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## Voice Controlling Robotic Vehicle by Bluetooth Module

**R. Rajalakshmi, Y. Sushma, T. Sowmya**

*UG Student, Department of CSE, SCSVMV Deemed University, Kanchipuram, India*

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### ABSTRACT

Voice controlled robotic vehicle (VCRV) is an advanced robotic vehicle which can be operated by the user (or) client commands. An ARM series microcontroller which is inter connected with the Arduino. And this Robotic car is connected to mobile App like AMR-voice, etc., which makes the robotic vehicle to move after getting the command from the user. The android mobile Application is connected with the Bluetooth module which is on the receiver side. The order is sent to the robot utilizing voice orders present on the android application. The speech (or) voice commands are received by a microphone which is present in the smart phone are processed by the voice module. When the voice signal commands are given to the Mobile Application, the VR module which is present in the mobile gets voice commands signals and convert the voice analog voice command signals to digital signals. Further, the digital signals are sent Bluetooth which is present on the receiver side. The Bluetooth on the robot side will receive the signals and the Arduino performs the loop execution and the motor driver which is made up with the motor connections will control the rotation of motors according to the commands given by the user.

Keywords: Arduino, Bluetooth module, motor Driver, DC motor, Battery.

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### 1. Introduction

The main concept of the project is to have control over the vehicle by using voice commands. The commands are sent through the mobile application using the HC-05 module. And another HC-05 module present on the robotic vehicle will get the signals and act according to the command. In the side of the Transmitter, the commands were commanded to the mobile app (AMR Voice) with the help of the google assistant which is connected with the app in the back-end. The Bluetooth Module on the robot side is paired with the Bluetooth application which is available in the mobile. The mobile application will function in such a way that the voice commands given are received by the micro-phon and those voice commands are converted to digital signals. These digital signals are then transmitted to the robot via Bluetooth transceiver module and are sent to the transceiver controller. The Bluetooth which is connected to the robot will get the orders. The controller contrasts these advanced signs and the put away program orders in the code which is as of now embedded in to the Arduino and convert them into voice strings. The voice string is then used to run the DC engines for the ideal time frame. And furthermore, the mechanical vehicle can be provided the orders by utilizing the SRC program. We can prepare and program the SRC to perceive the special words. The SRC can be effectively interfaced to the robot's microprocessor.

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### 2. Literature Survey

[1] It proposed the design of a robot that can be controlled using an application running on an android phone. It sends control order by means of Bluetooth which has certain highlights like controlling the speed of the engine, detecting and offering the data to mobile about the course and separation of the robot from the closest obstruction.[2]this voice controlled smart robot comes with enhanced develop smart. [3]the robot is moving by just clicking on the cell

\* Corresponding author.

E-mail address: [sushmayadlapalli199@gmail.com](mailto:sushmayadlapalli199@gmail.com)

phone with android operation system.[4]Users can save costs when using voice recognition technology.

### 3. Design

#### 3.1 Architecture of Voice Controlled Robotic Vehicle

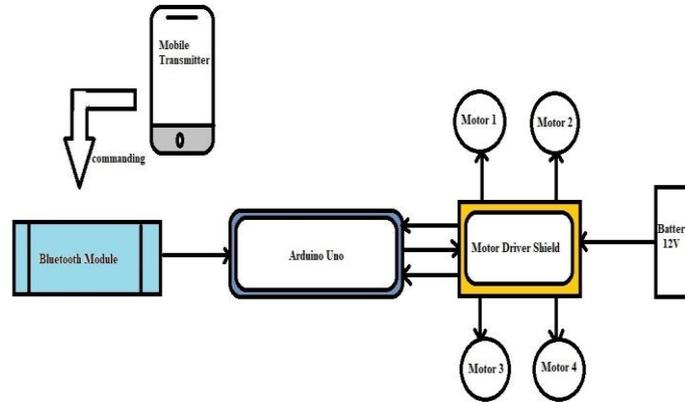


Fig-1 ( Voice Controlled Robotic Vehicle)

**Transmitter Side:-** The Mobile application is present in the smart phone which will access the voice commands through the Bluetooth module present in the mobile and converts the voice commands to digital signals and transfers the signals to the Robot.

**Receiver (or) Robot Side :-**The digital signals which are transmitted from the transmitter are received by the Bluetooth module present in the Robot will receive the signals and direct the signals to the microprocessor which is present in the Arduino will check with the stored commands and at the execution the DC motors will start moving according to the given command and the motor rotations are controlled by motor driver which is connected to the Arduino.

#### 3.2 Circuite Diagram

The circuit comprises of Arduino UNO Board, HC-05/HC-06 Bluetooth Module, L293D Motor Driver IC, a couple of DC Geared Motors of 200 RPM and a 9V Battery. The TX, RX pins of Arduino is associated with Rx, Tx pins of Bluetooth Module. The Bluetooth Module is provided with 5V. Essentially, left DC engine is associated with pin no 3 and 6 of L293D and right DC engine to stick no 14 and 11 of L293D. Arduino advanced pins 2,3,4,5 is associated with L293D 2, 7, 10, 15 respectively. The L293D IC Pins 2, 5, 12, 13 is GND pins, and 9, 1, 16 is provided with 5V. Be that as it may, pin 8 of L293D is straightforwardly provided with 9V.

