A Voice Controlled Vehicle For The Aid Of Disabled Person

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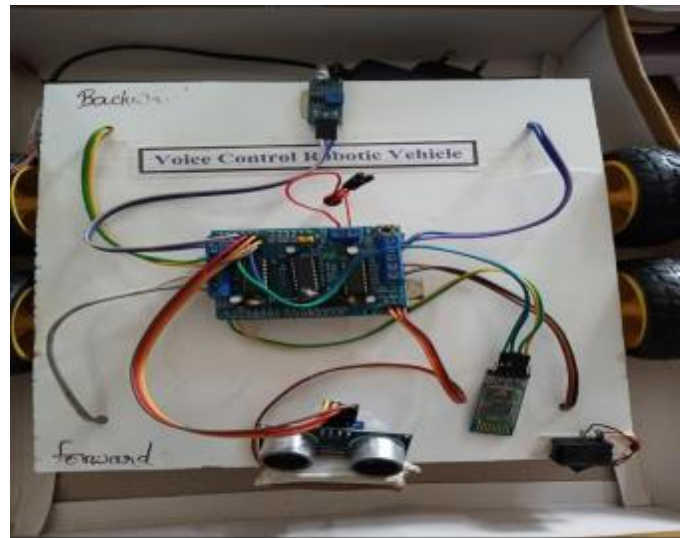
Abstract

A voice-controlled robot is a robotic system that is operated and controlled by user voice commands via a mobile phone. The concept revolves around creating a robot that can approach and assist individuals with disabilities in wheelchairs, specifically those who have impairments in both their hands and legs, rendering them unable to move independently from one location to another. These individuals currently depend on others for mobility. To address this issue, the proposed solution involves the development of a prototype known as the "**Voice Controlled Robot**".

When this technology is integrated into a wheelchair, individuals with disabilities can effortlessly navigate from one location to another independently through voice commands. The wheelchair responds to these commands, automatically facilitating movement to desired destinations. The primary objective behind creating this robot is to empower disabled individuals by providing them with a means to move autonomously using voice-activated controls.

1.INTRODUCTION

The voice-controlled robot relies on user-provided voice commands via a mobile phone. This robotic system enables users to command a robotic vehicle effortlessly through voice instructions, facilitating the execution of specific tasks with ease. The robot is versatile, capable of undertaking various tasks, serving as a voice-controlled vehicle or finding utility in settings requiring automated machinery. The primary objective is to develop a voice-controlled wheelchair and incorporate cutting-edge voice recognition technology into vehicles and other machinery. This robot ensures a hands-free, user-friendly experience, contributing to an eco-friendly environment. The project involves the design and implementation of advanced voice recognition technology in wheelchairs and other machinery, with the ultimate goal of creating highly efficient machines through this technology.

Voice controlled robot

2.Working

The working of this robot is complete in following points:

- **Voice Input:**

  Users operate the robot by providing voice commands through a mobile phone. These commands are specifically programmed into the Arduino UNO. The system then converts the voice input into a digital signal.

- **Voice Recognition:**

  The digital signal is processed using algorithms pre-programmed into the Arduino UNO. This step involves analyzing and recognizing the voice commands.

- **Translation of Commands:**

  The recognized voice commands are translated into instructions or actions that the robot is designed to perform. For instance, if the command is to "Turn Right," this action is executed by the servo motor integrated into the robot.
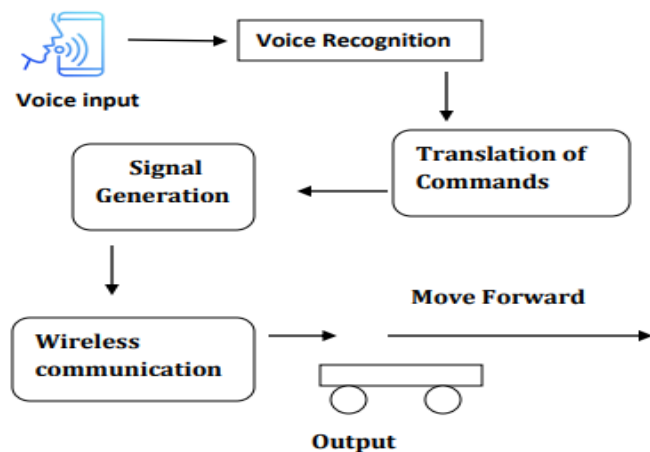
- **Signal Generation:**

  The translated commands are further converted into signals compatible with the robotic machine control system.

