Published by :
http://www.ijert.org

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 8 Issue 07, July-2019

An Voice Controlled Wheel Chair for Physically Challenged People with Therapy Unit

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***Abstract*—The main objective of this work is recommended to control a wheel chair by voice of the person who use the wheel chair for their needs. The system is designed to facilitate the movement of elder and handicapped people those who are not able to move well. The proposed system also includes a therapy unit that will gives an assistance for limbs of the user which can prevent numbness due to continuous rest. An obstacle sensor is included in the system to detect the presence of obstacles in the way of movement. The goal of this system is to help the disabled ones to move independently and it can eliminate enslavement.**

Keywords—Voice recognition module, Vibrator,Obstacle sensor

I. INTRODUCTION

Wheel chair is one of the most used mechanical device in the world, used by aged or physically challenged people. But for using this, user needs a self-assistance by hand to move. Statistics reveals that 15% of world population which is about 0.655 billion people are suffering from different sort of physical disability. Joystick controlled wheelchair are widely used throughout the world. But the difficulty is that handicapped people having issues with finger movement are unable to control the joystick since it needs hand control. As the voice is the most common mode of communication, the proposed system aims to design a voice controlled wheel chair with joystick as an optional one. In crowd areas voice cannot be recognized clearly and can use joystick. It includes a therapy unit to assist the limbs of the disabled person to prevent numbness that experienced due to continuous rest. The design also provide some additional features like obstacle detection for the safe movement.

II. LITERATURE SURVEY

Voice based Wheel Chair for Physically Challenged[1] proposed a system which aids an assistance for physically handicapped ones those who are not able to move by themselves. It uses speech recognition by interfacing speech recognition kit(HM2007) with microcontroller and wheelchair. The system provides a Mic for the user to give commands HM2007 registers the commands and fed them to microcontroller. Motor driver drives the wheel chair according to the commands from microcontroller.

Wheel Chair for Physically Disabled People with Voice &Eye control [2] introduce a concept useful for people with loco-motor disability. Here wheel chair is controlled by eye movement and voice commands. Eye movement is detected by using a head mounted camera. Corresponding output signals fed to motor which control wheel chair movement. Voice assistance is also used by this system. By giving commands the movement can be controlled.

Voice Controlled Wheel chair system [3] put forward a wheel chair system controlled by voice of the person. The goal of this system is to assist the physically challenged people. It uses speech recognition technology by which voice can be realized and organized with smart phone device as an intermediate interface. It also uses an obstacle sensor to detect the hurdles in between wheel chair in the way of its direction. A DC motor creates the movement of wheel chair.

Voice Controlled Wheel Chair for Physically Disabled Person [4] design a system that operates on users voice commands. This voice controlled wheel chair helps them to drives the wheel chair without any ones help. This system can be controlled by users simple voice commands. According to the direction specified in commands, wheel chair moves. Speech recognition is done here by using a speech recognition module.

Design and Construction Of Electric Drive –A smart system for disabled person with therapy facilities [5] proposed a wheel chair system with therapy unit for disabled persons. This paper focused on to design a single wheel chair with many facilities. The system consists of a therapy unit for limbs. It is done by using a vibrator. The system uses AT-mega 328/P microcontroller and it speed can be controlled. The unit also consists of an ultrasonic sensor for obstacle detection.

Voice Controlled Wheel Chair for Physically Disabled People [6] develops a system for assisting people with physical disabilities and old aged people who cannot move independently due to their physical weakness. It is based on voice recognition module which interfaced with DC motors, so that they can take input commands from the person or user and can move the wheel chair system. It also uses an android app to control wheel chair using smart phone. IR sensors are included in this design to detect obstacles in in the way of direction.

Design and Development of Smart wheel chair using voice recognition and Head Motion[7] introduce a system which control the wheel chair using voice recognition and head movement. The system detects the head movement by using MEM sensor and gives signal to microcontroller.

