GESTURE CONTROLLED ADVANCED WHEELCHAIR FOR PHYSICALLY CHALLENGED

Project Reference No.:*45S_BE_1659*

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Keywords

Arduino uno, Accelerometer, RF Transmitter and Receiver, Relay

Introduction

This project is an advance approach of changing the physical gesture of hand into the electrical signal and then to process that signal into digital signal of appropriate magnitude and to be transmitted through the transmitter. This project provides an instrumental solution to the people who have difficulty in moving or their body part has paralyzed, or they have lost their limb in an accident. This wheelchair is going to bring a paradigm shift between man and machine. Where this machine will be working on the user commands, we can also say its human machine interface. With the growth of technology there has always been an effort to use the technology for the betterment of mankind.

Wheelchairs are a way of reincarnating the purpose of life in the lives of disabled people. A smart hand-glove controlled wheelchair is very important for the physically challenged people. They cannot move anywhere like a normal person. For this reason, they always depend on the other people. But the smart glove-controlled wheelchair can remove this problem and help them to move anywhere.

Objective

In this project, we will design a Hand gesture controlled advanced wheelchair for physically disabled people who face difficulty in moving from one place to another in day today life. Our aim is to design a low-cost advanced wheelchair for physically challenged people.

A motorized wheelchair, power chair, electric wheelchair or electric-powered wheelchair (EPW) is a wheelchair that is propelled by means of an electric motor (usually using differential steering) rather than manual power. Motorized wheelchairs are useful for those unable to propel a manual wheelchair or who may need to use a wheelchair for distances or over terrain which

would be fatiguing in a manual wheelchair. They may also be used not just by people with 'traditional' mobility impairments, but also by people with cardiovascular and fatigue-based conditions.

Methodology:

ADXL-345 is a MEMS device which converts the gesture motions made by the user into electrical data which is sent to Arduino UNO based Arduino board. The microcontroller then processes the input received and drives the motors in corresponding direction, to move forward both motor rotate in forward direction and vice-versa for reverse direction, to rotate right, the right motor stops and left motor moves in forward direction and vice-versa for left rotation. In case of any presence of objects in the path movement path of wheelchair the ultrasonic sensor senses it and sends the input the microcontroller which in turn stops the movement of wheelchair thereby avoiding collision with the object.

Four general styles of powerchair drive systems exist: front, centre or rear wheel drive and all-wheel drive. Powered wheels are typically somewhat larger than the trailing/castoring wheels, while castoring wheels are typically larger than the castors on a manual chair. Centre wheel drive powerchairs have castors at both front and rear for a six-wheel layout.

Some manual wheelchairs may also be fitted with an auxiliary electric power system. This can take one of three forms: integrated with the hub of hand-propelled wheels, so that any force on the pushrims is magnified by the drive system, or mounted under the wheelchair and controlled as for a powerchair, but with the motive force either transmitted to the main wheels via a friction drive system, or delivered directly through an auxiliary drive wheel.

Results and Conclusion:

The gesture detection wheel chair is designed with two Arduino processor and controlled left, right, forward, and backward movement. Unlike traditional design the present method is successful in carrying paralysed people without meeting any error. Automated wheel chair can be used to help handicap people and the present work is aimed to help the paralysed people who can only move one side of their body or partially paralysed and help them to be able to move. In the present work the wireless system is successfully developed to move the wheel chair in various direction i.e., Forward, Backward, Left, and Right, or Stay in Same Position and also stop automatically when any obstacle is detected.

Future Scope:

(a) Automated wheel chair can be operated by a wireless remote which can reduce the wiring arrangements.
(b) Instead of using acceleration motion we can use eye retina using optical sensor to move wheel chair accordingly.
(c) We can use voice command IC's to interface our voice signal with micro-controller.
(d) This system can be extended by including GSM which sends an SMS during emergency.
(e) Research are going on development of handicap wheel chair using nervous system of human.