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Arduino Based Bluetooth Controlled Robotic Car

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Abstract - BLUETOOTH CONTROLLED ROBOTIC CAR(BCRC) is a mobile robot whose motions can be controlled by the user by giving a specific voice, or other commands using a Bluetooth device. In This Bluetooth Model, we are using voice commands to control the Robotic car. The speech is received by a microphone and processed by the voice module. When a command for the robot is recognized, then the voice module sends a command message to the robot's microcontroller.

This project V Controlled Robotic Vehicle helps to control robots through voice commands received via an android application. The integration of the control unit with a Bluetooth device is done to capture and read the voice commands. The robotic vehicle then operates as per the command received the via android application.

For this Atmel AVR Atmega 328microcontroller is integrated in the system which makes it possible to operate the vehicle via the android application.

Key Words: Arduino Uno, Bluetooth Model (HC 05), Atmega 328 Microcontroller, Piezo Electric Buzzer, L293D Motor driver IC, etc.

1. INTRODUCTION

The BLUETOOTH CONTROLLED ROBOTIC CAR is controlled through voice commands given by the user who is operating the system. These voice command needs to be given through an android app that is installed on the user's android mobile. Please note that users should have a good internet connection in order to have a smooth operation of the android application. Speech recognition is done within the android app and then a respective command is sent to the voice-controlled robot vehicle. The microcontroller fitted to the Robot decodes these commands and gives an appropriate command to the motors connected to the robot.

In a Bluetooth voice-operated robot the robotic vehicle movement is controlled via voice command. This is an Arduino Uno base project. In this project, we use a Bluetooth device to receive commands from users. Users use the android application to give the command to the Bluetooth device. The Bluetooth device receives a command from the application and transmits the same to Atmel AVR AT mega 328 microcontrollers then the microcontroller controls the robotic vehicle as per command. The microcontroller is the main unit of our project. It's a central processing unit (CPU) of the Robot. It receives various commands from the Bluetooth decoder and gives the respective output motor driver ICs. This robotic vehicle operated on 5 commands forward, reverse, left, right, and stop. In this project, we use Atmel AVR AT mega 328 microcontrollers after receiving the above command microcontroller to move the motors as per command. The communication between the android application and Bluetooth is serial communication. The robot is controlled by an Android mobile phone that connects to a Bluetooth decoder attached to the robot. Thus, we need 1 mobile & 1 Bluetooth decoder. A Bluetooth decoder is always connected to the Robot and another mobile phone is used to control the movements of the Robot. It consists of a Bluetooth decoder. It gives ASCII code output. This receiver enables wireless transmission & reception of serial data. It has 10 meters range. DC motor used for robotic vehicle movement.

1.1 OBJECTIVE

- The main objective of the project is to control the robotic car in the desired position.
- The project is to control the robot by the voice or push button.
- The project is designed to control a robotic vehicle by voice and manual control or remote operation

1.2 NEED OF PROJECT

The main objective of developing this Bluetooth vehicle microcontroller project is to control Vehicles according to human voice commands sent through Bluetooth. Project Architecture follows with human input voice and amplifiers, when a human sends a voice then it automatically converts the voice from Analog to digital signals via converters, here bandpass filters are connected to fingerprint templates to generate fingerprints, this module works with comparing and controlling digital signals and finally, this signal goes to the vehicle.

If the vehicle received the correct signal which is sent to be used then it can respond as per user project development. Now a day all robotics are working with signals and voice to control their functionality. Microcontrollers, Mat lab, and Micro semiconductors are used to develop this electronics system. This application is mainly useful for speech-enabled vehicle design and development. The advantages of this Voice recognition vehicle follows we control any electrical or electronic device with voice signals.

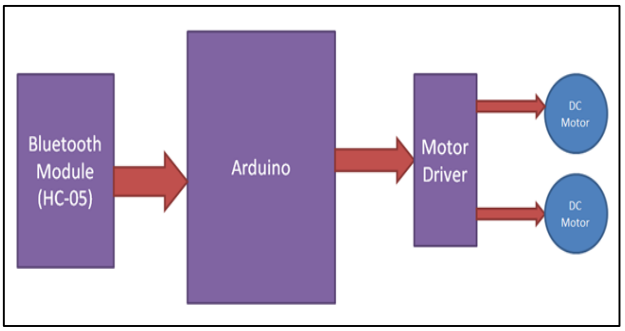


Fig 1.2: PROPOSED SYSTEM

The Bluetooth-controlled car moves according to the button touched in the android Bluetooth mobile app. To run this project first we need to download the Bluetooth app from the Google play store. We can use any Bluetooth app that supports or can send data. Here are some apps' names that might work correctly.

