WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

VOICE CONTROLLED WHEELCHAIR FOR DISABLED PERSON

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ABSTRACT -

The voice-controlled wheelchair is a state-of-the-art assistive technology designed to revolutionize the mobility of individuals with physical disabilities. Traditional wheelchairs are essential for mobility, but they often require physical effort or carer assistance, which can be a significant barrier for those with severe mobility impairments. This project offers a solution that allows people to move around their environment with spoken commands by combining wheelchair movement control systems with cutting-edge voice recognition technology. The system uses highly sensitive microphones and sophisticated speech recognition software to interpret spoken commands such as "stop," "turn left," and "move forward." Users are then granted total autonomy as the motion controls on the wheelchair are modified to correspond with these commands.

This technology enhances the quality of life for those with mobility impairments by allowing them to move more freely without the need for manual labor or outside assistance. To ensure a safe experience in a range of situations, the system also incorporates a number of safety features, such as obstacle detection sensors and emergency stop capabilities. Additionally, the system can adapt to various voice patterns and commands by integrating machine learning, progressively improving its accuracy and responsiveness. With these features, the voice-activated wheelchair promotes independence and social inclusion, enabling users to engage more fully in everyday activities and the community.

KEYWORDS :-

- Forword
- Reverse
- Left
- right
- stop

INTRODUCTION :

The voice-controlled wheelchair is a state-of-the-art assistive technology designed to revolutionize the mobility of individuals with physical disabilities. Traditional wheelchairs are essential for mobility, but they often require physical effort or carer assistance, which can be a significant barrier for those with severe mobility impairments. This project offers a solution that allows people to move around their environment with spoken commands by combining wheelchair movement control systems with cutting-edge voice recognition technology. The system uses highly sensitive microphones and sophisticated speech recognition software to interpret spoken commands such as "stop," "turn left," and "move forward." Users are then granted total autonomy as the motion controls on the wheelchair are modified to correspond with these commands.

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BLOCK DIAGRAM :

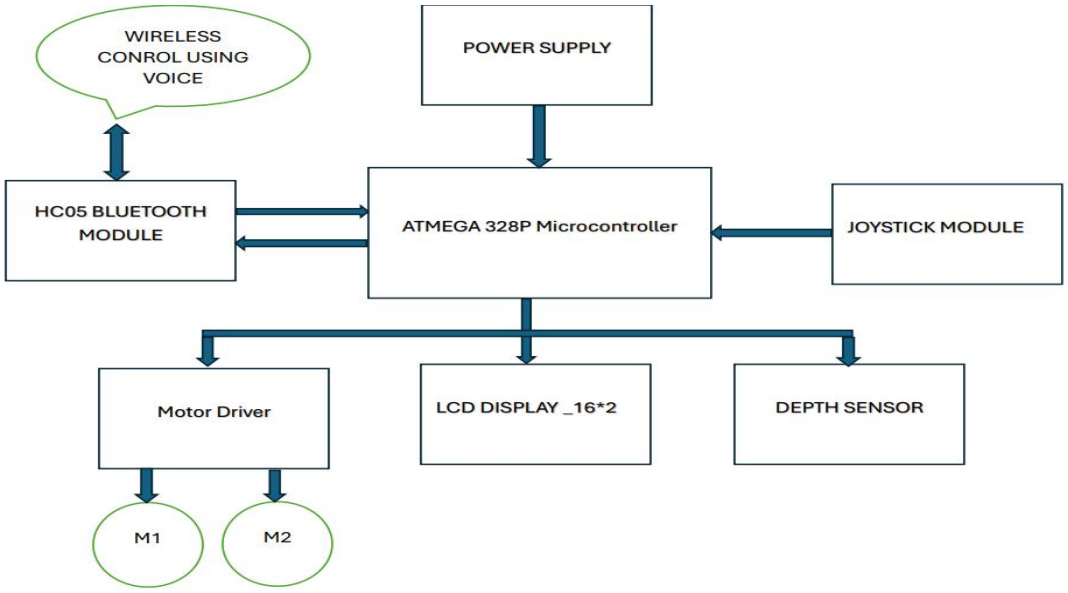

Figure 1: Block Diagram

WORKING :