• Wireless Communication:

Control signals are transmitted wirelessly from the control system to the robotic vehicle. This wireless communication is achieved through the utilization of the "Bluetooth Module HC-05."

• Output:

Upon receiving the control signals, the robot's control system interprets the commands and executes the corresponding operations.
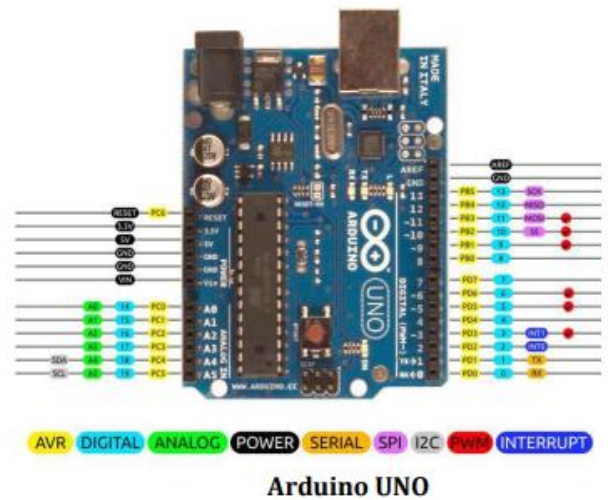

3.Hardware Requirements

These are the hardware which is used to make this robot:

1. Arduino UNO

2. Bluetooth Module HC-05

3. Ultrasonic Sensor

4. Infrared Sensor
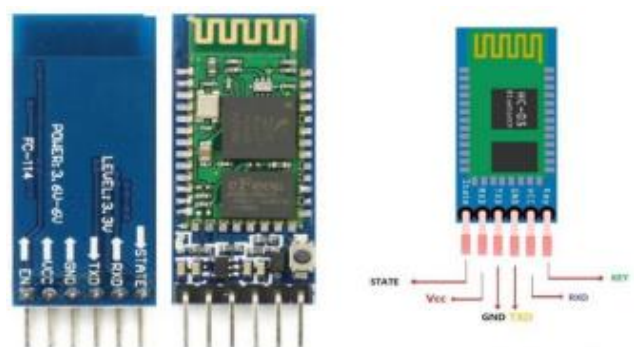
5. L293D DC Motor Driver

6. DC Motors

3.1 Arduino UNO

The Arduino UNO is a microcontroller that operates based on the ATmega328P microcontroller. It is equipped with 14 input/output pins, six of which can function as PWM (Pulse Width Modulation) outputs, allowing for precise control of connected devices. Additionally, it features six analog input ports. The board is designed with a reset button that enables the user to reset the previously loaded program. Furthermore, there is a USB connector that facilitates the uploading of programs and serves as a power supply for the Arduino UNO.

