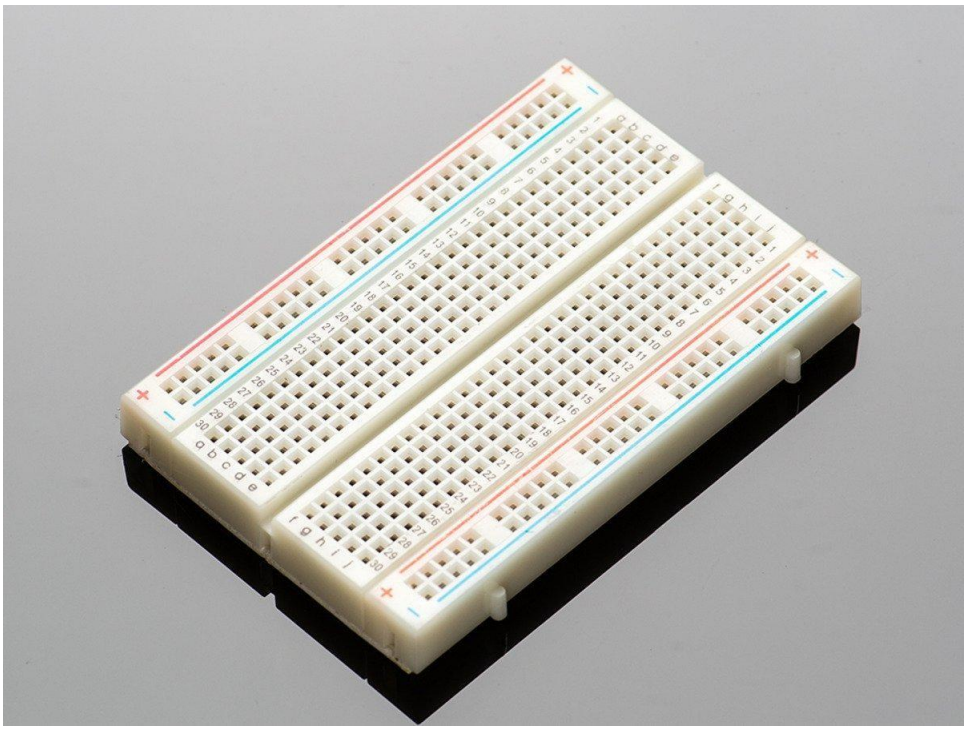
Bluetooth is the name given to a new technology standard using shortrange radio links, intended to replace the cable(s) connecting portable and/or fixed electronic devices. The standard defines a uniform structure for a wide range of devices to communicate with each other, with minimal user effort.

Its key features are robustness, low complexity, low power and low cost. The technology also offers wireless access to LANs, PSTN, the mobile phone network and the Internet for a host of home appliances and portable handheld interfaces.

Bluetooth could also be used in home networking applications. With increasing numbers of homes having multiple PCs, the need for networks that are simple to install and maintain, is growing. There is also the commercial need to provide "information push" capabilities, which is important for handheld and other such mobile devices and this has been partially incorporated in Bluetooth. Bluetooth's main strength is its ability to simultaneously handle both data and voice transmissions, allowing such innovative solutions as a mobile hands-free headset for voice calls, print to fax capability, and automatically synchronizing PDA, laptop, and cell phone address book applications.

These uses suggest that a technology like Bluetooth is extremely useful and will have a significant effect on the way information is accessed and used.

BREAD BOARD



A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in

electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate. The breadboard has strips of metal underneath the board and connect the holes on the top of the board. The top and bottom rows of holes are connected horizontally and split in the middle while the remaining holes are connected vertically.

What Is Motor Driver IC?

A motor driver IC is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver ICs act as an interface between microprocessors in robots and the motors in the robot. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. For this tutorial we will be referring the motor driver

IC as L293D only. L293D has 16 pins, they are comprised as follows:

Ground Pins - 4

Input Pins - 4

Output Pins - 4

Enable pins - 2

Voltage Pins – 2

Motor Driver ICs are primarily used in autonomous robotics only. Also most microprocessors operate at low voltages and require a small amount of current to operate while the motors require a relatively higher voltages and current . Thus current cannot be supplied to the motors from the microprocessor. This is the primary need for the motor driver IC.

