

SINGLE MOTOR OPERATED WHEELCHAIR FOR PHYSICALLY CHALLENGED

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Abstract: A joystick manage wheelchair may be very use complete for the handicaps. They cannot move anywhere like a everyday man or woman. For this reason they always rely on the other human beings. However the joystick manipulate wheelchair can eliminated this trouble and help them to transport anywhere. The motion of wheelchair may be control manually by means of the joystick. In maximum of computerized wheelchair use two motor. Each automobiles offer course to the wheelchair. This paper describes a machine in which handiest single motor are used. The total embedment of wheelchair, speed controller, equipment arrangement and a BLDC motor.

Introduction

The aim of this project is to use the wheelchair to move forward, backward, left and right. The general design of this project is the independence of the severely disabled person. This mechatronic toy stick is used for a number of functions such as speed control, gear control and vehicle control. This paper explains how a single-engine wheelchair can be used to control a wheelchair without any problem for the patient.

1. Working Principle

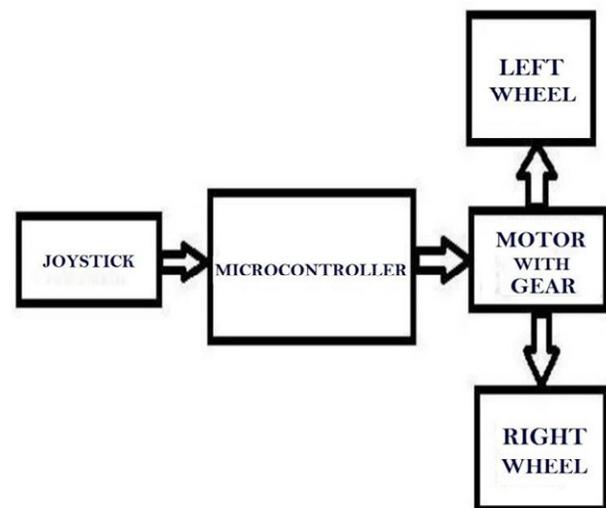
Initially the joy stick is rotated in the center. The joystick until stored in the center of the engine will stop. For this wheelchair use one BLDC engine with a power output of 500W. The motor is mounted inside the rear wheel. In a BLDC car the rotor has permanent magnets and the stator has an electronic control circuit, which uses sensors to operate it efficiently. Brushless motors improve high torque. When stopped, it decreases along the line as the speed increases. A battery is required for this 48V wheelchair. Four batteries connected to each series have a 12V and 26Ah rechargeable battery. Batteries are found inside the seats. Then use a 48V / 300-500 Watt speed controller. The speed control system consists of resistors, capacitors, MOSFET. These control the power supply and provide the desired value of the BLDC motor.

When you increase the rotation of the toy stick then change the magnetic flux and change the current on the BLDC motor with the help of a speed controller. The throttle position sensor was used to control the speed of the car. The TPS unit provides the throttle position voltage associated with a large BLDC motor. CU provides the required bias in TPS and TPS results. Ultimately the control gear depends on changing the gears position and compliance with the rear wheel. The mechatronic play stick changes position left or right and changes location settings in gear.

2. Block Diagram

The command is executed using a play stick and the command is sent to a microcontroller where the ATmega328p controller will issue a command. After performing, the controller sends a command to the gear control of a single BLDC motor. The BLDC motor is therefore rotated according to the command of the joy rod.

Fig.1: Block diagram of joystick control wheelchair



Analog Joystick



Fig.2 Analog Joystick

A joystick is known as proportional control. This is the most commonly used type of control. The joystick moves the powered wheelchair in the direction that the user points it in. Typically, the further the joystick is pushed, the faster the power wheelchair will go.

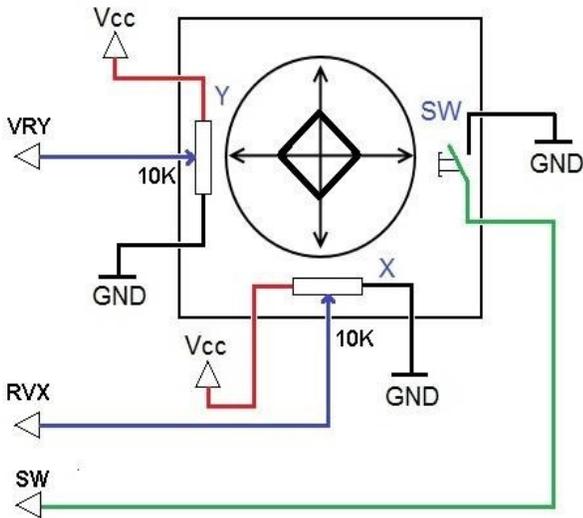
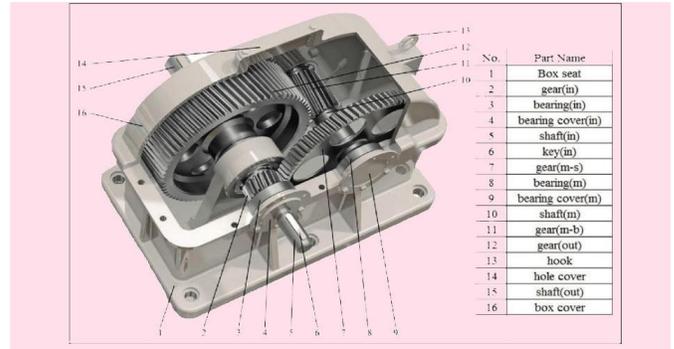