Arduino UNO

3.2 Bluetooth module HC-05

The HC-05 stands out as a widely utilized Bluetooth module, serving the purpose of establishing connectivity between a mobile phone and a robot. This module finds applications in diverse fields such as robotics, automation, and various electronics applications where wireless communication is essential. The HC-05 module is available in two distinct classes, namely Class 1 and Class 2, each categorized by its connectivity range. The Class 1 module boasts an impressive range of 100 meters, making it suitable for applications that require an extensive coverage area. On the other hand, the Class 2 module has a range of 10 meters, making it suitable for scenarios where a more localized wireless connection is sufficient. In the context of this robot, the Class 2 HC-05 module is employed, offering a balance between wireless functionality and range for optimal performance.
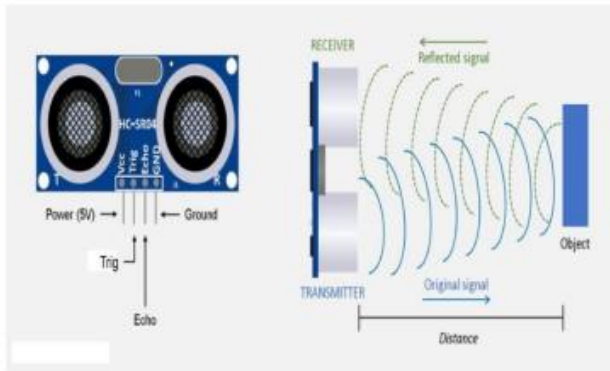

Bluetooth module HC-05

3.3 Ultrasonic Sensor

An ultrasonic sensor is a device designed for gauging the distance between objects by utilizing ultrasonic waves. It operates on the principle of echolocation, much like how bats navigate in the natural world. The sensor emits ultrasonic radiation, and when this radiation encounters an object, it reflects back to the sensor. Following this reflection,
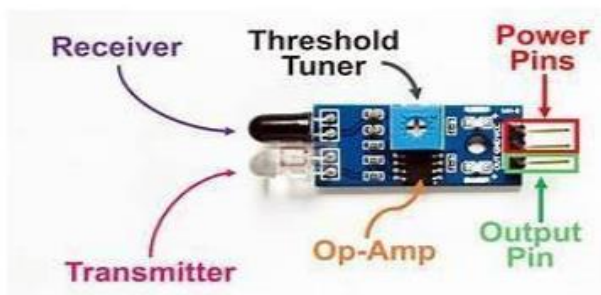
the sensor precisely measures the distance of the object from itself. In essence, the ultrasonic sensor employs the same fundamental concept used by bats for object detection through echolocation.

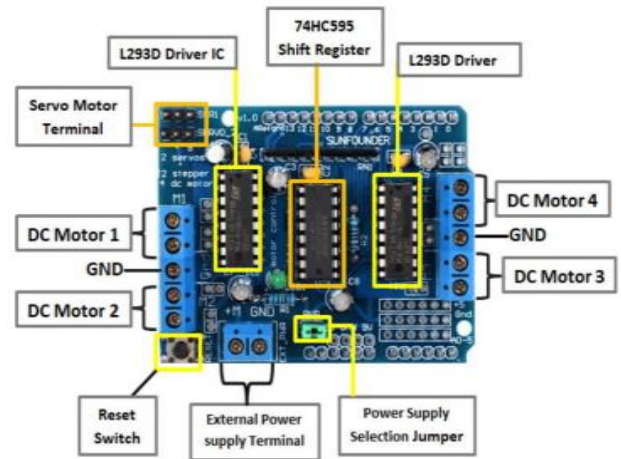**Ultrasonic sensor diagram**

3.4 Infrared Sensor

The infrared sensor (IR) is a widely used device that detects infrared radiations emitted or reflected by objects. Operating on the principle of emitting or radiating infrared radiation, it relies on the heat generated by objects. The sensor is composed of an infrared light source responsible for emitting radiation and a detector designed to identify the reflected radiation from the object. In essence, the infrared sensor functions by capturing and interpreting the infrared emissions or reflections, making it a valuable tool for various applications.

Infrared sensor

3.5 L293D DC Motor Driver

The L293D is a widely recognized integrated circuit (IC) extensively employed for the precise control of DC motors in electronics, robotics, and automation applications. Serving as a pivotal link between motors, microcontrollers, and other control systems, it offers a straightforward interface. This IC is equipped with two H-bridge circuits, each proficient in managing and controlling the operation of DC motors. Its versatility and user-friendly design make it a preferred choice for seamlessly integrating and controlling motors in a variety of electronic and robotic setups.

