International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 06 | June 2020 www.irjet.net p-ISSN: 2395-0072

Voice Controlled Bluetooth Vehicle

Shreyash Roushan[1], Ajay Kaushik[2]

[1]Student, Galgotias University, Uttar Pradesh
[2]Assistant Professor, SCSE, Galgotias University, Uttar Pradesh

---

Abstract - *This paper presents a methodology which proposes to use human speech as a continuous mode of control to drive a simple vehicle. The voice is fed into an Android application which transmits the signal to the receiver on board the vehicle. An arduino which will interface with the Bluetooth module on board the vehicle will provide the communication channel to correspond with the android device. This project is an application of vehicle automation and can be used to delivery essential commodities to high risk areas during catastrophes like recent COVID 19 outbreak. The main advantage of this setup is its long range, so it can be operated from a safe distance without risking further exposure to virus or any other possible threat.*

Key Words: **Arduino, Speech to Text, Bluetooth Module, DC Motor, IDE, Android.**

1. INTRODUCTION

Robotics as a discipline has seen unparalleled development since the early 1960s. It finds application in industries, manufacturing, bio engineering, space exploration and recreational activities like drones. Like any other robotic application this project also has three major dimensions –

(a) Mechanical Construction (b) Electrical Circuitry (c) Computer Programme.

The mechanical construction of the project involves the frame of the vehicle and two DC motors which drive the vehicle. The electronic circuitry comprises of the bluetooth module which facilitates the communication, Arduino Uno which interfaces with the motor driver is also a part of the circuitry. The third is the computer programme written in IDE (Arduino) which acts as the driver code for the vehicle. The driver code is installed on the arduino which process the command received, interacts accordingly with the motor driver which makes the vehicle move.

1.1 Literature Review

Previously many projects have ventured into the realm of vehicle which communicates with its operator using voice in one way or the other. These projects function around the basic tenet of voice recognition or speech to text, the difference arises in the implementation vis-a-vis driving code, sensors or mechanical parts used. Some also include additional features like obstacle detection, conformation on receiving command, automatic breaking and speed limiting system. The purpose is to make innovation in the field of vehicle automation so that it caters to multi-dimensional requirements from critical applications like space exploration and military use to humanitarian innovation to help those with disabilities to drive themselves. Some the projects might require 'training' to better adapt to the voice of the user resulting in increased accuracy. While those which do not require training are called speaker independent system. The voice commands can be a fixed set of commands (as in this project) while more advanced ones come with natural speech recognition which can process complete sentences or phrases in multiple languages and accents of the speaker.

2. METHODOLOGY

This project use an android smartphone as the transmitter to which commands are fed. Speech to text conversion takes place at this level using Google Speech to Text package available on the android device itself. The smartphone communicates with the vehicle with HC-05 bluetooth module which acts as an interface between the two. The HC-05 receives the signal and transmits it further to the arduino uno which is micro-controller based board which further process the signal and using the driver code fed to it commands the motor controller accordingly which in turn drives the vehicle using the two DC motors on each wheel providing the mechanical energy needed to do so.

2.1 Hardware

Android Smartphone – User speaks into the microphone of the device and the command is converted from speech to text and communicated to the vehicle via the bluetooth module. It also houses the voice control application.

HC-05 Bluetooth Module – It is a Bluetooth Serial Port Protocol module designed to wirelessly extend your serial interface. It helps add full duplex wireless functionality to your project. This facilitates seamless communication between the smartphone and the Arduino Uno micro-controller.

Arduino Uno – The Arduino Uno is an open source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. It helps process the incoming signal and command the motor driver to operate the vehicle as per the requirement. It has 14 digital input/output pins and can connect to a computer using USB and can be powered by a AC-to-DC adapter or battery.

L293D Motor Driver – It is a 12 Pin IC which is used to control DC or Stepper Motor. It can control up to 2 DC motors and alter their speed as well as direction.

DC Motors – This project uses two DC motors one on each wheel. Motor runs smoothly from 4V to 12V and gives 300 RPM at 12V. Motor has 8mm diameter, 17.5mm length drive shaft with D shape for excellent coupling.

2.2 Software

Arduino IDE – The Arduino Integrated Development Environment (IDE) is a cross platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards.

BT Voice Control for Arduino – It is an android application used to pass voice command over Bluetooth to the Arduino Uno.

Table – 1: Commands

S. No	Command	Function
1	Forward	Move forward.
2	Backward	Move backward.
3	Left	•If previous command = forward, then vehicle turns left & continues to move forward. • If previous command = backward, then vehicle turns left & continues to move backward.
4	Right	• If previous command = forward, then vehicle turns right & continues to move forward. • If previous command = backward, then vehicle turns right & continues to move backward.
5	Stop	Vehicle Stops.

2.3 Implementation (Syntax)

1. Start.
2. Establish connection between the smartphone and the vehicle.
3. Check if connection established.
4. If connection established, user will speak the predefined commands into the microphone of the smartphone.
5. Speech to Text conversion occurs and is further relayed.
6. Command is transmitted to the Bluetooth module.
7. It is further communicated with the Arduino Uno which further processes the command.
8. Arduino Uno commands the Motor Controller IC accordingly.

9. The Motor Controller in turn runs the two DC motors and vehicle executes the command as per user's desire.
10. Stop.

3. CONCLUSIONS

In today's fast moving world driven by globalisation and technological advances smart solution are required to tackle daily life issues. This voice controlled robotic vehicle is a simple demonstration of that fact. With the advent of speech recognition systems we are able to explore new avenues to data sharing and processing. The ability of this project to be controlled from a safe distance allows it to be of potential use in many promising sectors. This simple robot can find applications in various fields like –

- Hands free delivery of essential commodities to high risk areas in cases of catastrophes like COVID 19 outbreak, earthquake or flood.
- Military Operations
- Surveillance
- Recreational Activities

This project can further be improved by incorporating the concepts of following –
- Internet of Things – Will allow the user to control the vehicle from anywhere in the world.
- Machine Learning – Will allow the vehicle to be trained or to learn by itself so that it become truly autonomous.

REFERENCES

[1] A.N Khan, K. Priya, S. Kumar-"Implementation of Voice- Controlled Robotic Vehicle with Automatic Braking and Obstacle Avoidance". In INROADS Vol. 7 (Special Issue), 2018

[2] Prof. B. Jolad, M. Arora, R. Ganu, C. Bhatia -"Voice Controlled Robotic Vehicle". In IRJET Volume: 04 Issue: 06, June-2017

[3] Dr. M. Narayana, A. Alishety, H. Chapala -"Voice Controlled Robot using Android Application". In International Journal of Engineering Innovation and Research Volume: 04 Issue: 02