

VOICE CONTROLLED ROBOT (CAR)

MAJOR PROJECT REPORT

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Abstract

This project was developed in a way that the robot is controlled by voice commands. An android application with a microcontroller is used for required tasks. The connection between the android app and the vehicle is facilitated with Bluetooth technology. The robot is controlled by buttons on the application or by spoken commands of the user. The movement of the robot is facilitated by the two dc servo motors connected with microcontroller at the receiver side. The commands from the application is converted in to digital signals by the Bluetooth RF transmitter for an appropriate range (about 100 meters) to the robot. At the receiver end the data gets decoded by the receiver and is fed to the microcontroller which drives the DC motors for the necessary work. The aim of Voice Controlled Robotic Vehicle is to perform the required task by listening to the commands of the user. A prior preparatory session is needed for the smooth operation the robot by the user. For the same a code is used for giving instruction to the controller.

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1 Introduction

Our aim is to make a robot vehicle which can be controlled by the voice command of a person. Normally these types of systems are called as Speech Controlled Automation System (SCAS). Our design is a prototype of the above mentioned system.

The idea is to create a sort of robot which going to be driven by voice commands. The robot is remotely controlled by a mobile phone; there are many articles that show the communication between a robot and smart phone. Smart phone is a very good interface for remotely automating the robot.

It contains many features that can be helpful. In this design, an android application with a micro controller is used for the required task. The connection between the application and the robot is facilitate with Bluetooth technology. The commands issued will be relayed over through the channel and will be received by the module. The objective of voice controlled robotic vehicle (VCRV) is to listen and act on the commands of the user. Here the system requires accent training, post which the device will start understanding the commands issued; and the commands have been added by codes.

The main motive to build a VCRV is to analyze the human voice and act according to the programmed commands. The most basic commands are backward, forward, right , left and also stop the robot. The vehicle is to be controlled wirelessly with the use of android smartphone; our intention is to make a robotic vehicle with use of advanced smartphone technology in a very simple and economic way.

2 Materials and Methods

Modeling and designing of the VCRV was done by the following part available in the market and also the programming of the arduino was done and the app was developed by using app inventor on the internet.

2.1 Chassis-

A chassis is the internal framework of the artificial object which support in its construction and use Direct inclusion in abstracting services. Figure 1. Shows chassis diagram.



Figure 1

2.2 Gear Motor-

A DC motor is a class of rotary electrical machine that converts t\direct current into mechanical energy. All types of DC motors have some kind of internal mechanism either electronic or electro mechanical, so it can change the direction of flow of current in path of motor periodically. The below Figure 2. Shows the Gear Motor

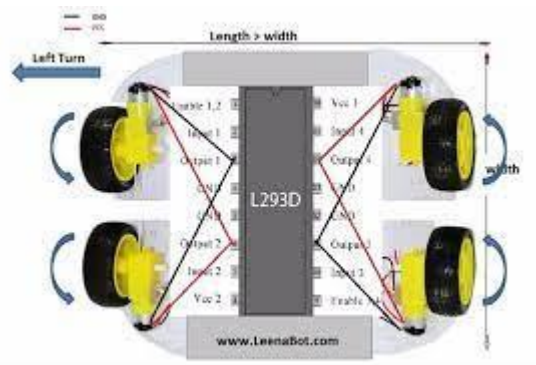


Figure 2

2.3 Wheels-

A wheel is circular block of durable and hard material which is placed in axil

about which the wheel rotates when a moment is applied by torque or gravity, thereby making one of the simple machines. When placed under a load bearing platform, the wheel turning on the horizontal axil makes it possible to transport heavy loads Figure 3. Shows the wheel of this



Figure 3

2.4 Aduino UNO Board-

Figure 4 shows Aduino UNO is an open source micro controller board placed on the micro chip ATmega328p micro controller and developed by Aduino.cc. The board has 6 Analog pins, 14 digital pins programmable with Aduino IDE via a Type B USB cable. It can power by external main volt battery.



Figure 4

2.5 L298D Motor Driver -

The L298 Driver is a high voltage high current dual bridge driver designed to accept standard TTL Logic levels and drive inductive loads. The emitter of the lower level transistors of each bridge are connected together to the corresponding external terminal can be used for the connection of an external sensing resistor Figure 5. Shows the L298D Motor Driver.

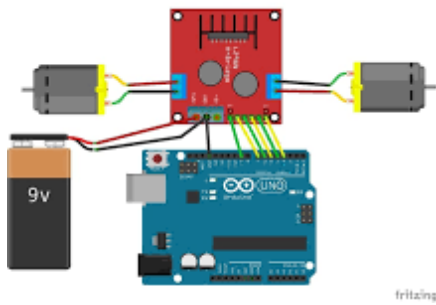


Figure 5.

