MEMS BASED SMART WHEEL CHAIR

AIM:

Design and Development of MEMS based smart wheel chair.

PURPOSE:

Physically challenged people can't do all works as like normal people. They have some physical limitations to do all kind of works. Especially people who lost legs are need wheel chair to move from one place to other place. Regular wheel chairs need some efforts though hands to move. There are smart wheel chairs available in market those can be controlled with battery power. But here we want to develop wheel chair that can be controlled by accelerometer (MEMS – ADXL335/345) and accelerometer communicates with wheel chair through RF communication. Proposed project title is MEMS based smart wheel chair using Arduino.

DESCRIPTION:

This smart wheel chair has two parts. One part is at patient side which can be placed on hand or head (helmet-type). Other part is at wheel chair. Both sides two Arduino controllers control entire wheel chair. At transmitter side Arduino connected to MEMS (accelerometer-ADXL335/345) and RF transmitter. At receiver side Arduino connected to RF receiver and L293d (H-Bridge). This H-Bridge can control wheel chair motors in various directions.

WORKING:

When patient moves his hand, then MEMS (accelerometer-ADXL335/345) generates X, Y axis values and send to Arduino. Arduino generates RF 4 bit codes based on X and Y values. RF receiver receives RF codes, based on these RF codes Arduino gives commands to L293d (H-bridge). Based on these commands Motors will be controlled. Patients can easily controls wheel chair just by moving hand. Wheel chair moment conditions will be displaying on 16x2 LCD display.

TECHNICAL SPECIFICATIONS:

HARDWARE:

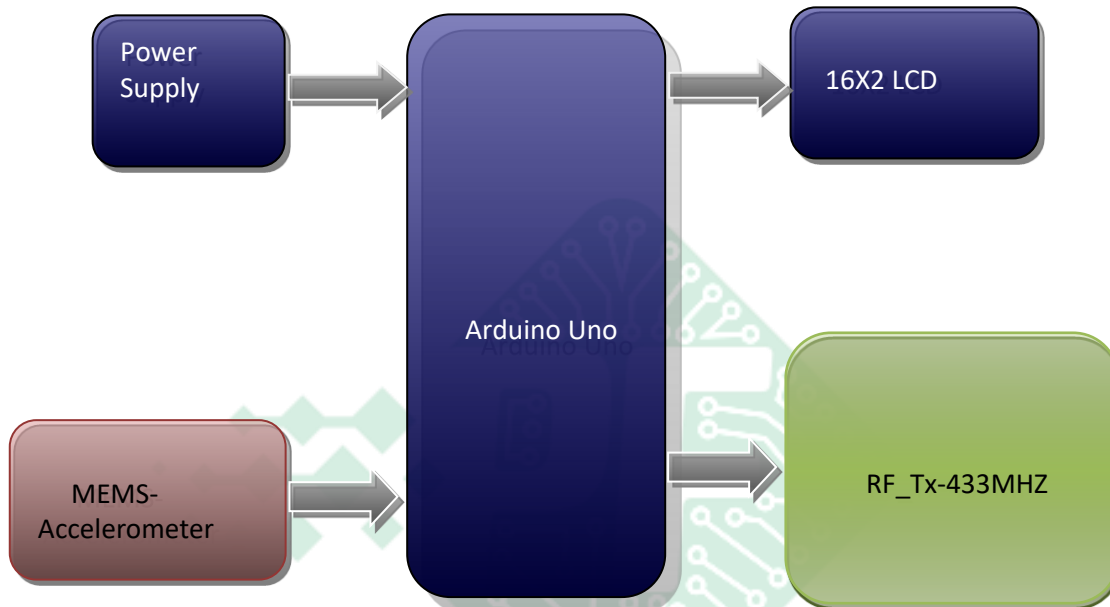|		
Microcontroller	:	Arduino Uno
Crystal	:	16 MHz
LCD	:	16X2 LCD
Wireless Module	:	433MHz
H-Bridge	:	L293D
Motor	:	12V DC Gear Type
Accelerometer (MEMS)	:	ADXL 345/335
Power Source	:	12v 1 amp DC Battery

SOFTWARE:

