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Voice Controlled Wheel chair for Differently Abled

Suhas Somappa Byahatti, Sirajahamad Akbarbasha Onti, Praveen Kuberappa Kammar, Karthik Hulihalli, Jagadeeshwar G Shivangutti

U.G. Student, Department of Electrical & Electronics Engineering, Tontadarya College of Engineering, Gadag, Karnataka, India
Sr.Assistant Professor, Department of Electrical & Electronics Engineering, Tontdarya College Of Engineering, Gadag, Karnataka, India

ABSTRACT: This project is related to controlling a wheel chair by means of human voice. The objective of this project is to facilitate the movement of people who are disabled or handicapped. Based upon the direction specified in the commands, the Arduino will drive the 2 motors. People those who has disabilities with their hands, foot and lower body are unable to perform tasks on regular basis. So, there are many applications which help handicapped person to perform their tasks. The aim of this system to help people who cannot move properly without help others due to any physical illness or disabilities. Speech recognition technology will provide a new way of human interaction with machine. The result of this project is show that this can be used for future research work and public interest.

I. INTRODUCTION

While the needs of many individuals with disabilities can be satisfied with power wheelchairs, some members of the disabled community find it is difficult or impossible to operate a standard power wheelchair. This project could be part of an assistive technology. It is for more independent, productive and enjoyable living.

Speech signals are the most important means of communication in human beings. Almost every conversation to interact is done by means of voice signals. Sounds and various speech signals can be converted into electrical form using a microphone. Physical disability can occur due to multiple reasons like injuries from accident, age related &health problems. Wheelchair is used to provide a mode of transportation for such disabled people with impairments in hands and legs. People with such issues like paralytic people find it difficult to operate the wheelchair manually or using a remote assembly. For such people the project is designed to work on voice-based commands so that the paralytic or disabled person can give direction commands by just speaking into the microphone given. The system also includes directional buttons for wheelchair control using remote. The system consists of an Atmega328 based circuit interfaced with a voice recognition module that takes speech commands from the user converts this speech into digital data which is then debugged by the micro-controller to get directional commands. The entire system consists of two circuits. I.e. the transmitter circuit and a receiver circuit. Transmitter circuit comprises of the voice recognition module and the receiver circuit consist of the motor and driver assembly. Ease of Use.

II. OBJECTIVES

1. Enhanced Mobility: Develop a wheelchair system that enables users to navigate through their environment with ease, providing a higher degree of independence.
2. Voice Recognition Integration: Implement advanced voice recognition algorithms to accurately interpret and execute user commands, ensuring a responsive and reliable control interface.
3. Safety Features: Integrate safety mechanisms to detect and respond to potential obstacles, ensuring the well-being of the user during navigation.
4. User-Friendly Interface: Design an intuitive user interface that accommodates users with various levels of physical ability, making the system accessible and easy to use.

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III. METHODOLOGY

In this block diagram we use cell phone as voice recognition to converts acoustic sound to the electric signal. Here we use an application as voice recognition and also this convert in the form of appropriate bit stream which could later is mounted in the cell phone. This bit stream is transmitted via Bluetooth and received by the receiver Bluetooth module in serial channel with range of frequency band from2.4to 2.485 GHz. Arduino is well programmed and it has a preloaded data on it. This data will useful to match the incoming digital bits and produce an appropriate output this will apply to theL293D IC. L293D is a 16-pin motor driver IC to drive DC motor with high current rate. This IC can control two DC motor simultaneously in any direction. According to input data IC will rotate the DC motor in clockwise or anticlockwise direction (like Right, left, forward, reverse and stop). Power supply unit give +5-volt DC supply applied to Bluetooth receiver module, microcontroller and L293DIC.