When using a wheelchair that is Bluetooth-controlled, individuals with physical disabilities can operate it wirelessly using a joystick or a smartphone app. The system is powered by an Arduino 328 microcontroller, which interprets commands via Bluetooth or a joystick (HC-05). The L298 motor driver controls two DC gear motors, and for security, infrared sensors sense depth.

Working Principle:

Step 1: User Input and Signal Transmission

1. Bluetooth Control via Smartphone:

- The user connects a smartphone app to the HC-05 Bluetooth module. The app sends commands such as Forward, Backward, Left, Right, or Stop. The HC-05 module transmits these commands to the Arduino 328.

2. Joystick Control (As an Additional feature):

- If the user prefers manual control, a joystick can be used. Moving the joystick in any direction sends signals to the Arduino 328.

Step 2: Signal Processing by Arduino 328

- The Arduino 328 receives commands from the Bluetooth module or joystick and processes them. Based on the command, it decides the movement of the DC gear motors. The processed signals are sent to the L298 motor driver, which controls the motors.

Step 3: Controlling the Motors

- The L298 motor driver receives instructions from the Arduino 328 and controls the two DC gear motors. The motors rotate based on the received commands, causing the wheelchair to move. Different movement commands trigger the following actions:
- Forward: Both motors rotate forward at the same speed.
- Backward: Both motors rotate backward at the same speed.
- Left: Left motor stops or rotates slowly, right motor rotates forward.
- Right: Right motor stops or rotates slowly, left motor rotates forward.
- Stop: Both motors stop.

Step 4: Depth Sensing using IR Sensors

- Two IR sensors are placed on the front of the wheelchair to sense the depth. When depth is detected within a certain range. The Arduino 328 automatically stops the motors to prevent any accident.
- A warning signal is sent to the LCD display as “IR Detected”.
- This safety feature ensures smooth movement without accidents.

Step 5: LCD Display for Real-Time Status

- The LCD display is used to provide important updates to the user.
  It can show:

- Current movement direction (e.g., " Forward", "Left").
- Warning messages if depth is detected.

Step 6: Ensuring User Safety and System Efficiency

- The system ensures safe navigation with automatic stopping when depth is detected.
- The joystick feature provides an alternative control method if Bluetooth connection is lost.
- The LCD display keeps the user informed about the wheelchair's status at all times

LITERATURE SURVEY :

This study presents a voice-controlled wheelchair integrated with a health monitoring system. The design incorporates voice recognition for movement control and sensors for monitoring vital health parameters, aiming to enhance user autonomy and safety. The system also includes ultrasonic detection for obstacle avoidance, contributing to a comprehensive assistive technology solution for individuals with physical disabilities.
This paper presents a voice-controlled wheelchair system designed to assist elderly and handicapped individuals with limited mobility. The system includes a therapy unit to aid the user's limbs, preventing numbness from continuous rest. An obstacle sensor is integrated to detect obstacles in the path, enhancing user safety. The goal is to enable disabled individuals to move independently, reducing reliance on assistance.

