The Voice Controlled Wheel Chair

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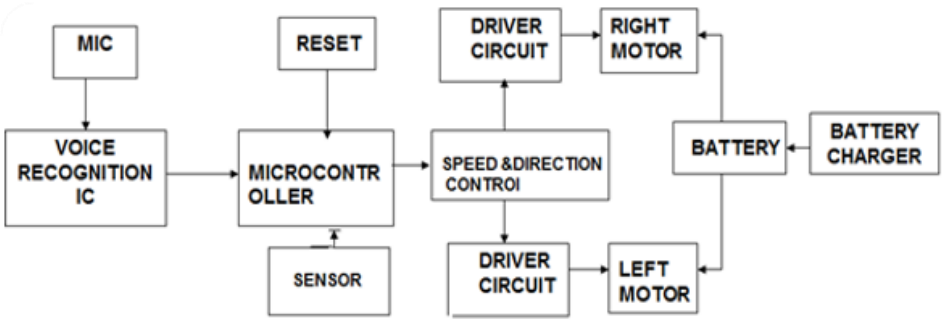
Abstract:- The Voice-Controlled Wheelchair (VCW) stands as a remarkable technological innovation aimed at revolutionizing mobility assistance for individuals with physical disabilities. This paper presents an overview of the development, functionality, and potential impact of VCW in improving the quality of life for users. The VCW integrates cutting-edge speech recognition technology with advanced motion control systems, enabling users to navigate their environment effortlessly through verbal commands. By harnessing natural language processing algorithms, the wheelchair interprets and executes commands with precision, offering users unparalleled autonomy and independence in their daily activities. Key features of the VCW include customizable voice commands, obstacle detection and avoidance mechanisms, and seamless integration with smart home systems and assistive devices. Furthermore, the wheelchair's intuitive interface and adaptive learning capabilities ensure a user-friendly experience, catering to a wide range of individuals with diverse needs and preferences. In addition to enhancing mobility, the VCW promotes social inclusion by fostering greater engagement and participation in various settings, including home environments, workplaces, and public spaces. Its potential to mitigate physical barriers and facilitate seamless interaction with the surrounding environment signifies a significant stride towards achieving universal accessibility and inclusivity. Through empirical studies and user testimonials, this paper evaluates the efficacy, usability, and user satisfaction of the VCW, highlighting its transformative impact on the lives of individuals with mobility impairments. Moreover, it discusses challenges and future directions in the development and deployment of voice-controlled assistive technologies, emphasizing the importance of continuous innovation and collaboration in advancing accessibility solutions.

1. Introduction :- In this project, we will introduce the latest innovation in mobility technology: a voice-controlled wheelchair. This innovative technology is designed to help people with limited mobility to move around more easily and independently. With this new technology, users can control their wheelchair using their voice, which makes it easier for them to move around and perform daily tasks. For wheelchair users, navigating through the world can be a constant struggle. From inaccessible buildings to limited mobility, the challenges they face are numerous. But what if I told you that there's a solution that can help them overcome these obstacles? That's right, voice-controlled wheelchairs are here, and they're changing the game for wheelchair users everywhere. A voice-controlled wheelchair is a type of assistive technology that allows individuals with limited mobility to control their

wheelchair using voice commands. This technology uses advanced sensors and algorithms to accurately interpret spoken commands and translate them into actions, such as moving forward or turning left. By eliminating the need for physical controls, voice-controlled wheelchairs provide greater independence and freedom of movement for users.

The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the sense that you train the words (or vocal utterances) you want the circuit to recognize. This board allows you to experiment with many facets of speech recognition technology. It has 8 bit data out which can be interfaced with any microcontroller for further development. Some of interfacing applications which can be made are controlling home appliances, robotics movements, Speech Assisted technologies, Speech to text translation, and many more Speech recognition is a popular topic in today's life. The applications of Speech recognition can be found everywhere, which make our life more effective. For example the applications in the mobile phone, instead of typing the name of the person who people want to call, people can just directly speak the name of the person to the mobile phone, and the mobile phone will automatically call that person. If people want send some text messages to someone, people can also speak messages to the mobile phone instead of typing. Speech recognition is a technology that people can control the system with their speech. Instead of typing on the keyboard or operating the buttons for the system, using speech to control system is more convenient. It can also reduce the cost of the industry production at the same time. Robotic wheelchairs have enhanced the manual wheelchairs by introducing locomotion controls.These devices can ease the lives of many disabled people, particularly those with severe impairments by increasing their range of mobility.These robotic enhancement will provide benefit people who cannot use hands and legs. In this project we have developed a voice controlled wheelchair which aim to counter the above problems. The wheelchair can be controlled using joystick as well as using voice commands. He/She just needs to say the direction or move the button for that direction and the wheelchair moves in the desired direction. In hardware development, we are using HM2007 voice recognition module which correlates commands to do speech processing and give the result to Arduino which is further programmed with respective locomotion commands.

