VOICE CONTROL WHEEL CHAIR TECHNOLOGY

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ABSTRACT

Differently disabled people face many hardships in life, having to be dependent on another person to move from place to place. Therefore, a wheelchair is needed to use when handicapped people would like to travel by themselves. The wheel chair is divided into two different types based on the power used for mobility
1. Manual controlled wheel chair.
2. Electric powered wheel chair.
Manual powered wheelchairs are driven by manual power. Electrically powered wheel chairs run with electric power however manual operation is required to operate the joystick for the movement of the chair hands and arms must be used to operate the wheelchair. Consequently, people with hands and arms impairment finds difficult to use a typical wheelchair. These people need to get help from other people around to control the wheelchair and it will create a big problem when these people would like to travel alone. Therefore, the objective of this project is to design and construct a voice controlled wheelchair. The developed wheelchair can operate by using the voice commands through the given input. In this Project we are implementing the Real time hardware section of AUTONOMOUS WHEEL CHAIR with input of voice command from the speech recognition module and manual switch control
Keywords: Disabled people, Wheel chair, Manual switches control, Voice Contolled, GSM Module, Real time, Motorized Wheelchair.

INTRODUCTION

Voice-controlled wheelchairs represent a significant advancement in assistive technology, empowering individuals with independence and ease. By harnessing the power of voice commands, these innovative devices offer a hands-free solution for wheelchair control, enhancing accessibility and inclusivity for users in various environments. One approach to implementing voice control in wheelchairs involves the integration of a 4-channel relay module, which serves as a crucial component for translating voice commands into motor movements.

The 4-channel relay module acts as an interface between the voice recognition system and the wheelchair's motor control mechanism, facilitating the execution of commands such as forward, backward, left, and right movements. This relay module consists of four independent channels,

each capable of controlling the direction and speed of a wheelchair motor, making it well-suited for implementing multi-directional movement commands.

In the context of voice-controlled wheelchairs, the 4-channel relay module serves as a bridge between the low-voltage signals generated by the voice recognition system and the high-power electrical signals required to drive the wheelchair motors. The integration of a 4-channel relay module in voice-controlled wheelchairs offers several advantages, including simplicity, reliability, and ease of implementation.

In summary, the integration of a 4-channel relay module in voice-controlled wheelchairs represents a practical and effective approach to implementing motor control functionality. By serving as a reliable interface between the voice recognition system and the wheelchair's motors, the relay module enables precise and responsive movement in accordance with the user's voice commands, thereby enhancing accessibility and mobility for individuals with disabilities.

LITERATURE SURVEY

In the past few years, many projects are developed related to the wheelchair. The existing wheelchair for the disabled and aged people are designed in such a way that they can't move independently without an external support. The developed projects are based on the joystick, voice, hand gesture and brain wave sensing.

1. "Android Controlled Smart Wheelchair with Gesture and Voice Control", M R Sreeraj, Shahima Azad, Binumol Baby, Ms. Neema George. International Journal of Advances in Computer Science and Technology. ISSN 2320 – 2602, Vol.9 no.6, June 2020. This project specifies about the smart wheelchair consist of IOT based wheelchair which is controlled using an android smart phone taking inputs as phone gesture, voice, and touch. Also, it provides object detection that provides ease of navigation without colliding with objects in its path. They used Android software is used to control the wheelchair. A coding language such as c or python is required to program the Arduino.Arduino Software (IDE) it is used to create and upload the code to the Arduino.

2. "Joystick Controlled Wheelchair" by Trinayan Saharia, Jyotika Bauri, and Mrs. Chayanika Bhagabati, featured in the International Research Journal of Engineering and Technology (IRJET) in July 2017, presents a study on the development and implementation of a joystick-based control system for wheelchairs. Focusing on enhancing maneuverability and user control, the research investigates the design considerations, technical specifications, and usability aspects of the joystick interface. The study contributes valuable insights into assistive technology, aiming to improve the mobility and autonomy of individuals with physical disabilities through intuitive and efficient control mechanisms.

EXISTING METHOD

In existing wheelchair system there is voice based controlled and it is also manually controlled by some other person to push or to move back. As technology has developed voice controlled wheelchair has been widely available all around the world. But for paralyzed, physically disabled persons or handicapped persons they face some problems and we don't know when they are in any critical situation. So to overcome that an alternative is necessary The existing system consists of a joystick which can be used to control the movement of wheel chair. According to the output came from joystick, As technology has developed joystick-controlled wheel chair is widely available all around the world. But for paralyzed, physically disabled or handicapped persons, having issues related to fingers or hands, it needs hand movement for controlling joystick. Moreover, old aged people have poor wrist movement face problems to use the joystick. So, an alternative is necessary to overcome the necessity of joystick in controlling movement of wheel chair.