DESIGN METHODOLOGY

CONSTRUCTIONS

Building the Circuit on Breadboard and Setup Chassis

Now Arduino nano is the brains of the project for ours. And we would use Bluetooth connectivity feature for controlling the car with smartphone.

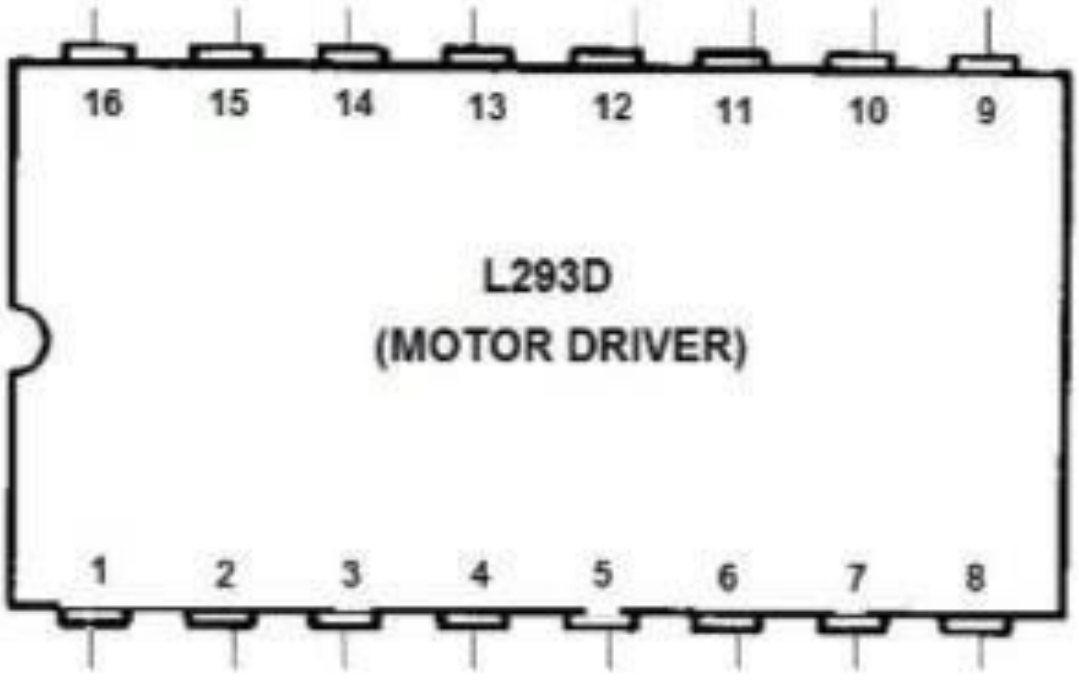
Now the wires represent the 4 output that would control the motor driver. Those 4 logic levels actually are the inputs of the motor driver and the motor driver uses that logic levels to move as per the logic levels are fed. And the arduino controls that.....means that it enables

the driver to move both motors forward or backward or reverse or move right or left or just stop. This is accomplished in the code.

So see the diagrams above and then connect the motor driver inputs. Then connect the motors at the output with a couple of screws and fix the wheels . I have connected my L293 driver as per it's connection. Check your own driver, search over the net and datasheets and connect as per required.

