ICEST-2K24 [International Conference on Engineering, Science and Technology]
In Association with
International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN - 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)

Hand Gesture Controlled Electrical Wheelchair

Mr. Rushikesh Chavan[1], Mr. Choramale Dhanaji Ajinath[1], Mr. Tate Onkar Santosh[1], Mr. Taufik Rasul Tikote[1], Prof. Gophane M.S.[5]

[1]Department of Electrical Engineering Savitribai Phule Pune University, Maharashtra, India
[2]Department of Electrical Engineering, S, B. Patil Collage of Engineering, Maharashtra, India

ABSTRACT

A wheelchair is not the same functionality for a person with disabilities. In our project, we have designed a programmable automatic wheelchair. In our project, we have connected a DC motor to a common wheel of a wheel chair. The motor is connected to the wheel of the wheel chair by means of a chain and a 12 volt DC supply is given to the motor. Controllers are attached to turn the motor on and off, this wheelchair allows physically challenged people to move from one position to another. A physically challenged person needs the support of another person to operate a normal wheelchair. The core of our project is a self-propelled wheel chair for the physically challenged that moves with arm movements and head movements. This wheel chair is operated with the help of hand gestures so that a physically challenged person can easily operate Wheel Chair This wheelchair is operated by hand movements. If we move the arm in forward backward direction then the wheel chair will move forward and backward. To make the wheel rotate in 360 degrees, forward, backward, right, left, and stop, induction is given. To decode this induction, Arduino uno is used. The Arduino uno is given a 12V DC supply and a DC motor is connected to it. This paper proposes a novel approach to provide intelligence to a low-cost smart wheelchair based on a wheel chair embedded system. Sensors give the wheelchair the power to sense and the scientific inference in the microcontroller gives the wheelchair the intelligent power to make and execute decisions. This wheel chair is partially made so that a physically challenged person can buy it at a low cost.

Keywords:

I. INTRODUCTION

This wheelchair is specially designed for patients who cannot move their limbs without their head. A wheelchair is a mode of mobility that makes it easier for the disabled to move around. To move it, either the handle or the wheels must be turned. Electric motors, batteries, controllers, are examples of electrical wheelchairs or power wheelchairs. Around the world, accidents, wars, and spinal cord injuries have resulted in countless individuals losing their limbs. These people have to rely on the help of a wheelchair. We have made this wheel chair for such people. Wheel chair, DC motor, DC battery, charger, connecting wire, micro controllers, byke chain pocket, hand gesture controller, this component are used in this wheel chair.

In this wheel chair, the motor will be connected to the chuck of the wheel chair with the help of a chain pocket. After programming in Arduino uno the motor is connected to the output site of the micro controller

the micro controller is supplied with 12v dc from the battery and the hand gauge controller is connected to the Arduino via a wireless system.

So that this wheel chair can be driven by disabled people based on their hand and head movements, this wheel chair will also be able to be driven by humans.

This wheel chair does not require a second person to operate it, this wheel chair can easily transport a disabled person from one place to another.

While controlling the wheelchair, turning left and right is easily controlled by head movement, depending on the user, the wheelchair will automatically stop near any obstacle. This method of controlling the wheel chair can be easily handled by a disabled person.

II. CIRCUIT DIAGRAM

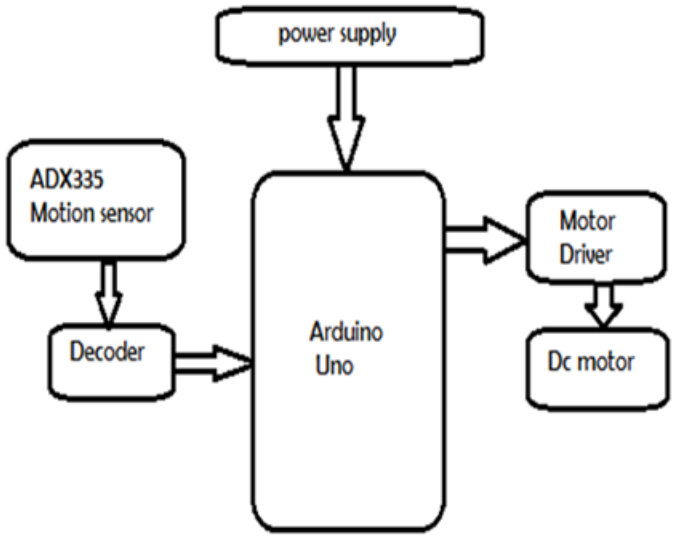

Figure 1: Circuit Diagram

III.CONTRUCTION

The accelerometer is used to detect the user's hand gestures and the Arduino Uno is used to process the data from the accelerometer and send the signal to the motor driver. The motor driver then controls the movement of the DC motor, which moves the wheelchair.