2.6 HC05 Bluetooth module-

Figure 6. Shows HC05 module is a simple Bluetooth module is a simple Bluetooth serial port protocol module designed for wireless serial connection setup. It has a footprint as small as 12.7mm X 27mm. It will simplify the overall design cycle.



Figure 6

2.7 App Development-

The application to control the vehicle was coded and created using app available on the Google play store known as MIT AI2 Companion. This app was developed by MIT Figure 7. Shows MIT AI2 App.

Connection Diagram

The block diagram of the voice controlled robotic vehicle is as follows. The Figure 9. Shows the connections in the circuit are made as per the following diagram.

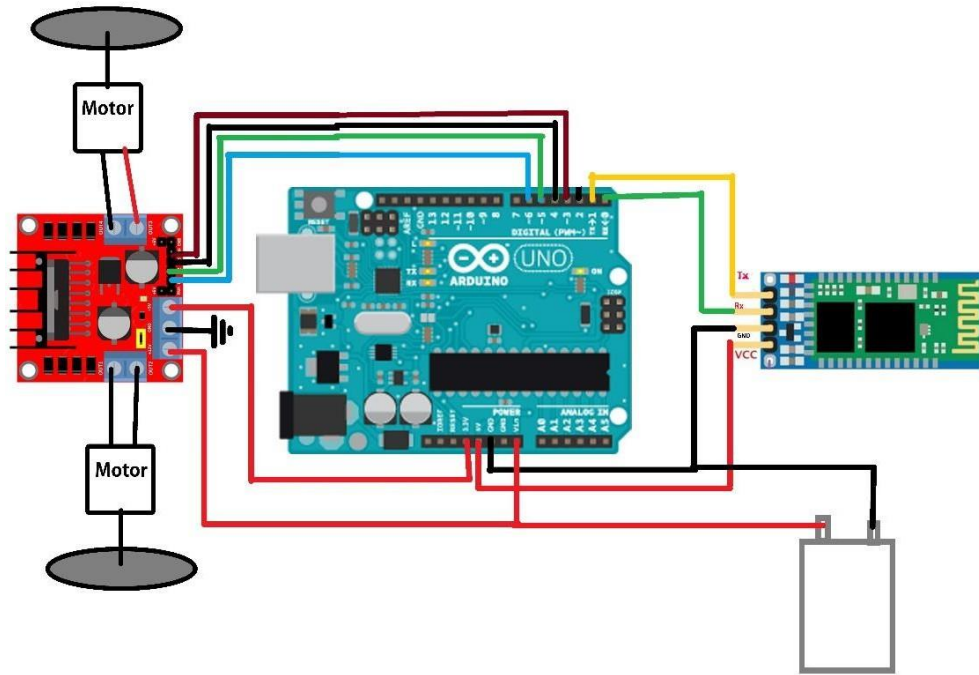


Figure 7.

3 Result and Discussion-

Human voice is identified using a microphone in the android smart phone. This voice is analyzed and converted into English words using the android operating system codes and Artificial Intelligence software. Speech recognition is the inter-disciplinary sub-field of computational linguistics that develops methodologies and technologies that enables the recognition and translation of spoken language into text by computers. It is also known as automatic speech recognition (ASR), computer speech recognition or speech to text (STT). It incorporates knowledge and research in the linguistics, computer science, and electrical engineering fields. From the technology perspective, speech recognition has a long history with several waves of major innovations. Most recently, the field has benefited from advances in deep learning and big data. The advances are evidenced not only by the surge of academic papers published in the field, but more importantly by the worldwide industry adoption of a variety of deep learning methods in designing and deploying speech recognition systems.

4 The project has several advantages and some of the are discussed below:

- It can be developed into a real-world vehicle tor transportation purposes.
- The robotic vehicle can be used where humans find difficult to reach but human voice reaches like in a small pipeline, in fire situations, in highly toxic areas Etc.

- It can be integrated with wheelchairs for assisting disabled persons.
- It can be used to bring and place small objects.
- In military applications such as observation of enemy camp using cameras.

5 Conclusion:

The “Voice Controlled Robotic Vehicle” project has many applications and in present and future. The project can be made more effective by adding features to it in the future. The project has applications in wide variety of areas such as military, home security, rescue missions, industries, medical assistance etc. We were successful in implementing a simple model of voice controlled robotic vehicle using the available resources. The implementation of this project is easy, so this robot is beneficial for human life. The Voice Control Robot is useful for disable people and monitoring purpose. It works on simple voice command, so it is easy to use. It is useful for those areas where humans can't reach. The size of this robot is small, so we can use this robot for spying purpose. It can be used for surveillance. We can implement web cam in this robot for security purpose. The voice recognition software has an accuracy and for identify a voice command and it is also highly sensitive to the surrounding noise.

6 Reference:

Links

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