

Voice Control Car Using Arduino

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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.*

Keywords: *Robot, Design, Fabrication, Sensor, Automation*

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. In current scenario vehicles are manually controlled and all are done by the person who is driving the vehicle. Every action like start and stop, applying brake, gear transmission, acceleration requires human effort. But nowadays new technologies have been developed that can be integrated with the conventional vehicles to new vehicle form. In the technology era, the space between the physical and the digital world is brought closer by the introduction of gesture concept. For all dangerous tasks, we prefer technology rather than people. Even though these robots are being controlled manually in the early stages, these can now be controlled via voice and gestures. This technology of gesture and voice recognition can be defined by the interaction between the computer and the body language of human beings.

METHODOLOGY

1) Software Description:-

1. Voice Command Input:

The user gives voice commands, such as "forward," "backward," "left," "right," or "stop" through a smartphone or another voice control device. A smartphone app (such as Bluetooth Voice Control) converts these spoken words into text and sends them to the Arduino via Bluetooth.

2. Bluetooth Communication:

The Bluetooth module (HC-05 or HC-06) connected to the Arduino receives the voice command in text form via Bluetooth.

The Arduino reads the command text and processes it for controlling the robot's movements.

3. Command Processing:

Arduino compares the received command with predefined commands in the code. Based on the received command, Arduino sends signals to the

motor driver (L298N or similar) to control the DC motors attached to the robot's wheels.

4. Motor Control:

If the command is "forward," both motors rotate in the forward direction, moving the robot forward.
 For "backward," both motors rotate in reverse.
 For "left," one motor stops or rotates slower, and the other rotates forward, making the robot turn left.
 For "right," the opposite motor slows down or stops, and the other moves forward, making the robot turn right.
 For "stop," both motors halt, stopping the robot.

5. Looping Process:

This cycle repeats, allowing the robot to respond to real-time voice commands as long as it's powered on and connected to the Bluetooth device.

2) Hardware Description:-

The hardware components of the Voice Control Car Using Arduino are essential for collecting data, processing information, and facilitating communication. Below are the key hardware elements that make up the system:

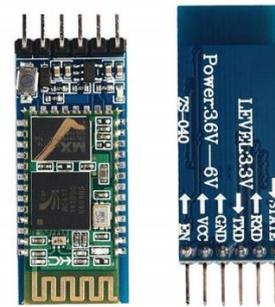
1. Arduino Board (e.g., Arduino Uno or Nano) - the main controller.

Arduino 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

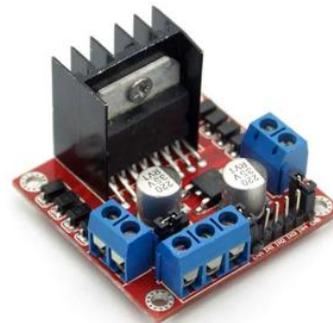


2. Bluetooth Module (HC-05 or HC-06) - to connect with a smartphone or voice recognition module.

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.



3. Motor Driver (e.g., L298N) - to control the motors.
 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



4. DC Motors and Wheels - to allow the robot to move.
DC 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.



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



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.

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