IV. FUTURE SCOPE

Hand gesture wheelchairs have the potential to bridge the gap between man and machine. This hand gesture can then be converted into speech and brain signal recognition which will be a battle-winning factor for people with full body paralysis. We can further improve wheelchairs by making them at a lower cost and with higher precision that are operated via wireless remotes with various different sensors. An array of sensors can be used and combining inputs from multiple sensors and then processing them. Safety features such as applying ultrasonic sensors to detect objects can be added to the wheelchair. A GPS system can also be activated to know

the exact location of the wheelchair user and an SMS can be sent to a predetermined number in case of emergency using the GSM module.

V. ACTUAL PROJECT MODEL

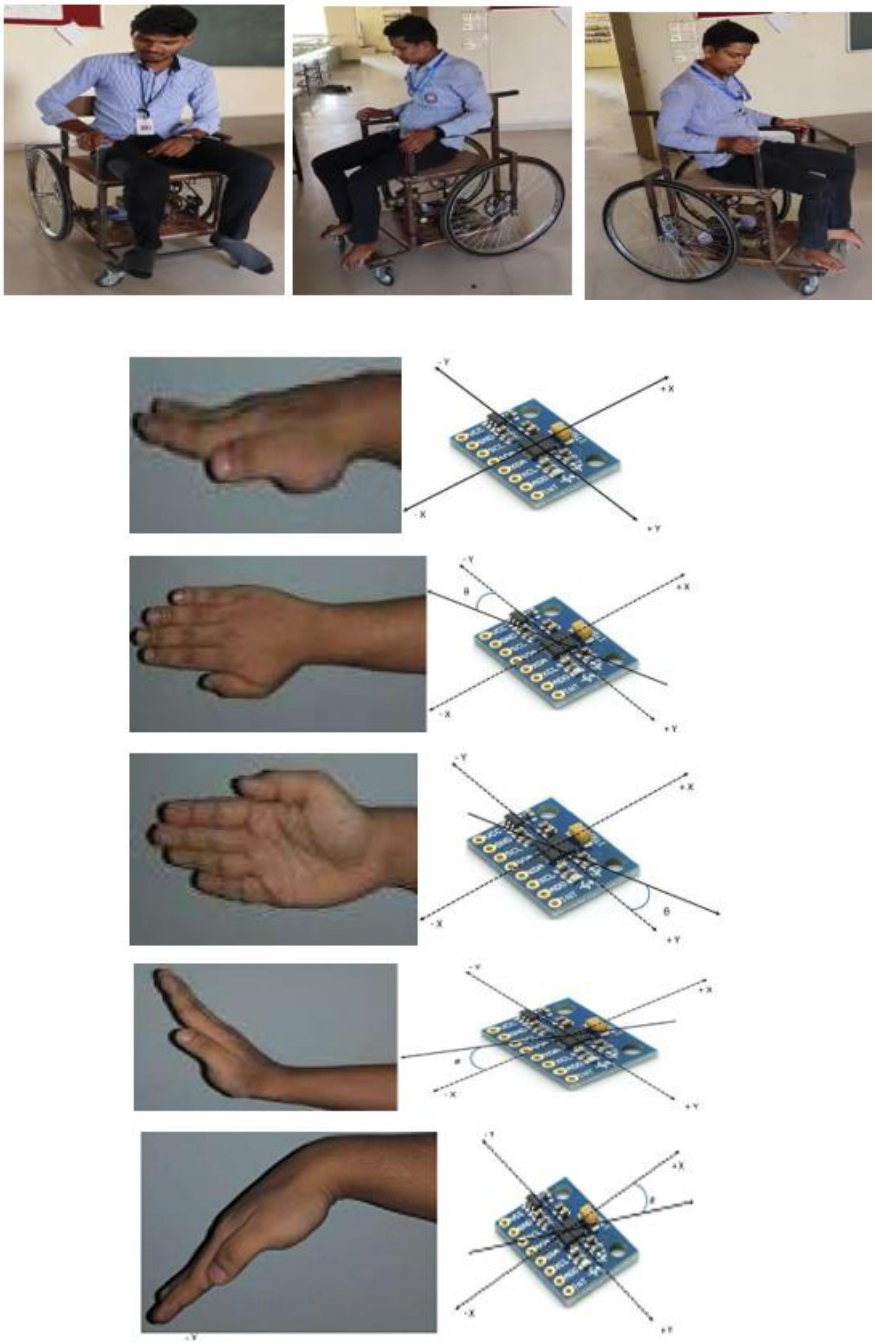

Figure 2: Actual Project Model

VI. WORKING

Working of hand gesture controlled electrical wheelchair

Youtube vedio link https://youtube.com/shorts/txnLdPKvA60?si=NO3VWi5gr1aiAyrd

Figure 3:

As discussed, the different hand gestures are assigned to different motions of the wheel chair i.e., forward, backward, left and right. When the hand tilts in forward direction the angle of tilt is sensed by the accelerometer MPU6050 and relay 2 and relay 4 actuates motor then it rotates in clockwise direction and chair moves in forward direction. Fig.3 – Forward hand gesture and motion of wheelchair in forward direction As the hand tilts in backward direction the angle of tilt is sensed by the accelerometer MPU6050 and. Hand Gesture Controlled Wheelchair SectionA-Research Paper Eur.Chem.Bull.2023,12(Special Issue 5), 3855-3864 3858 Fig.4 – Backward hand gesture and motion of wheelchair in backward direction As the hand tilts in left direction the angle of tilt is sensed by the accelerometer MPU6050 and relay 2 and relay 3 actuates motor 1 rotates in clockwise direction and motor 2 rotates in anticlockwise direction due to this chair moves in left direction. Fig.5 – Left hand gesture and motion of wheelchair in left direction As the hand tilts in right direction the angle of tilt is sensed by the accelerometer MPU6050 and relay 2 and relay 3 actuates motor 1 rotates in anticlockwise direction and motor 2 rotates in clockwise direction hence, chair moves in right direction. Fig.6– Right hand gesture and motion of wheelchair in right direction When the hand or palm of hand is parallel to surface at that condition all relays are at off position and both the motors are at rest.