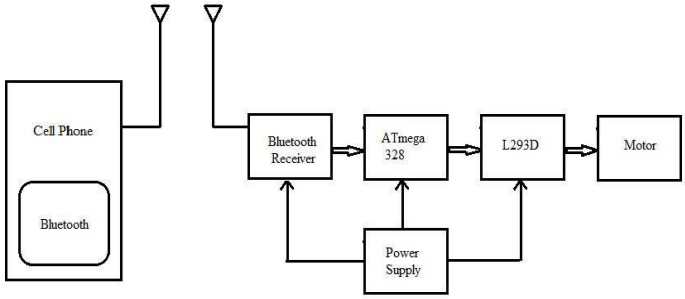

Fig1.Block Diagram of Model

IV. WORKING

Voice signals are given with the help of android app. Voice is recognized with the help of android base voice application. Bluetooth HC-05 is used for serial transmission. Microcontroller is used to interface between motors and voice recognition system. Battery is used to supply current to the motor.

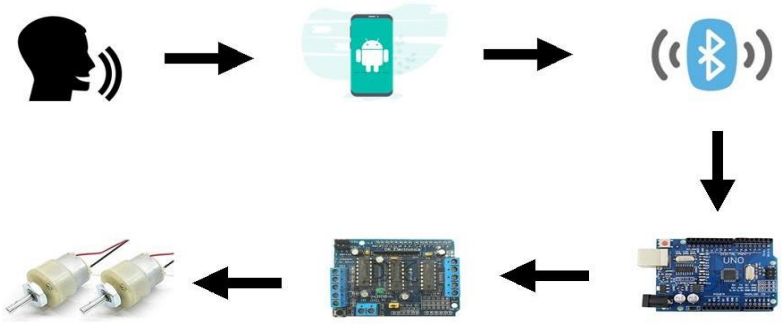

Fig2.FlowDiagram

When the voice is recognized, the wheelchair will move in that direction by giving commands to the wheelchair. These commands are transferred to the wheelchair using electrical signal which are used the drive left and right motor of the wheelchair. There are basically two motors connected to the left and right wheels of the wheelchair. The electrical signals are transferred to those motors using some hardware ports, called communication port. The voice commands which are used to move the wheelchair are like left, right, forward and reverse etc. Two wheels are used in the wheelchair for proper balancing. The movement of the wheels is controlled by DC motors which are attached to the wheelchair.

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The wheelchair directions and movement possible are given as follow

COMMANDS	OUTPUT
Front	motor 1 and motor 2 moves forward
Back	motor 1 and motor 2 moves backward
Left	only motor1 moves forward and rotates to left
Right	only motor 2 moves forward and rotates to right

Fig3.Directions

A. Android App Voice Control Robot for Arduino:

To control the whole set up through our voice command we would need an android app which we can easily control through voice commands and navigation keys.

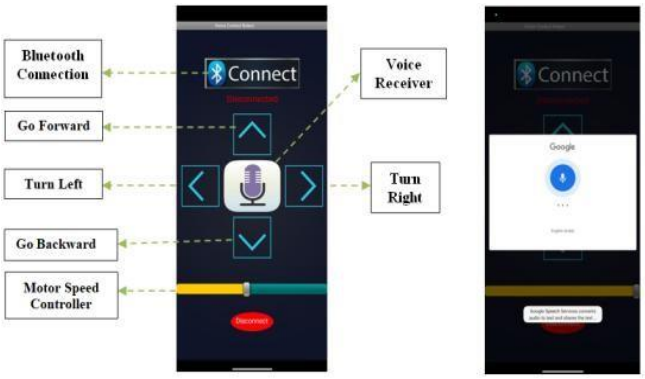

Fig 4: Bluetooth voice control android app

Fig 5: Connecting Bluetooth

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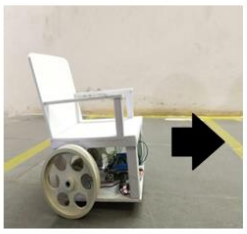
V. RESULTS

Fig 6. Working Model

- The project was tested for the movement of the wheel chair using trained voice after the design and development of the self-automated wheel chair with its various interfacing units.
- If the requirement is forward then all the dc motors are provided with 5V and submitted in forwarding directions for linear progression.
- If the requirement is backwards then all the dc motors are provided with 5V and moved in reversed tracks for linear movement.
- If the condition is to turn right then the right dc motors are suspended and the left dc motors are provided with 5V and the wheelchair progress in right direction.
- If the condition is to switch left then the left dc motors are suspended and the right dc motors are provided with 5V and the wheelchair progress in left direction.
- If STOP over the voice command is said then all the dc motors are stopped.