Fix the motors with screws and fix the motor driver and breadboard with double sided tapes or simple tape. Also fix the castor wheel.See pic. Your chassis can be different so check it carefully.Attach wheels

CONNECTIONS



Power	L293D			
9V	1	8	9	16
GND	4	5	12	13

Arduino	D2	D3	D4	D5
L293D	2	7	10	15

Motor	+		-	
L293D	3	11	6	14

Arduino	D0	D1	5V	GND
HC05	TX	RX	Vcc	GND

Connect the L293D pins according to table

- Connect 9v to 1,8,9,16pins of L293D motor drive
- Connect arduino board D2 to 2 nd pin of L293D motor drive
- Connect arduino board D3 to 7 th pin of L293D motor drive
- Connect arduino board D4 to 10 th pin of L293D motor drive
- Connect arduino board D5 to 15 th pin of L293D motor drive Connect 1 st motor positive to 3 rd pin of L293D motor drive
- Connect 2 nd motor positive to 11 th pin of L293D motor drive
- Connect 1 st motor negative to 6 th pin of L293D motor drive
- Connect 2 nd motor negative to 14 th pin of L293D motor drive
- Connect arduino board D0 to TX of HC05 bluetooth module

- Connect arduino board D1 to RX of HC05 bluetooth module
- Connect arduino board 5V to Vcc of HC05 bluetooth module
- Connect arduino board GND to GND of HC05 bluetooth module

WORKING

Now Upload the Code and Attach Power Source CODE:

```
/*Toy car using Bluetooth and voice recognition*/

#include<stdio.h>

int main( ) {
 int motor_input1=2;
int motor_input2=3;
 int motor_input3=4;
 int motor_input4=5;
String voice="";
 voidsetup()
 {
 Serial.begin(9600);
pinMode(motor_input1, OUTPUT);   //RIGHT MOTOR
 pinMode(motor_input2, OUTPUT);   //RIGHT MOTOR
 pinMode(motor_input3, OUTPUT);   //LEFT MOTOR
 pinMode(motor_input4, OUTPUT);   //LEFT MOTOR
}
voidloop()
```

```
{
while(Serial.available()>0)
   {
delay(10);
char c=Serial.read();
      voice+=c;
 }
 if (voice.length() >0)
 {
 //Serial.println(voice);
 if(voice=="forward")
    {
 digitalWrite(motor_input1, HIGH);
 digitalWrite(motor_input2, LOW);
digitalWrite(motor_input3, HIGH);
 digitalWrite(motor_input4, LOW);
 Serial.println("forward");
 delay(800);
  voice = "";
  }
else  if(voice=="back")
   {
digitalWrite(motor_input1, LOW);
digitalWrite(motor_input2, HIGH);
```