2. Block Diagram



Microphone:

It is used to convert the voice signal in to electrical signal. Output of the MIC is given to the voice recognition Module.

Microcontroller:

The microcontroller is semiconductor chip. It is programmable, multipurpose, multi functional. The **AT89C51** is a low-power, high-performance CMOS 8-bit microcomputer with 8Kbytes of Flash programmable and erasable read only memory (PEROM). he devices manufactured using Atmel's high-density non-volatile memory technology and is-compatible with the industry-standard 80C51 and 80C52 instruction set and pin-out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer.

Speed and driving:

The motor which we used is procured from AGNI MOTOR,BANGLORE has the following specifications:120W,9.8Nm,60 rpm with no load .Two 12V,32Ah lead acid AMARON batteries were purchased .we can increase speed of motor using.

Battery:

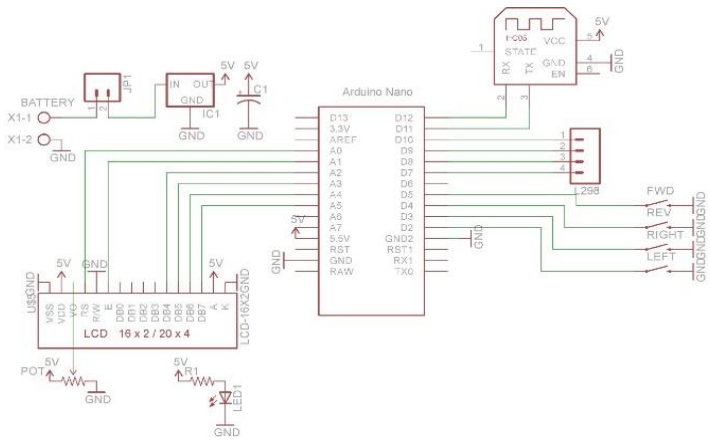
Here 12V battery is used for the motors to provide a sufficient power to the motors and here we are also used mechanism charging of battery. So here we are used a battery charger for charging the battery.

3. Challenges Faced by Wheelchair Users

Wheelchair users face a multitude of challenges on a daily basis. One of the biggest challenges is limited mobility. Many buildings and public spaces are not designed with wheelchair accessibility in mind, making it difficult for wheelchair users to navigate their surroundings. This can lead to feelings of isolation and frustration.

Another challenge faced by wheelchair users is a lack of independence. Simple tasks that able-bodied people take for granted, such as opening doors or reaching high shelves, can be nearly impossible for someone in a wheelchair. This can lead to a loss of autonomy and a feeling of helplessness.

4. Circuit Diagram



Working:- The above picture shows the proposed model of the system. This project is based on At mega 328P uc . It is an 8 bit controller which has 3GPIO ports . LCD 16*2 display is interfaced on PORTB , HC05 Bluetooth module is interfaced on TX and RX pin , two dc geared motors are connected on PORTD through L298 motor driver module. After powering on the microcontroller will bootup and initialize all peripheral which are connected on the PORTS . And baud rate of 9600BPS will be set to start communication with Bluetooth module. LCD display is initialised and configured in 16*2 4 bit .Now the controller will wait for any input data to be received from Bluetooth module. As soon as the data is received the controller will send command to motors to rotate in clockwise or anticlockwise as required to move in forward , reverse , right and left direction The same data will be shown on LCD display also. The uc will motor the battery voltage and will display on LCD . The process will run continuously till the power supply is connected.

5. Component Details

- The voice-controlled wheelchair consists of the following components:
- HC05 Bluetooth module
- Copper Clad 150mm*150mm
- LCD 16*2 display
- Battery 12v 2A
- Johnson gear motor 100 RPM
- IC base 28 pin
- Microcontroller Atmega 328P
- L298 Motor driver
- 7805 Voltage regulator
- Capacitor 1000uf/25v
- Diode 1N4007
- Resistor 330 ohm, 10k ohm
- LED , Wires

6. Applicatioins

- Easy to drive with negligible efforts.
- Less Complexity and Hardware to mount.
- Can be mounted on the existing wheelchair.
- Wireless control helps to monitor the wheelchair.
- Reduces manpower and dependency on other human drive.
- Wheelchair is compact and economical.
- Provides easy movement for physically challenged people.
- Low power consuming and easy to operate the wheelchair.

7. Future scope and advancements

The literature survey revealed the need for a more accessible and user-friendly wheelchair design. The voice-controlled feature addresses this need and has the potential to greatly improve the quality of life for wheelchair users.