VII. RESULT

Let consider one time fully charged battery
At average battery current are 2.4amp and 12volt supply.
Battery charging time atb3hr to 3.30hr.

VIII. LITERATURE SURVEY

The aim of this hand gesture and head movement controlled electric wheelchair project is to enable the disabled person to move from one place to another easily with the help of a wheelchair. A typical powered wheelchair uses sensors to learn left and right signals, a speech interface to interpret commands, a wireless device to determine room-level positioning, and motor-control software to affect the wheelchair's movement. Are This wheelchair learns the layout of its environment through a perceived, guided tour given by the user or the user's caregivers. Then, the wheelchair can move to any previously named location under hand gesture and head motion commands.

IX. CONCLUSION

The commands from the hand gesture to the microcontroller are then sent to the H-Bridge to drive the motor. The commands in the micro-controller are processed according to our designed control algorithm. After that the motor starts and the wheel chair runs
The wheelchair is fully capable of carrying a load of up to 110Kg and moving according to the gestures given by the person using the wheelchair. This wheel chair can be easily used by disabled people

X. REFERENCES

[1]. Head Motion Controlled Wheelchair V. Purushothaman, R. Androse, M.J. Lokesh, S. Nawin Chander, R. Rajkamal
[2]. Head-Motion Controlled Wheel Chair Direction Using ATMega328p Microcontroller" Ankit Kunti 1, Vikas Chouhan2, Kuldeep Singh3, Avinash Raj Yadav4, Ishwar Yadav5, D. Pankaj 6, Sandeep Somkuwar7
[3]. Hand Gesture Controlled Wheelchair Dr. Sachin M. Bhosle, Mr. Mandar A. More1, Mr. Ashish B. Nalawade2, Mr. Ashutosh V. Hajare3, Mr. Akshay B. Garad
[4]. Design and Making of Head Motion Controlled Wheelchair Harshwardhan Patil* Student, Department of Electronics Engineering, SRM University, Chennai, India