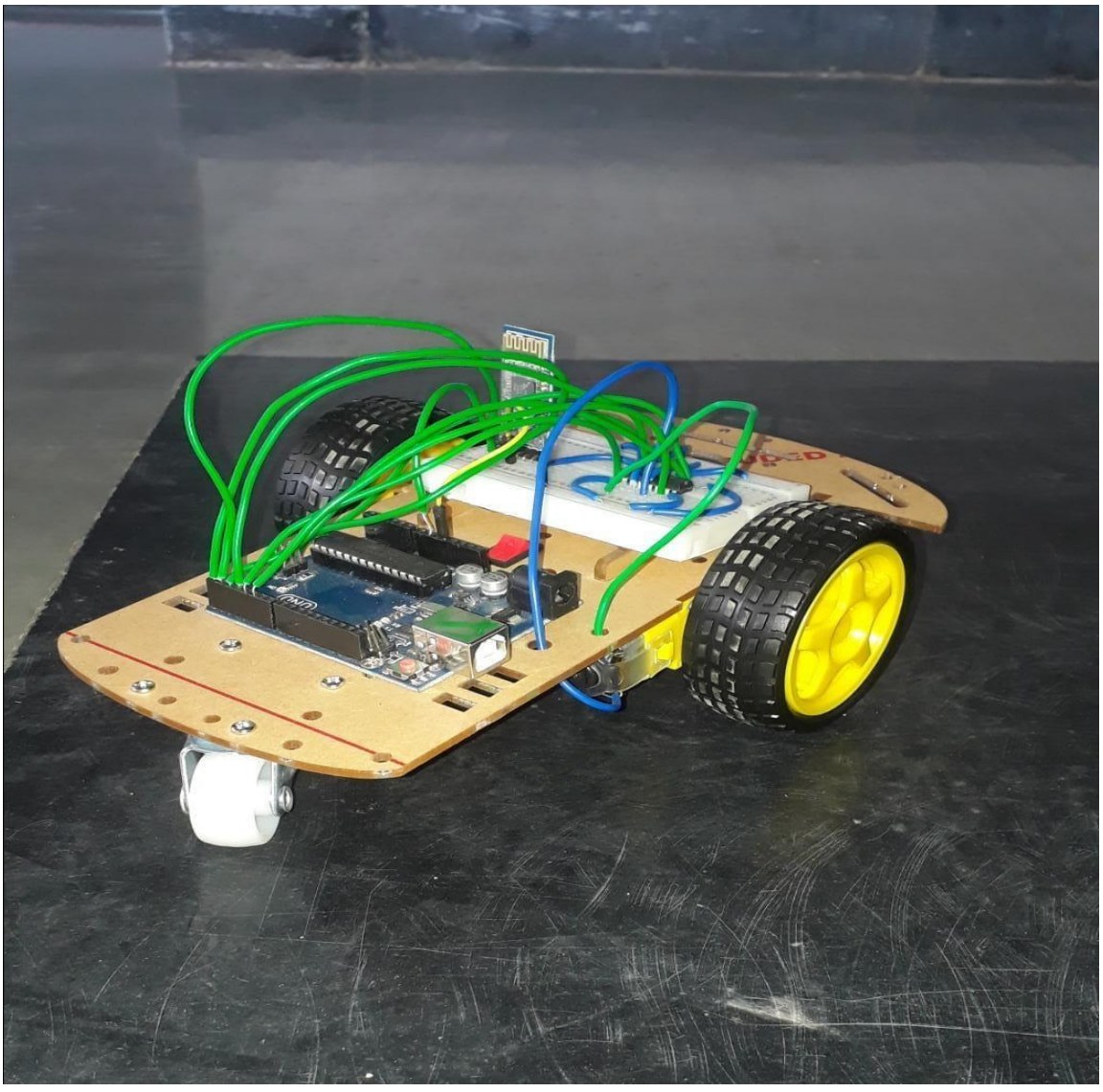
```
digitalWrite(motor_input3, LOW);
digitalWrite(motor_input4, HIGH);
Serial.println("back");
delay(800);
    voice = "";
    }
 else  if(voice=="left")
    {
 digitalWrite(motor_input1, HIGH);
 digitalWrite(motor_input2, LOW);
 digitalWrite(motor_input3, LOW);
  digitalWrite(motor_input4, HIGH);
  Serial.println("left");
  delay(800);
   voice = "";
    }
 else
  if(voice=="right")
    {
 digitalWrite(motor_input1, LOW);
 digitalWrite(motor_input2, HIGH);
 digitalWrite(motor_input3, HIGH);
digitalWrite(motor_input4, LOW);
```

```
 Serial.println("right");
delay(800);
    voice = "";
    }
 else
 if(voice=="stop")
     {
 digitalWrite(motor_input1, LOW);
 digitalWrite(motor_input2, LOW);
  digitalWrite(motor_input3, LOW);
 digitalWrite(motor_input4, LOW);
 Serial.println("stop");
 delay(800);
    voice = "";
     }
  else
     {
     voice = "";
   }
    }
   }
```

We connect the Bluetooth module with the mobile app. Once done, the commands which we give through the mobile get sent to the Arduino via the module. We accept character by character from the serial buffer sent by the app and combine them to form a string.

ATTACHMENTS

TOY CAR



APPLICATION LINK

- ✓ **https://play.google.com/store/apps/details?id=com.satech.arduin ocontroller**

Toy Car as AI Bot

Raktim Gautam Goswami[1], Abhishek Bairagi[2], Alok Ranjan Kesari[3] & G V V Sharma[4]

CONTENTS

Abstract—**A Toycar is controlled using bluetooth and google voice recognition software.**

1 Hardware Setup

1.1 Assemble the motors, chassis and wheels to build the toycar.

1.2 Stick the breadboard to the chassis of the toycar.

1.3 Stick a 9V battery to the breadboard and connect the positive and negative terminals to extreme ends of the breadboard.