L293D DC Motor driver Diagram

3.6 DC Motors

There are two types of DC motors which are used in this robot:

• Servo Motor

 • BO Motor

3.6.1 Servo Motor

A servo motor is an electrical component designed to achieve precise pushing or rotation of an object. It finds applications in electronics and robotics, particularly in scenarios where accurate positional and angular movements are essential. This device is instrumental in providing controlled and precise motion, making it a valuable asset in various applications where specific object movements are required.

Servo Motor

3.6.2 BO Motor

The BO motor is a compact DC geared motor known for its lightweight design, delivering substantial torque and RPM even under low voltage conditions. Its application is prominent in electronic operations, especially in situations demanding bidirectional and oscillatory movement. This motor is particularly well-suited for scenarios where the need for back-and-forth motion is essential.
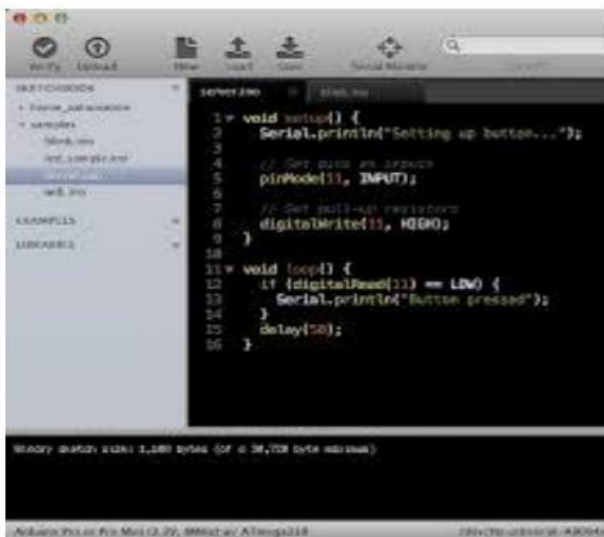
BO (Battery operated) Motor

4. Software requirement

To program an Arduino Uno "Arduino IDE" software is required.

4.1 Arduino IDE (Integrated development environment)

The Arduino Integrated Development Environment (IDE) is a software application employed for programming and creating applications for the Arduino microcontroller. Offering a user-friendly interface along with a toolkit, it facilitates users in writing, compiling, and uploading code onto the Arduino board. The IDE serves as a comprehensive platform for developing and managing code for Arduino-based projects.

Arduino IDE Interface

An Android application is utilized for command input, with examples such as the Blue Control app and Bluetooth app. This application comes pre-installed on every Android operating system and is readily available for download from various app markets on Android devices.

Android App Interface

5. How to use

• First switch '**ON**' the robot and open android application in your mobile phone.

• Connect the device to your mobile phone through HC-05 module.

• To connect your devices, you required a password which is already build in HC-05 module. The password is "**0000**" or "**1234**".

• Speak command through mobile phone whose action you required of this robot. For Example: "**Move Forward**".

• Now your robot is start moving as per your command.

6. Applications and future works

1. The best use of this robot is to implemented in wheelchairs of those persons whose are disabled.

2. This robot is used in that places where are humans are reached like small pipe lines and old caves to explore new things.

3. The robot is used in command-and-control equipment's and devices.

4. It is used for delivery purpose by given suitable instructions after advancement.

5. It is used in emergency like hospitals.

6. It is in industrial purpose to perform specific tasks.

7.Conclusion

The voice-controlled robot exemplifies the progressive integration of voice recognition technology within the realm of robotics. Offering a hands-free and user-friendly experience, it significantly enhances user engagement in various tasks. The potential applications of this technology span across diverse fields, including military, medical, home rescue, and home security. Notably, its most significant utilization lies in assistive technology, where it holds promise for empowering individuals with disabilities and facilitating improved accessibility.

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