A) Voice Commands:



- When the app is started at that point a request is created if the Bluetooth is not switched on.
- When the Bluetooth has turned on the request considers the information when the user affects the virtual button.
- If the requirement is forward then all the dc motors are provided with 5V and submitted in forwarding directions for linear progression.

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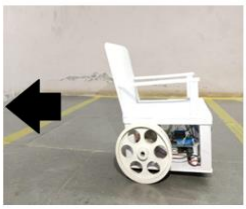

- If the requirement is backwards then all the dc motors are provided with 5V and moved in reversed tracks for linear movement.

- If the condition is to turn right then the right dc motors are suspended and the left dc motors are provided with 5V and the wheelchair progress in right direction.

- If the condition is to switch left then the left dc motors are suspended and the right dc motors are provided with 5V and the wheelchair progress in left direction.

- If STOP over the voice command is said then all the dc motors are stopped.

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VI. 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. 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.

VII. INNOVATION IN THE PROJECT

The solution for the project "Voice Controlled Wheelchair for Differently Abled" revolves around the development of a wheelchair system that responds to voice commands, addressing the mobility challenges encountered by individuals with disabilities. Central to the solution is the creation of a user-friendly interface capable of recognizing a diverse range of voice commands, enabling effortless control of wheelchair movement. Advanced voice recognition technology will be seamlessly integrated into the system, either through existing software or custom algorithms, ensuring accurate interpretation and execution of spoken instructions in real-time. Safety remains paramount, Usability testing, involving individuals from the target user group, will refine the system's effectiveness and reliability. Moreover, a focus on cost-effectiveness and scalability will ensure accessibility to a broader user base. Ultimately, this solution aims to empower individuals with mobility impairments, enhancing their independence and overall quality of life through intuitive wheelchair control via voice commands.

VIII. SCOPE FOR FUTURE WORK

- Refined Voice Commands: Making it understands more words and accents for smoother control.
- Easier Joystick Navigation: Improving the joystick interface for effortless manoeuvring.
- Smart Navigation: Adding features to help it find the best routes and avoid obstacles.
- Integration with Smart Devices: Connecting it with home gadgets for seamless control.
- Remote Monitoring and Assistance: Allowing caregivers to check in and help remotely.
- Virtual Reality Training: Using VR for fun and effective practice sessions.
- Enhanced Safety Features: Adding alerts and safeguards for peace of mind.
- Continuous Improvement: Committing to ongoing development to make it Even better over time

REFERENCES

[1]. "Wheelchair for Physically and Mentally Disabled Persons", Nirmal T M, International Journal of Electrical and Electronics Research
[2]. "Solar Powered Wheel Chair: Mobility For Physically Challenged", Arun Manohar Gurram, P.S.V Ramana Rao, Raghuveer Dontikurti, International Journal of Current Engineering and Technology,
[3]. "Design and Implementation of an Electric Wheel-Chair to Economies it with Respect to Bangladesh" by Humaira Salmin, Hafiz Rakibul, Pratik Kumar Kundu, B.M. Fahmid Jahur Shuvo, K.B.M. Nasiruzzaman and Rahman MD Moshiour, International Journal of Multidisciplinary Sciences and Engineering, Vol. 5
[4]. Speech recognition module, PPT web page available at https://www.slideshare.net/mobile/RkPalz/speech.recognization module robomart
[5]. Arduino with voice recognition module, web page available at https://www.geetech.com/wiki/index.php/arduino voice recognition module
[6]. Voice controlled automation; web page available at https://www.slideshare.net/mob/pro/Voice controlled automation
[7]. "Voiceoperatedwheelchair"byJayeshK.Kokate,A.M.Agarkar"international Journal of research in engineering and technology" Volume 3,Issue 2,Feb 2014.