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GESTURE BASED WHEELCHAIR FOR PHYSICALLY CHALLENGED

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ABSTRACT

*Micro electromechanical systems (MEMS) is the technology of very small mechanical devices which are also called as Nano electro mechanical systems(NEMS). The main aim of this project is to control the wheel chair using MEMS.The MEMS will be fixed to the hand. Whenever the hand moves in a particular direction, the mechanical movement of the hand will be recognized by MEMS. MEMS converts this mechanical hand movement into equivalent electrical signals(X,Y,Z coordinates) and send it to the microcontroller. The communication between microcontroller and MEMS takes place based on i2c protocol. Wireless Wheel chair has two D.C gear motors. These motors move in 2D direction with the help of driver IC L293D according its input signals.This driver acts as H-bridge. Full wave bridge rectifier is used to rectify the ac output of secondary of 230/12V step down transforme**r.*

***Keywords*:** *ADXL335 accelerometer, IC 293D driver,ardunio software, ATMEGA328P microcontroller*

I. INTRODUCTION

If we want to go anywhere we should take help from any person for moving the wheelchair. This is the main drawback of existing method. The project deals with the control of a wheelchair for physically challenged . It involves the controlling of the wheelchair by the gestures made by the victim. The person sitting in the chair holds a small box or cap in which the circuit is fitted. The circuit recognizes the gestures made by the victim and transmits the values to the receiver bearing a motor driver board to which motors are fitted. The readings are accessed and the motors of the wheelchair are moved accordingly for the operation of the wheelchair.

II. ATMEL ATMEGA328P

The ATMEL ATMEGA328P is one member of the ATMEL 8-bit microcontroller family. Each member of the family has different amounts of RAM, ROM, I/O ports, etc. Depending on the number of external pins required they may come in packages with more than a hundred pins, or with as few as eight. The ATMEGA328P was selected for the EE 459 class for a variety of reasons. Availability of both the chips and development software. Available in 28-pin DIP (dual-inline package) that is into available IC sockets. Enough TTL compatible I/O pins (21) to handle most EE 459L project tasks. FLASH memory for easy and fast reprogramming.

2.1 ADXL335 Accelerometer

The ADXL335 is a low-power, 3-axis MEMS accelerometer modules with ratio metric analog voltage

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outputs. The Adafruit breakout boards for these modules feature on-board 3.3v voltage regulation which makes them simple to interface with 5V microcontrollers such as the arduino.

2.2 DESCRIPTION OF RX-TX MODULES

This radio frequency (RF) transmission system employs amplitude shift keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs.

III. FIGURES:

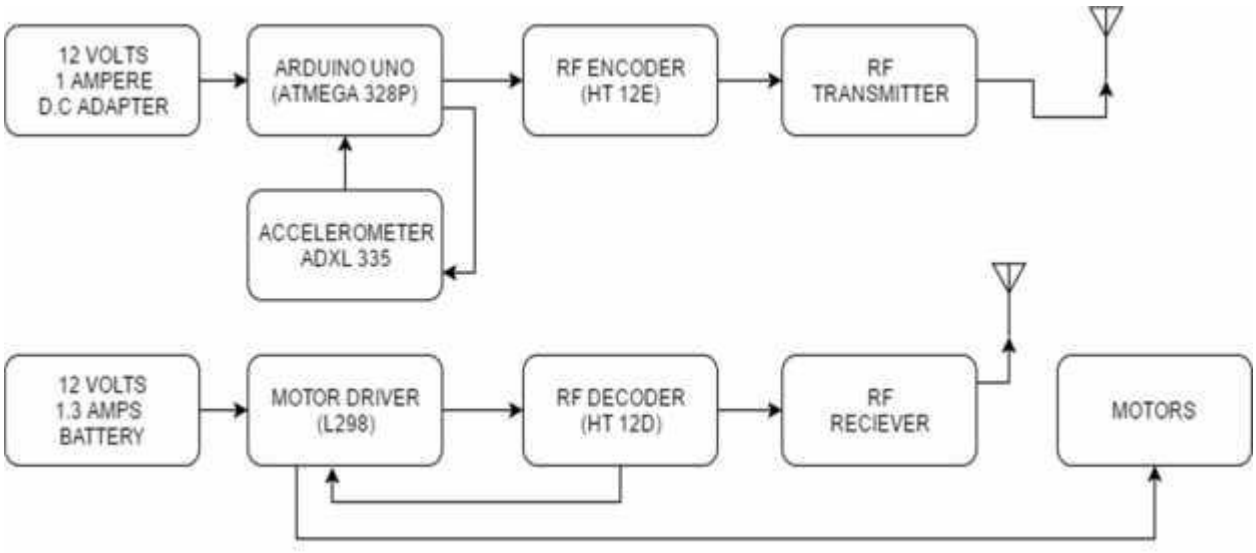

Fig.3.1 BLOCK DIAGRAM OF TRANSMITER AND RECEIVER

In this project the components used are micro controller, power supply, potentiometer, motor driver and dc motors. By using adopter which converts power supply from 230v to 5v and alternate current is connected. This dc supply is given to voltage regulator and the output will be regulated to 5v.This supply is parallel is given to micro controller, motor driver and dc motor.