- Bluetooth SPP Protocol
- Bluetooth controller

2. METHODOLOGY

The main objective of developing this Bluetooth Voice recognition vehicle microcontroller project is to control Vehicles according to human voice commands. Project Architecture follows with human input voice, when human sends voice then it automatically converts the voice from Analog to digital signals via converters, this module works with comparing and controlling digital signals and finally, this signal goes to the vehicle. If the vehicle received the correct signal which is sent by the user, then it can respond as per user project development. Now a day all robotics are working with signals and voice to control their functionality. Microcontrollers, Mat lab, and Micro semiconductors are used to develop this electronics system. This application is mainly useful for speech-enabled vehicle design and development. Advantages of this Voice recognition vehicle follow we control any electrical or electronic device with voice signals

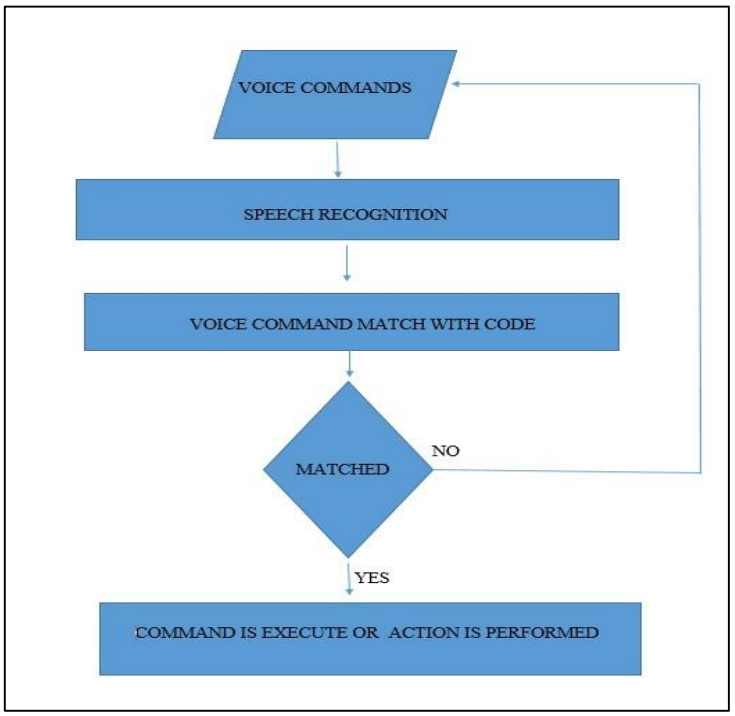
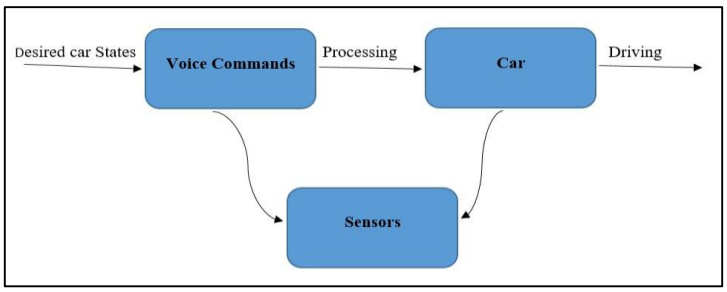


FIG 2.1: DATA FLOW DIAGRAM

3. SYSTEM DEVOLOPMENT



3.1: BLOCK DIAGRAM OF SYSTEM

Fig 3.1 is the block diagram Bluetooth control robotic car. The car is controlled by voice command. The human voice is recognized, and the voice command is converted into a text command. This text command is compared with code written in Arduino Uno programming, if the command matches the car moving forward, back, left,

or right this process is worked through by the Bluetooth module. This robotic car has another sensor like L293d motor driving IC,

LDR, LED, SR-04 ULTRASONIC SENSOR ETC.

