

# Hand Gesture and Joystick Control Handicapped Wheel Chair with Solar Charge

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**Abstract** – Generally in our society the handicapped people are depends upon another persons those are physically healthy. Now we are walking with faster world so everyone is busy in their work or in their life. They can't give you time for caring of handicapped people regularly. So we are students of bachelor of engineering to find out the solution of this problem, we made a fully automatic wheel chair for comfortable and low weight to carry and more easily move from to one place to another place for physically handicapped people. The designing work and fabricating by using joystick and hand gesture based to control the wheel chair properly. generally the normal wheel chair are used to common purpose for handicapped people, But now a days we developed the technology as per our idea's. so our group developed the project is "Hand Gesture And Joystick Control Handicapped Wheel Chair With Solar charge". It is useful for the physically abnormal people, with his hand movement and using joystick. This technology is used to controlled and command the wheel chair, it is the smart option for the people for driving the wheel chair without any problem. The main feature's of this wheel chair is to used the solar charge system to charge the batteries by using solar panel. Now all handicapped people area accepting the smart innovative chair for daily uses and completed their incomplete ness and do all work themself.

**Key Words:** Joystick, ATmega328, DC Motor, Accelerometer Sensor, L293dIC, DC Motor

## 1. INTRODUCTION

The aim of the project is smart hand gesture and joystick control handicapped wheel chair with solar charge. The main innovative part of this project is the combination of two controlling method's to controlled gesture are the micro-electromechanical system accelerometer sensor are in used. It is very highly sensitive sensor which detect the tilt. The tilt identify to change the direction of the wheel chair by using accelerometer depending on the tilt. The gesture is the most frequently spelled term in the electronics field. In electronic technologies has more development to occurring micro electro-mechanical system. Accelerometer sensor is more important because those technologies are fully user friendly in nature. The

combination of joystick and micro electro-mechanical system accelerometer sensor based devised is easily to reach for common man. The smart wheel chair is totally electric powered chair. It's designed for indoor and outdoor purpose.it has used for those people who are not used the manual chair due to arm, hand, shoulder any other disabling condition and do not have leg's to drive manually the chair with their foot. The smart wheel chair has various power function such as tilt, legs elevation etc, or necessary to healt hand function. The wheel chair uses electric motors to move the wheels. They are usually power by 12 volt DC supply for Rechargeable batteries with solar panel. Similarly it has charge electric supply also available which provide separate charging unit.

## 2. HARDWARE DESCRIPTION

To fabricate the joystick and hand gesture controlled wheel chair various types of material are used, first of all wheel chair to fabricated by mechanically and to install the mechanical equipments. Like wheel, caster wheel, motor gear etc. Then the second part of electrical and electronics component proper connection and installation for wheel chair after the completion two section the wheel chair are turned to "Hand Gestures and Joystick Control Handicapped Wheel Chair with Solar Charge."

### 2.1 Mechanical Components

1. Wheelchair

### 2.2. Electrical and Electronics

1. Joystick,
2. ADXL335 accelerometer sensor
3. Microcontroller ATMEGA328
4. L298N motor driver module
5. Transformer 12 volt 2 amp
6. High torque 12 volt DC Gear motor
7. Solar panel 25 watt
8. 12 volt 12 amp chargeable battery

### 3. BLOCK DIAGRAM

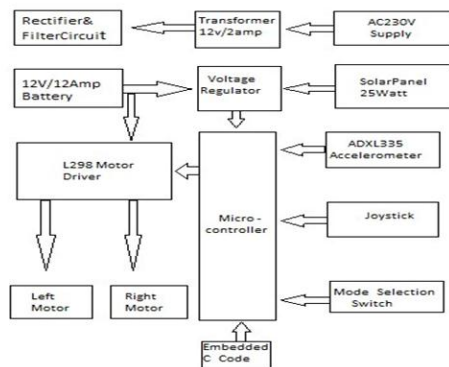


Fig-1: Block diagram of system connection.

#### 3.1. Analog Joystick



Fig2-: Analog Joystick

The analog Joystick has another name is control stick or thumb stick is an input data to provide for a controller that is used for two dimensional input. the analog joystick is similar to two potentiometer one is vertical movement and another is horizontal movement. there is another type of select switch it can be used as retro gaming and robotic control or racing cars.