The ATMEGA328P microcontroller is 28 pin digital IC. As this is the memory element IC, a crystal oscillator (11 to 12 MHz) which generates continuous clock pulse of constant frequencies and acts as a reference timer for the micro controller. As in general 1^{st} pin is used as reset button to refresh the memory allocation of the present stage and initialize the program from the first. The power supply for micro controller is given at 3^{rd} and 28^{th} pins.

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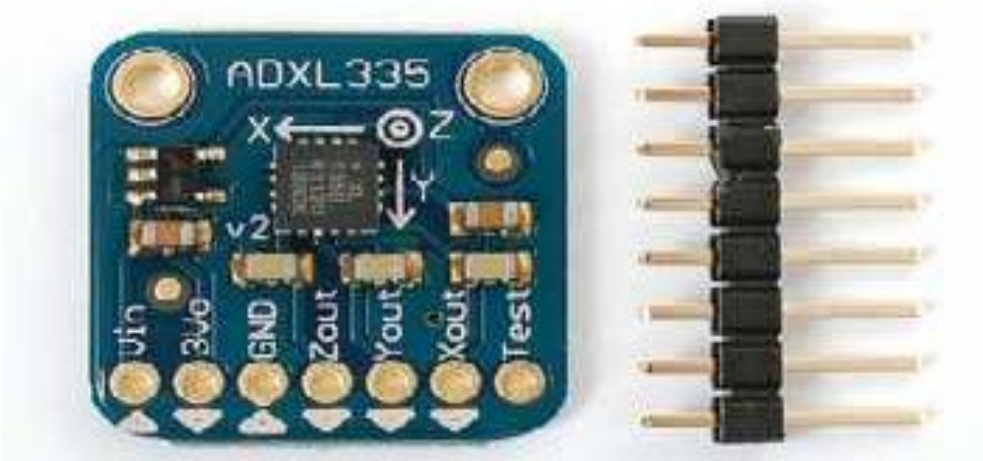
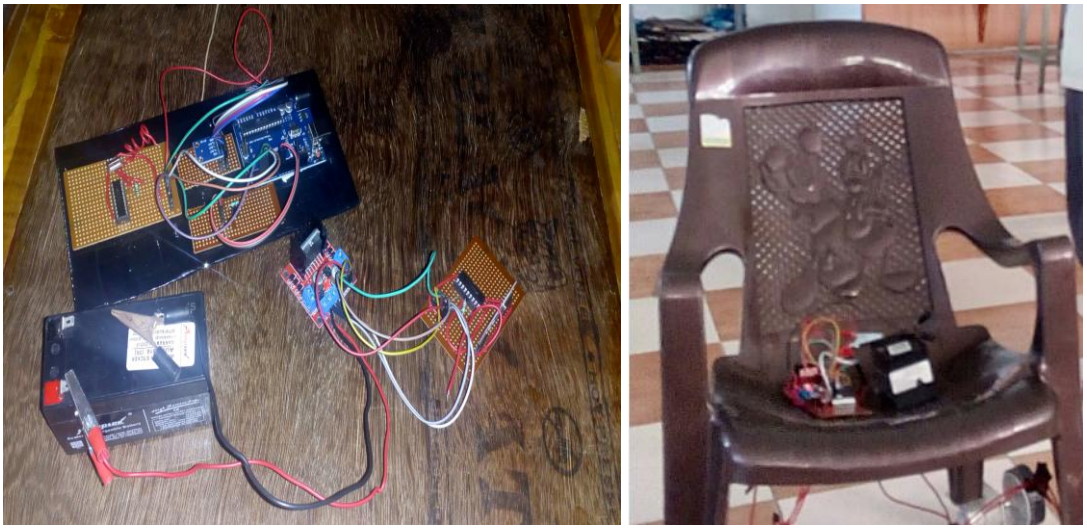


Fig.3.2. ADXL335 Accelerometer

The ADXL335 can measure at least +/- 3G in the X, Y and Z axis. It is perfect for high resolution static acceleration measurements such as tilt sensing, as well as for moderate dynamic accelerations from motion, shock or vibration.

The sensor consists of a micro-machined structure on a silicon wafer. The structure is suspended by polysilicon springs which allow it to deflect in the when subject to acceleration in the X, Y and/or Z axis. Deflection causes a change in capacitance between fixed plates and plates attached to the suspended structure. This change in capacitance on each axis is converted to an output voltage proportional to the acceleration on that axis.

IV.RESULT



V. CONCLUSION

As per the paper we designed with the micro controller and DC motors which have been successfully completed and tested out the output in different conditions of the timing principles. When started the construction of these we analyzed that varying of speed of the motor and its way of operation using timer. Among those the most

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available one and interfacing to microcontroller is easy with the DC motor using motor driver.

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2. T he ATMEGA328P microcontroller by Fezder
3. 30 Arduino projects for the Evil Genius, Getting Started with Arduino by MASSIMO BANZI