Fig.3 Analog Joystick schematic diagram

A joystick, sometimes called a flight stick, is a device that incorporates a rod that rotates on the base and reports an angle or direction to the control device. The movement of the cursor is controlled by moving the lever on the manual joystick. Input device widely used in game programs and sometimes, in explicit programs.

Gear System

The control gear depends on changing gear position and compliance with the rear wheel. The mechatronic play stick changes the position to the left or right and changes the geographical position of the gear according to the mechatronic play stick. Hand gears or wheelchairs are places for armrests and drive rear wheels. As a result, the wheels can be made smaller than normal. Hand gear does not make the wheelchair wider or wider, so the drive should be used in the home.



It consists of a free gear, connected to a rotating shaft in the center of the bearing. [2] proposed a novel method for secure transportation of railway systems has been proposed in this project. In existing methods, most of the methods are manual resulting in a lot of human errors. This project proposes a system which can be controlled automatically without any outside help. This project has a model concerning two train sections and a gate section. Its top or slotted for fixed with free gear and one small rod is connected to the movement gear of choice with the help of a mechatronic joystick wire.

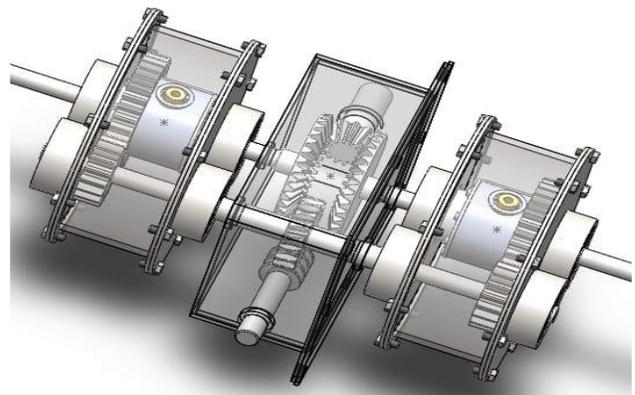


Fig.4 Gear System

3. Discussion

All electric wheelchairs can be controlled by a proposed work frame. One thing that should be required is the gear system. A limited play stick will suffice for this frame work but a strong field will be required.

4. Conclusion

This wheelchair is designed for people with physical disabilities who are unable to walk, so they can easily carry it with their hands using Joystick. The first test of driving a single-engine wheelchair using a gear system showed good control and ease of use. A wheelchair with several guides and flexible speed control makes it easy and understandable for a mechatronic toy stick with minimal effort on the patient. [4] emphasized that people who are visually impaired have a hard time navigating their surroundings, recognizing objects, and avoiding hazards on their own since they do not know what is going on in their immediate surroundings. . [6] proposed a system, this fully automatic vehicle is equipped by micro controller, motor driving mechanism and battery. The power stored in the battery is used to drive the DC motor that causes the movement to AGV. The speed of rotation of DC motor i.e., velocity of AGV is controlled by the microprocessor controller. This is an era of automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased.

5. References

- [1] "WORKING PRINCIPLE OF ARDUINO AND USING IT AS A TOOL FOR STUDY AND RESEARCH" by L.Louis, IJCACS, Vol.1, No.2, April 2016, pp.21-29
- [2] Christo Ananth, K.Nagarajan, Vinod Kumar.V., "A Smart Approach For Secure Control Of Railway Transportation Systems", International Journal of Pure and Applied Mathematics, Volume 117, Issue 15, 2017, (1215-1221)
- [3] www.engineersgarage.com/electronic_circuits.
- [4] Christo Ananth, Stalin Jacob, Jenifer Darling Rosita, MS Muthuraman, T Ananth Kumar, "Low Cost Visual Support System for Challenged People", 2022 International Conference on Smart Technologies and Systems for Next Generation Computing (ICSTSN), 978-1-6654-2111-9/22, IEEE, 10.1109/ICSTSN53084.2022.9761312, March 2022,pp. 1-4
- [5] http://www.electricaltechnology.org/2014/10/IC74_04-electronic-project.htmlk
- [6] Christo Ananth, M.A.Fathima, M.Gnana Soundarya, M.L.Jothi Alphonsa Sundari, B.Gayathri, Praghash.K, "Fully Automatic Vehicle for Multipurpose Applications", International Journal Of Advanced Research in Biology, Engineering, Science and Technology (IJARBEST), Volume 1,Special Issue 2 - November 2015, pp.8-12.

Model Figure