The literature survey on voice-controlled wheelchair technology reveals several potential advancements and future scope for this technology. Some of these include:

- Improved voice recognition technology to enhance accuracy and reliability of voice commands.
- Integration with other assistive technologies, such as smart home systems and wearable devices, to provide a more comprehensive and seamless user experience.
- Increased customization options to accommodate the unique needs and preferences of individual users.
- Advancements in battery technology to extend the range and duration of use for voice-controlled wheelchairs.

8. The prototype model of the wheelchair

Above figure shows the Using such a technique will update the Voice-controlled wheelchairs represent a significant advancement in assistive technology, providing increased independence and mobility for individuals with disabilities. Here are some potential outcomes and benefits of voice-controlled wheelchairs:

[1] **Increased Independence:** Voice-controlled wheelchairs allow users to navigate their environment without the need for manual control, giving them greater independence to move around freely.

[2] **Improved Quality of Life:** By enabling users to control their wheelchairs using voice commands, these devices can enhance the quality of life for individuals with disabilities, allowing them to participate more fully in daily activities and engage with their surroundings.

[3] **Enhanced Accessibility:** Voice control technology can make wheelchairs more accessible for individuals with limited mobility or dexterity, as it eliminates the need for complex manual controls.

[4] **Customization:** Voice-controlled wheelchairs can be tailored to meet the specific needs and preferences of individual users, allowing them to personalize their experience and optimize their mobility.

[5] **Safety:** Advanced voice recognition and control systems can enhance safety by providing precise control over the wheelchair's movements, reducing the risk of accidents or collisions.

[6] **Integration with Other Devices:** Voice-controlled wheelchairs can be integrated with other assistive technologies and smart devices, allowing users to interact with their environment in new ways and access additional features and functionalities.

[7] **User Empowerment:** By giving users the ability to control their wheelchairs through voice commands, these devices empower individuals with disabilities to take control of their mobility and navigate their surroundings with confidence.

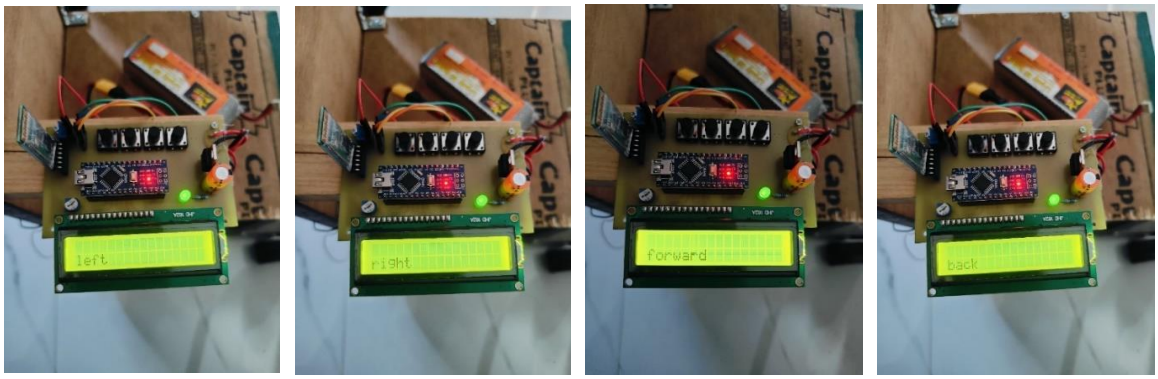
9. Advantages

This project describes the design and development of the motion control using voice recognition and graphical Android App for a wheelchair application.

10. Project Outcome

The Voice commands Which are Wheelchair follows:

Turn Left: Turn Right: Move Forward: Move Back:



11. Conclusion

In conclusion, voice-controlled wheelchairs have the potential to revolutionize the lives of wheelchair users by providing them with increased independence and mobility. By using simple voice commands, users can control their wheelchairs with ease, allowing them to navigate their environment more efficiently.

Furthermore, the development of voice-controlled wheelchairs is an important step towards creating a more inclusive society that values the needs and abilities of all individuals, regardless of their physical limitations. It is our responsibility to support the development and adoption of this technology, so that everyone can enjoy the benefits of increased independence and mobility.

12. Current Developments and Future Possibilities

As technology continues to advance, so do the possibilities for voice-controlled wheelchairs. One exciting development is the integration of artificial intelligence, allowing the wheelchair to learn and adapt to the user's needs over time. This could lead to even greater independence and mobility for wheelchair users.

Another area of development is the use of sensors and cameras to detect obstacles and automatically adjust the wheelchair's path. This could greatly reduce the risk of accidents and make it easier for users to navigate unfamiliar environments.

13. Refrences

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