#### 3.2. Arduino Atmega328



fig-3: AT mega 328

ATmega328 IC has 28 pins. Out of which, 20 of the pins function as input ports. It's work as an input to the 14 pins are digital and 6 pins function is given PWM output

and it has an analog input output used the 6 pins. The two pins are used to crystal oscillator and it provide the clock pulse for the ATmega328 Chip. Obviously the pins has got power to '2' of the pin is VCC and GND provide the supply for operation.

#### 3.3. 12V DC Motors



Fig -4: Gear 12v dc motor

In smart wheel chair, there are two gear motor are used. It moves any direction gives you commands like forward, reversed, left and right and micro controller is used to controlled the motor L298N H bridge driver ICs used for driving the motors.

#### 3.4 ADXL335

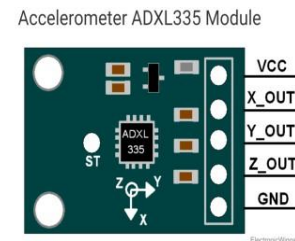


Fig-5: ADXL335

The ADXL 335 is measure the static acceleration due to gravity in tilt sensing application as well as dynamic acceleration resulting from motion, shock or vibration.

#### 3.5 L298 Motor Driver.

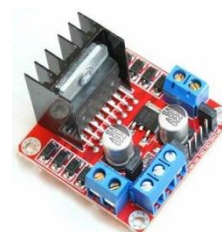


Fig-6: L298 Motor Driver

The L298 is an integrated monolithic circuit in a 15-lead Multi watt and Power SO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable

inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional supply input is provided so that the logic works at a lower voltage.

### 3.6 12 Volt 12 Amp Chargeable Battery



Fig.-7: 12 volt rechargeable battery

A rechargeable battery, storage battery, or secondary cell, is a type of electrical battery which can be charged, discharged in to a load, and recharged many times, as opposed to a disposable or primary battery, which is supplied fully charged and discarded after use. It is composed of one or more electrochemical cells.

### 4. OPERATION OF WHEEL CHAIR

In this project the controller is used as combination of joystick and gesture. These are controlled the wheel chair by two ways are shown in model given bellow fig (e). In this system few new innovative part available like the speed control. When the user required high speed it provide large supply to motor and to have slow speed then it provide few current to motor. The effective thing of this project is the two controller are used very easily and effectively. To provide the supply for the system by using 12 volt rechargeable battery and to ON the toggle switch and to gate the supply for motor and it will start and to control by using the joystick and gesture by navigating them forward, reversed, left and right as users says. It will work successfully. After work is done, off the switch and disconnect the power supply. The all programs coding is done by arduino and its loaded in to the arduino. The joystick and hand gesture are controlled all over to the wheel chair. After the installation of all the components according to block diagram we get desired output. We have successfully completed our project to specific changes in old technology. In present project we have to used the joystick, AT mega 328 controller, L298N motor driver, 12 volt gear motors, 12volt rechargeable batteries.

### 5. RESULT

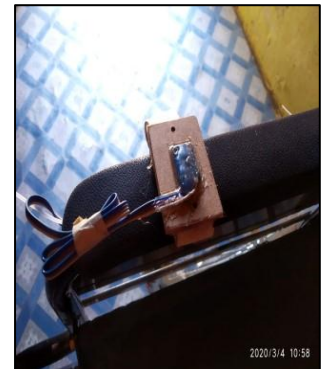


Fig-a: System Circuit Fig-b: Accelerometer Sensor

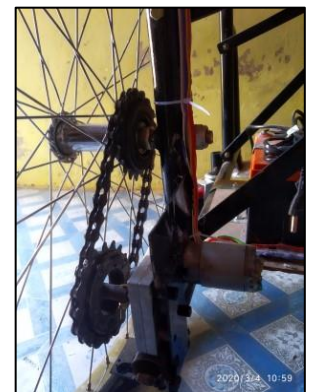


Fig-c: Analog Joystick Fig-d: DC Motor Alignment



Fig-e: Actual model

### 6. CONCLUSION

The smart wheel chair have designed for the handicapped people who can not walk so they can easily Handle this chair by using the joystick and hand gesture If they can't move their hand the gesture are mount at the neck of people or any part of body which they can move easily. For operation and effective cost of Wheel chair we are

eliminated the battery backup issue by using solar charge technology.

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