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III. METHODOLOGY

A. *Existing System*

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, microcontroller give instructions to the motor and move wheel chair to the desired location.

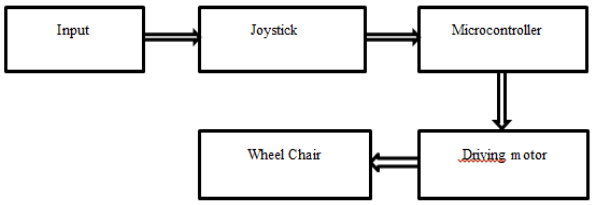

Fig.1. Existing block diagram.

As technology has developed ,joystick controlled wheel chair are 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.

B. *Proposed System*

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. So the system can be used as a multipurpose device. The system also includes a servomotor and vibrator for assisting the upper and lower limbs of the user those who are suffering from numbness due to continuous rest. A switch is provided for enabling therapy unit. It includes a contolling unit and therapy unit. The controlling unit includes

1.Microcontroller

AT-Mega 2560 ,the high performance, low power 8 bit microcontroller is the brain of the system. The device can achieve throughput of 16 million instructions per second at 16 MHZ. The instructions from voice recognition module I analyzed by microcontroller and it moves the wheel chair in the desired location. It also senses the switching and trigger the therapy units to turn on. It encounters the obstacles in the way of wheel chair and stops the motion of the wheel chair.

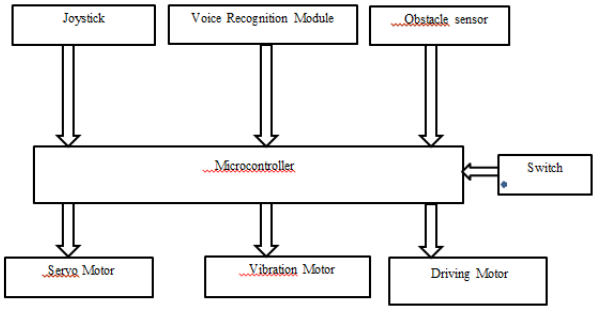

Fig.2. Proposed block diagram.

2.Joystick

Joystick is an innovative device that takes physical movement of human hand and converts the movements for use in a control machines. It works on a simple principle where the machine accepts the hand movement of user with the help of asset of sensors and then converts it into a mathematical code, which is finally moves the body in the computer in the desired way. The working principle is simple and is based on vertical and horizontal movements. For moving right and left, horizontal axis is used. Front and back movement is enabled by vertical axis. For moving right and front the value changes from center value to 1024. For moving left and back the value will lowered to 0 from center value ranges from 550 to 560. The output of joystick is analyzed by microcontroller. The device is used here as an optional one in hectic places where the voice cannot be recognized.

3.Voice Recognition Module

Voice recognition module used here is V3 module. The module along with a Mic is a board used for feeding input commands. The entire module is a speaker dependent one. It can support up to 15 voice commands in all. Maximum 7 voice commands would work at the same time. The user only need to train the module first before let it be recognizing any voice inputs. Any 7 voice commands in the library can be analyzed into recognizer. This means that 7 commands are effective at the same time. The process starts with the recording of users voice commands and copy trained voice to the recognizer. Finally the trained voice command is stored in the flash memory ranging numbers from 0 to 14. When one input command arrives ,then V3 module will recognize the command and then it is fed to the microcontroller.

4.Obstacle Sensor

HC-SR04 is the ultrasonic sensing module used here. It can provide accuracy ranging up to 3millimeter. It has a transmitter emits an ultrasonic waves in one direction and it started timing when it is launched. Ultrasonic speed in the air, would return immediately when it encounters obstacles on the way of its direction. If it detects any obstacle, then a signal is sent to microcontroller and in turn stops the motion of wheel chair.