METHODOLOGY :

In this project Android application is connected to the wheel chair via Bluetooth. For connection the HC-05 module is used inside Microcontroller. We have provided the IR sensors which helps to avoid accidents happens due to any obstacle. User can use two features provided in application either Voice or Touch mode and these commands will be forwarded to the Microcontroller mounted on wheel chair via Bluetooth. We have used battery as power supply which helps to accommodate large distance

ACTUAL SYSTEM :

Figure 2: Actual System

FLOWCHART :

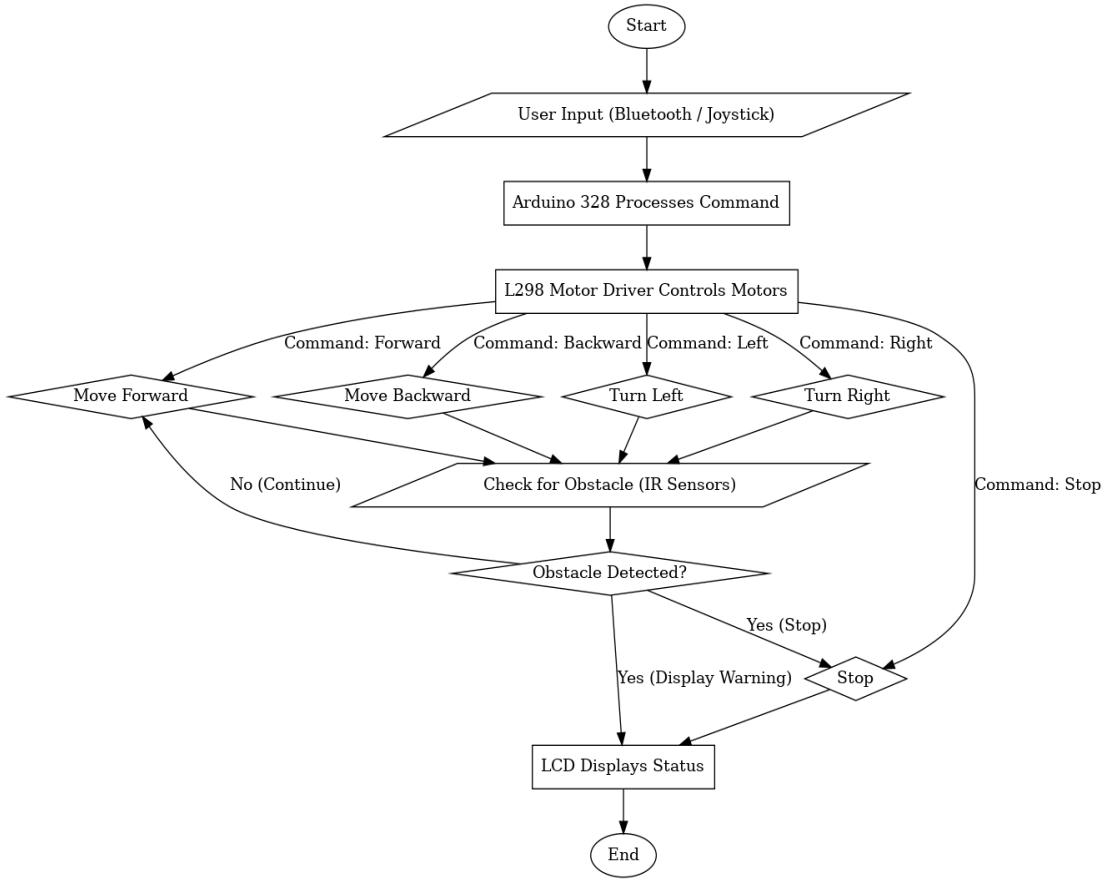

Figure 3: Flow chart

CONCLUSION :

Voice controlled wheelchair has the key functionality of following voice commands. Along with the normal methods of operations such as joystick, a novel way of controlling the chair using a web application, will also be made available. This provides user the ability to control the wheelchair while sitting in some corner of the house. The proposed model uses advanced hardware which not only processes the voice but also controls the motors, thus, reducing the number of hardware used and decreasing the cost. However, there is also a disadvantage that it does not distinguish between a normal conversation and a command. The problem of the recognition of commands by another person is minimized in a situation where the user is wearing a dynamic microphone with a narrow filed of sound, which also partially removes the background noise and enhances the change in the colour of pronounced commands by the user. This does not have a larger effect on the quality of the recognition