PROPOSED METHOD

As voice is the most common form of communication, proposed design is developed to operate the wheel chair using the command of the user. But in hectic areas voice cannot be recognized easily. Therefore, the option for joystick were also included in the system as an optional one. The present wheelchairs do not have combination of technologies for their working. However, only two types of wheelchairs are available in market like hand operated and joystick operated have come into wide use. We are trying to construct a voice-controlled wheelchair including the GSM module and the emergency switch to the wheel chair project enhances safety, communication, and accessibility for users. The GSM module allows for remote monitoring, tracking, and communication capabilities, while the emergency switch provides a quick and reliable way to halt wheelchair movement in urgent situations.The GSM module enables real-time tracking and monitoring of the wheelchair's location, providing caregivers and emergency responders with valuable information in case of emergencies or incidents. Users can also communicate with caregivers or emergency services using SMS or voice calls, enhancing safety and peace of mind.The emergency switch serves as a critical safety feature, allowing users to immediately stop wheelchair movement in situations where manual intervention is required.Users and caregivers benefit from real-time tracking, remote monitoring, and quick response capabilities, improving overall safety and peace of mind.

SYSTEM DESIGN

The proposed **"VOICE CONTROL WHEEL CHAIR"**. The design is developed with a voice recognition system, which allows the physically disabled person to control the wheelchair by voice command who have issues in hand movement due to ageing or paralysis. In this system we are using Arduino Uno microcontroller, which acts as a brain of the system this microcontroller controls the circuit function. Various components are interfaced with this

Microcontroller to perform desired operation of the system. The hardware components used in this system are 4-Channel Relay, Motors, Motor Drive, Arduino UNO, Hc-05 Bluetooth module,12V Battery, Connecting wires, 1-Channel Relay Module

To accomplish the task initially upload the code in the arduino and then pair blue tooth module witharduino blue control app in smart phone. And then give the power supply to the circuit using battery.

We use cellphone as a voice recognition module to converts acoustic sound to the electric signal. It converts as a bit stream and this bit stream is transmitted via Bluetooth and received by the receiver Bluetooth module in serial range of frequency band
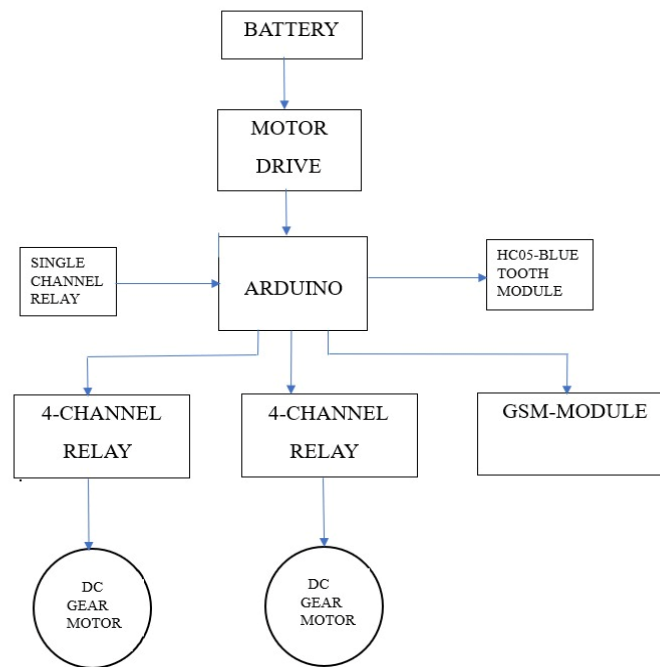
Arduino is well programmed and it have a preload data on it. This data will useful to match the incoming digital bits and produce an appropriate output. According to input data the wheels are move. Power Supply unit give +5v volt supply applied to Bluetooth receiver module, microcontroller. When the 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 wheel chair.

Joystick option also available, to used Joystick first disable the voice command so that it will not perform any action on your voice. Only action will now be performing through Joystick. In that Option, the programming option is simple the same task will be perform as which was being perform through voice command. The only change is input command which is now Joystick.

RESULT ANALYSIS

As a result of this project, we designed and manufactured a better multipurpose wheelchair for disable people to move from one place to another place. Wheelchair analysis was carried out both theoretically and practically. During the practical examination the weight of 110 kg was loaded and using a multifunctional wheelchair.

Front and Back view of the wheel chair

In the voice-controlled mode, we design 5 commands to control the movement of wheelchair to forward, backward, left, right, stop.

START

BACK

FORWARD

LEFT

RIGHT

CONCLUSION

In this paper the autonomous wheelchair is successfully developed. This wheelchair can be operated by the simple manual switches and also voice commands given by the user to help people with physical disability who cannot control their movements especially with arms and hands more independent. The design not only reduce the manufacture cost compared with present market but also will give great competitive with other types of electrical wheelchairs. This project consists of complete addition of the electronic circuits the hardware designing and software knowledge. We can also add new technology in this wheelchair. This system can be made highly efficient and effective detects the cracks or deformities on the track which when rectified in time will reduce train accidents.

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