1.4 Stick a 9V battery to the breadboard and connect the positive and negative terminals to extreme ends of the breadboard.

1.5 Provide 9V to the supply pin of the Arduino.

1.6 Plug the L293D motor driver IC in Fig. 1.6 on the breadboard.

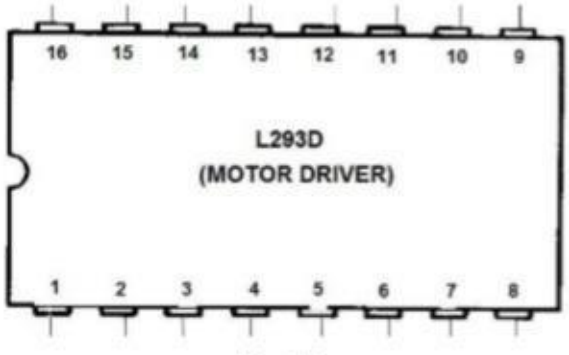


Fig. 1.6

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Power	L293D			
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Arduino	D2	D3	D4	D5
L293D	2	7	10	15

Motor	+		-	
L293D	3	11	6	14

TABLE 1.7

Arduino	D0	D1	5V	GND
HC05	TX	RX	Vcc	GND

TABLE 1.8

1.7 Connect the L293D pins according to Table 1.7.

1.8 Connect the HC05 pins according to Table 1.8.

2 Implementation

2.1 Dump the following code in Arduino using its IDE.

```
wget https://raw.githubusercontent.com/
    gadepall/EE1390/master/bot/codes/vcb.cpp
```

2.2 Install Google API "Arduino Bluetooth Controller" using google play-store

2.3 Open the app and connect to HC-05.

2.4 Open voice control section in the app and tap to give following commands.
Left, Right, Forward, Back & Stop

GLOSSARY

- **Ic**- Intrigrated circuit sometimes called a chip or microchip.
- **Bluettoth**-Bluetooth is an open wireless technology for transmitting fixed and mobile electronic data over a short distance.
- **Arduino**-Arduino is a open source electronic platform based on easy to use hardware and software.
- **BreadBoard**-A board for making an experimental model of an electronic circuit.
- **Module**-Each of a set of a standardized parts of independent units that can be used to construct a more complex structure such as an item of furniture or a building.
- **Motor driver**-They act as a bridge between the controller and motor in a motor drive.

Significance

As car technology improves, more features will be added to cars and these features will most likely distract a driver. Voice commands for cars, according to CNET, should allow a driver to issue commands and not be distracted. CNET states that Nuance is suggesting that in the future they will create a software that resembles Siri, but for cars.Most speech recognition software on the market today only have about 50 to 60 voice commands, but Ford Sync has 10,000. However, CNET suggest that even 10,000 voice commands is not sufficient given the complexity and the variety of tasks a user may want to do while driving.Voice command for cars is different from voice command for mobile phones and for

computers because a driver may use the feature to look for nearby restaurants, look for gas, driving directions, road conditions, and the location of the nearest hotel. Currently, technology allows a driver to issue voice commands on both a portable GPS like a Garmin and a car manufacturer navigation system.

Benefits of Voice-Based Mobile Apps

- **Easier and faster**: Initially, the only option to deliver a command was with a keypad. With voice recognition, communication with devices has become faster and more natural.
- **Works precisely**:Errorscan be avoided and users can focus on what they're doing instead of looking at their phone.
- **Improved productivity**: Voice-based mobile apps provide streamlined operations that enhance operational productivity.
- **Safety improvement**: Voice technology is quick and safe to interpret and follow, and requires less training.
- **Multiple uses**: Voice-based orders through mobile devices help to carry out tasks.

Conclusion

Voice recognition technology has indeed come a long way and with the intense competition between mobile app development companies, the advancement of voice recognition technology advancements is a long road ahead of us.

REFERENCE

- ✓ https://play.google.com/store/apps/details?id=com.broxcode.arduinobluetoothfree
- ✓ https://github.com/gadepall/EE1390/blob/master/bot/codes/vcb.cpp