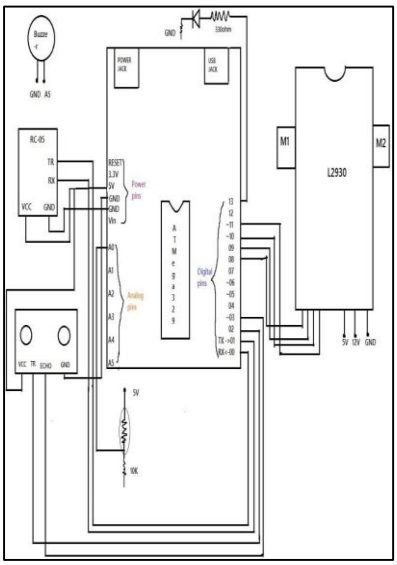


Fig 3.2 SYSTEM ARCHITECTURE

Fig 3.2 Shown Bluetooth controlling robotics car using Arduino system Architecture. In this different circuit board Connected to the Arduino circuit for making voice-controlled. +5 V power supply given to the Arduino circuit to Active Arduino board. 6 Analog pins are used for Analog signals and 13 digital pins are used for receiving and transmitting signals.

HC SR 05 is a Bluetooth module connected to an Arduino Uno board for establishing serial communication between mobile and robot. HC SR 05 module has 4 pins VCC, ground, RDX, and Txd. The VCC is connected to+5volt pin of Arduino board, Gnd pin Hc 05 is connected to ground pin of Arduino board, RDX pin i.e., receive is connected to TX pin of Arduino board, Txd pin i.e. Transmit Pin (TX) Connected to the Receiver Pin (Rx) of Arduino Circuit. The receiver pin of HR SC 05 Connects to the TX pin of the Arduino Circuit.

Ultrasonic sensor HC SR has 4 pins. Vcc pin connects to the Power Supply pin (Vcc) and GND pin connects to the GND of the Arduino Circuit. Trigger input signal pin connected to the Pin 2 Digital pin and echo output signal pins connected to the Pin 3 of Arduino Circuit board.

The photoelectric buzzer has Two Pins One pin connected to the Digital of Arduino and one pin connected to the

GND pin of Arduino Circuit board. In this system, two LEDs are used. Two pins of Led are connected to the Analog pin of the Arduino circuit for Analog signal input and output. Two remaining two pins of Led connect to GND using a 10K register.

The L293D module is used to run DC motors. Two DC motors are connected to the L293D module. Each motor has two connections this pin is connected to the digital pin of the Arduino Uno board. One is Vcc pin L293D IC required an s+5V power supply to run. This pin another Vcc pin is used to give power supply to run DC motors. Motor required +12V power supply and last is ground in is connect to GND pin of Arduino Uno circuit board.

4. PROGRAMMING CODES

```
char data;
 int m1_c = 8;
int m1_a = 9;
 int m2_c = 10;
 int m2_a = 11;
const int trigPin1 = 6;
 const int echoPin1 = 7;
 int buz = A5;
int led1 = A4;
int led2 = A3;
void setup ()
 Serial.begin(9600);
 pinMode (m1_c, OUTPUT);
pinMode (m1_a, OUTPUT);
 pinMode (m2_c, OUTPUT);
 pinMode (m2_a, OUTPUT);
 pinMode (buz, OUTPUT);
 pinMode (led1, OUTPUT);
pinMode (led2, OUTPUT);


      digitalWrite (m1_c, HIGH);
     digitalWrite (m1_a, HIGH);
     digitalWrite (m2_c, HIGH);
    digitalWrite (m2_a, HIGH);
     digitalWrite (buz, LOW);
    digitalWrite (led1, LOW);
     digitalWrite (led2, LOW);
```

```
 delay (1000);
}
void loop ()
 {
 data = Serial.read();
 long duration1, inches1, cm1;
pinMode (trigPin1, OUTPUT);
 digitalWrite (trigPin1, LOW);
delayMicroseconds (2);
digitalWrite (trigPin1, HIGH);

 delayMicroseconds (10);
digitalWrite (trigPin1, LOW);
 pinMode (echoPin1, INPUT);
duration1 = pulseIn (echoPin1, HIGH);
 inches1 = microsecondsToInches (duration1);
 cm1 = microsecondsToCentimeters (duration1);

 if (analogRead(A0) <= 500)
 {
  digitalWrite (led1, HIGH);    digitalWrite (led2, HIGH);
 }  else
 {
  digitalWrite (led1, LOW);    digitalWrite (led2, LOW);
 }

 if (cm1 >= 20)
 {

 digitalWrite (buz, LOW);

  if (data == 'a')
  {
    digitalWrite (m1_c, HIGH);
digitalWrite (m1_a, LOW);
digitalWrite (m2_c, HIGH);
 digitalWrite (m2_a, LOW);
  delay (10);
 }
  if (data == 'b')
  {

    digitalWrite (m1_c, LOW);
digitalWrite (m1_a, HIGH);
  digitalWrite (m2_c, LOW);
digitalWrite (m2_a, HIGH);
 delay (10);
  }
 if (data == 'c')
  {

   digitalWrite (m1_c, HIGH);
  digitalWrite (m1_a, LOW);
 digitalWrite (m2_c, HIGH);
 digitalWrite (m2_a, HIGH);
  delay (10);
 }
 if (data == 'd')
  {
   digitalWrite (m1_c, HIGH);
  digitalWrite (m1_a, HIGH);
 digitalWrite (m2_c, HIGH);
  digitalWrite (m2_a, LOW);
  delay (10);
 }
 if (data == 'e')
{
```