Arduino IDE

Proteus based circuit diagram
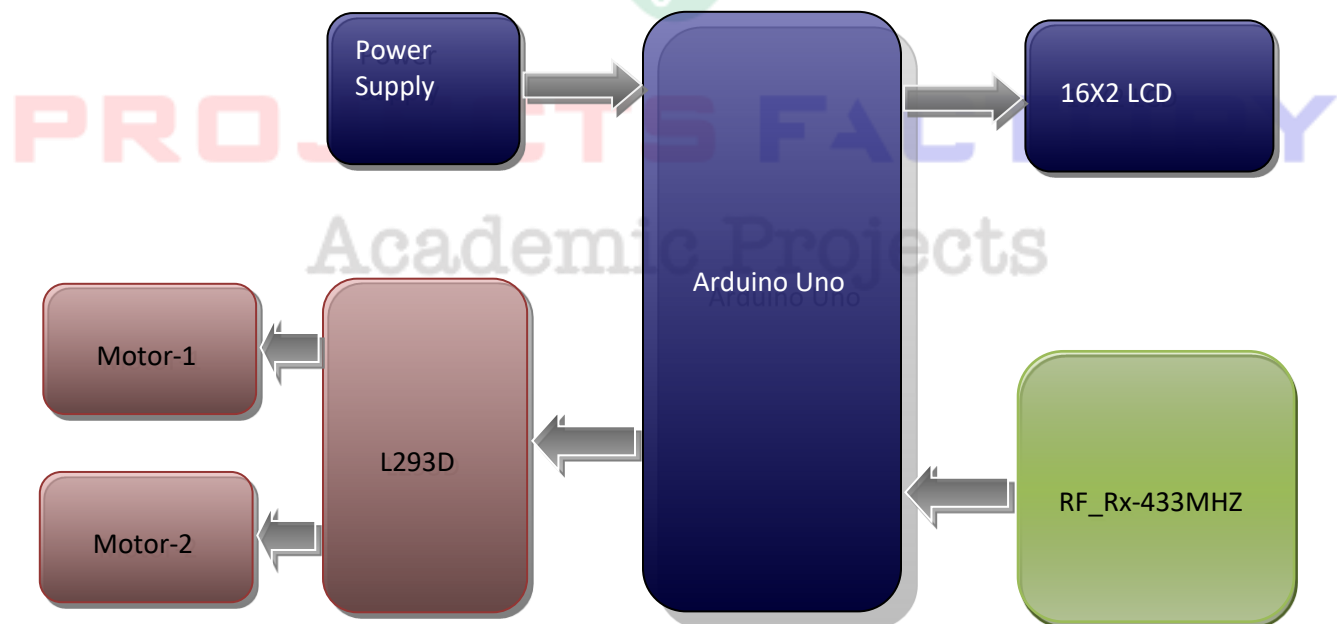
APPLICATIONS:

- ➢ Robotic Applications
- ➢ Wheel Chair Applications
- ➢ Smart Wheel Chair
- ➢ Gesture Based Applications
- ➢ Accelerometer (MEMS) based Applications
- ➢ Wireless smart wheel chair
- ➢ Wireless communication
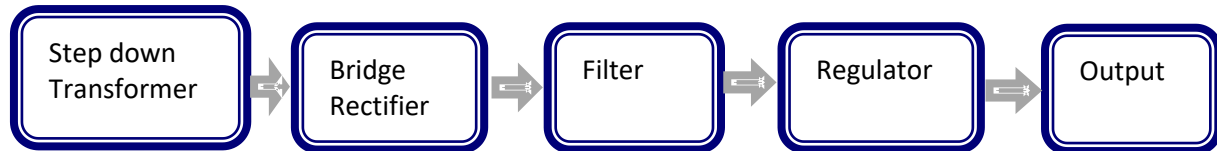- ➢ For Physically Challenged People

BLOCK DIAGRAM:

Transmitter Section:

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Power Supply ──────► Arduino Uno ──────► 16X2 LCD

MEMS-Accelerometer ──────► Arduino Uno ──────► RF_Tx-433MHZ
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Receiver Section:

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Power Supply ──────► Arduino Uno ──────► 16X2 LCD

Motor-1 ◄────── L293D ◄────── Arduino Uno ◄────── RF_Rx-433MHZ
Motor-2 ◄──────
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POWER SUPPLY BLOCKDIAGRAM:

Step down Transformer → Bridge Rectifier → Filter → Regulator → Output

INTERFACES COVERD:

- We have covered RF module 433MHz module interface
- MEMS accelerometer (ADXL335/345)
- Wheelchair Structure control (L293D and DC gear motors)