5.Driver Unit

The driver unit has four 12 V relays in which each of these are used to make H-Bridge to drive a single motor. It has four n-p-n transistors whose function is to magnify the driving

International Journal of Engineering Research & Technology (IJERT)
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current to drive the relays. Permanent Magnet DC motor is used here. Because it has low cost, high starting torque. A 24V DC lead acid battery is used as power supply unit for the motors.
The therapy unit consist of a Servomotor and vibrator

6.Servo Motor

HG90is the servomotor used here. It is actually a DC motor whose speed can be controlled by using gears. Its revolution can be cut off from 90 degree to 180 degree. Rotation of servomotor is limited between the fixed angles. In this system, when hand of the user were placed on the belt attached to the wheel chair, the servomotor enables therapy to the hands by its to and fro motion which is make easier by the servo motor shaft.

7.Vibration Motor

Vibrator is used to provide vibration to the lower limbs, which can suffer numbness due to the continuous rest. It is achieved by constructing a vibrator circuit along with a vibration pad. It helps the patient to regenerate their blood circulation. When a DC current flows through the device it can brings heat from one side and the other side becomes cooler.

The therapy unit is the key of this work which have a lot of advantages.

IV. CONCLUSION AND FUTURE WORK

The implemented system has a Voice recognition module and Therapy unit. For disabled and handicapped persons, the proposed system not only helps the locomotion but also provides therapy. By using this system disabled person can do some kind of therapies without the help of another person. The system is also able to sense the obstacles, is not present in ordinary wheel chair. The implemented device helps to improve the lifestyle of the physically disabled persons and lead them to keep pace with others in the society. In future, for the convenience of the patient the device can be modify and can be implemented as a chair cum bed system. And finally we can conclude that those people who are socially isolated or lag behind due to their physical disabilities will have the opportunity to move freely without any assistance like other people of the society by using their voice commands.

REFERENCES

[1] Ravi Teja Ch.V, P Shekar, S. Roja, H. Hariprasad, Y. Bhargavi.“ Voice Based Wheel Chair for Physically Challenged”. International Journal of New Innovations in Engineering and Technology. ISSN-2319-6319,Volume 3, Issue 1, March 2015.

[2] Prof.Miss.Pranita Bhosale, Mr.Akshay Satpe, Mr. Tapan Singha, Miss. Kajal Patil.“ Wheel Chair for Physically Disabled People with Voice &Eye control”. Global Research and development Journal for Engineering. ISSN:2455-5703, Volume 1, Issue 6, May 2016.

[3] Mohammad Ilyas Malik,Tanveer Bashir, Mr.Omar Farooq Khan.“ Voice Controlled Wheel chair system”.IJCSMC,Volume 6,Issue 6,June 2017, Pg.411-419.

[4] Prof.Manoj V Bramhe, Navya Vijay, K. Bhagyasree Rao, Payal Bisen,Riddhi Navsalkar, Tanushri Bajganiya.“ Voice Controlled Wheel Chair for Physically Disabled Person”.IJAREEIE,ISSN(print):2320-3765,ISSN(online):2278-8875,Volume 6, issue 2, February2017.

[5] Sania Sheikh,Alfiya Sheikh,Abhishek waghmare,Ankit yadav,Shubham Bhoyar, Chetana Dolase.“ DESIGN AND CONSTRUCTION OF ELECTRIC DRIVE –A smart system for disabled person with therapy facilities”IRJET,ISSN(online):2395-0056,Volume:05,Issue:03,March 2018

[6] Priya C A,saadiya,Bagyasree, S D pranjala,Mr.Supreeth H S G.“ Voice Controlled Wheel Chair for Physically Disabled People”.IJRASET,ISSN:2321-.9653, Volume 6, Issue 5,May 2018.

[7] Dr.B.Paulchamy,N.Vinothini,S.Sharukhan,S.Sona,M.Sri Gayathri,C.Nandhini.“ Design and Development of Smart wheel chair using voice recognition and Head Motion”.IJSEAS,Volume-3,Issue-5,May 2018