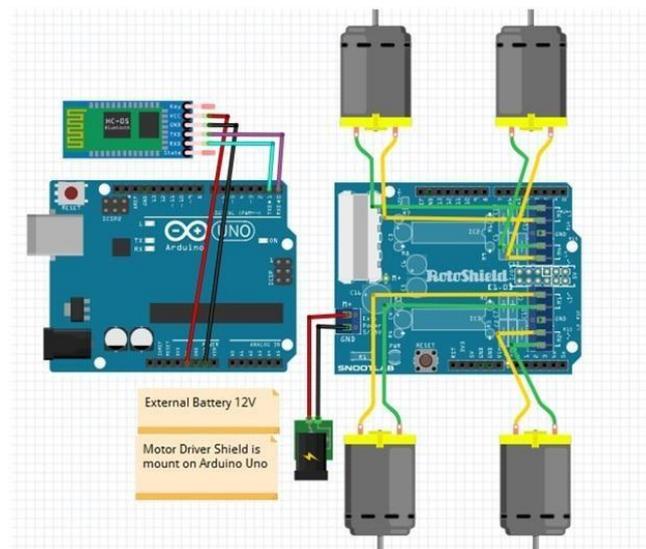


Fig -2: Circuit Diagram

### 3.3 System Specification:

- 3.3.1 Hardware Specification
  - Arduino UNO
  - L298 Motor Driver IC
  - Bluetooth Device Module
  - DC Motors
  - Battery
- 3.3.2 Software Specification
  - Windows
  - Arduino IDE software(4.0 version or above)

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## 4. Working

The block diagram of the simple voice controlled robotic vehicle is given it consists of the smartphone that recognizes the voice commands and are being wirelessly transferred to the Bluetooth module HC05. The module at that point changes over the order to content and the series of characters are sent to the Arduino for additional handling. The Arduino microcontroller decodes the string got and correspondingly performs further capacities. The signals are sent to the motor that hence powers and drives the motors connected to it. On the Transmitter area, commands are given to the Mobile Application through the mic. This portable handset is associated with the moving vehicle by means of Bluetooth module. The portable application utilized, is modified so that the voice orders given to the handset are received by the mic and these simple voice orders are changed over to advanced word successions (A to D transformation). These stored sequences are than transmitted to the robotic vehicle via Bluetooth transceiver module and are sent to the transceiver controller. Android application transceiver is used to decode the received signal with the Bluetooth module. The controller contrasts these signals and the put away program orders in it and convert them into voice strings. The voice strings are then used to run the servo engines for the ideal interval of time. The microcontroller, sends directions, which when executed, helps in working of the engine driver. The yield of the Arduino goes to the engine driver IC and it controls the specific engine. A DC power supply is required to run the system. The DC power supply feeds the Microcontroller and the Bluetooth module.

### 4.1 Steps to control the robotic vehicle.

Install any Bluetooth Application for Arduino

Pair HC-05 Bluetooth module with the mobile

Default password is "1234" or "0000"

Click on the "MIC" icon and speak/instruct the robot

On speaking our speech gets recognized and converted into text. That text is transferred using Bluetooth

The Bluetooth Module receives the string, decodes it and compares it with the Instructions that are described in the program and moves the robot in forward direction

### Advantages

- The Robot is small in size, therefore less space required.
- We can access the robot vehicle from the distance of meters as we are using WIFI for the connection between robot and the server PC.
- Low power consumption.
- No accident is done by improper driving of people and also available for elderly and disabled people.

Some real-world applications of this voice-controlled Robot are:

- The robot is useful in places where humans find difficult to reach but human voice reach. Such as- in fire situations, in highly toxic areas.
- The robot can be used for monitoring or investigation.
- The voice controlled robotic car can be easily drive by unskilled driver by using voice commands with help of android application in smart phone.

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## 5. Results and Implementation

- Through our Design and implementation of our proposed system, we are able to achieve the following as results:

- Robot is controlled through voice commands given by the user who is operating the project.
- These voice command needs to be given through an android app which is installed on the users android mobile.
- Speech recognition is done within the android app and then a respective command is sent to the voice-controlled robot vehicle.
- Microcontroller fitted on the vehicle decodes these commands and gives an appropriate command to the motors connected to the vehicle.

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## 6. Conclusion

We are going to develop a technology which is useful for the modern and developing society. We can reduce the maximum number of accidents and also have a pleasant driving . This robotic vehicle works on the principle of Arduino programming and speech Recognition technology. The vehicle can be operated by using some simple voice commands.

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## 7. Future Enhancements

- 1) In Future ,it can be developed by using ZIGBEE, and also can implement for the development in the voice commands
- 2) It can also be developed for the deaf and dumb people using the hand gestures.
- 3) The hand gestures can be used for analysing and annotating the video sequences of technical talks.
- 4) Electric Optimization such rest and restart programs can be implemented.
- 5) Speech and voice recognition and voice identification security systems.

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