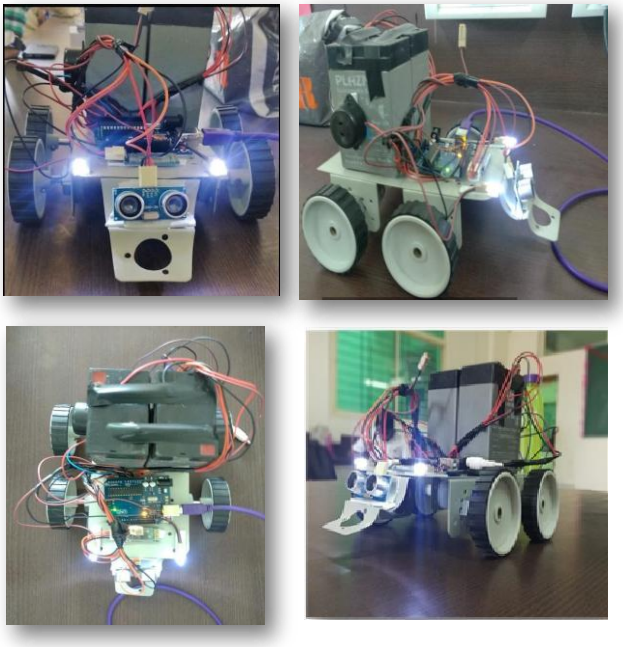
5. CONCLUSIONS

The integration of voice reorganization system into robotics vehicle help disabled people.

The speech control system, though quite simple, shows the ability to apply speech reorganization techniques to control the application.

The method provides real-time operation, in this system android application is used to recognize human voice and is converted to text, the text is further processed and used to control robotics movements

6. PROJECT OUTPUT



7. RESULTS

- DC motor rotating properly.
- Wireless connection password working properly.
- Obstacle detection is working good.
- Car working on all commands.
- All the devices working properly.

8. REFERENCES

[1] Aniket R. Yeole, Sapana M. Bramhankar, Monali D. Wani, "Smart Phone Controlled Robot Using ATMEGA328 Microcontroller", ISO 3297: 2007 Pg:352-356

[2] R. M. Narayana, Harsha Chapala, "Voice Control Robot using Android Application ", Volume :4, ISSN: 2277 5668 Pg:332-337

[3] Ritika Pahuja, Narender Kumar, "Android Mobile Phone Controlled Bluetooth Robot Using 8051 Microcontroller", ISSN (Online): Pg:2347 – 3878

[4] K. Kannan, Dr. J. Selvakumar, "Arduino Based BLUETOOTH CONTROLLED ROBOTIC CAR", Volume:02 issue :01, Mar-2015 ISSN: 2395-0072

[5] Mrumal.K. Pathak, Javed Khan, "ROBOT CONTROL DESIGN USING ANDROID SMARTPHONE ",2 Feb 2015, ISSN :2347-5471

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