

# Synopsis on

## MULTI CONTROLLED ELECTRIC WHEELCHAIR

### 1) Project Reference Number

46S\_BE\_4028

### 2) Title of the project

DISABLED ASSISTIVE WHEELCHAIR

### 3) Name of the College & Department

Canara Engineering College, Department of Electronics and Communication  
Engineering

### 4) Name of the students & Guide(s)

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### 5) Keywords

Disabled Assistive Wheelchair, Multi Controller, Human Following Technology, Joystick controlled Wheelchair, Automated Assistive technology.

### 6) Introduction

The aim of this project is to provide a wheelchair designed for one side or partial body paralysis patients. Although access to wheelchairs is a human right, it is not the case. Hence providing wheelchairs that are affordable and accessible to everyone not only allows mobility but also gives everyone the right to access a professional & social life with fewer barriers. The wheelchair design presented in this paper is an automated system where the movement of direction is controlled by a Joystick and it has special feature called Human Following system, Obstacle avoidance system, Emergency Alarm all control units are connected to microcontroller Arduino Uno. Automatic or automation means, as by electronic devices, reducing human intervention to a minimum. This will reduce the time delay and human efforts in the medical system.

Electric wheelchairs make the user more independent as they do not have to rely on someone to push the chair. Nowadays more electric wheelchairs are introduced in society. Disabled Assistive Wheelchair is Mechanical, Electrical Controlled device designed to have self-mobility with the help of user command. This reduces the user’s human efforts and force to drive the wheels for a wheelchair.

### 7) Objective

Its main objective is to make an electric wheelchair to dedicate for our college which could help the disabled people who are visiting our college. Electric Wheelchairs save a lot of energy and give the flexibility to move around and to make it automated we implemented human following system along with obstacle avoidance and to make it reliable product the wheelchair is customisable with additional features as per costumer requirement. Possible customization we can update our wheel chair with more accurate Human following using Open CV, GPS & GMS module, Bluetooth controlled and many more etc. Electric wheelchairs serve the purpose of making more places accessible without too much tiredness and effort. It’s easy to control either by using, joystick or human following system.

### 8)Methodology

Disabled assistive chair is a chair with multiple controllers in it and with assistive features. In this project we focused on Mechanical design and Electronic design. Mechanical design defines all the technical calculations power required for wheelchair, speed, run time, Capacity of Wheelchair in kilogram etc which makes the wheelchair more efficient in the mechanical design as per we met our requirements.

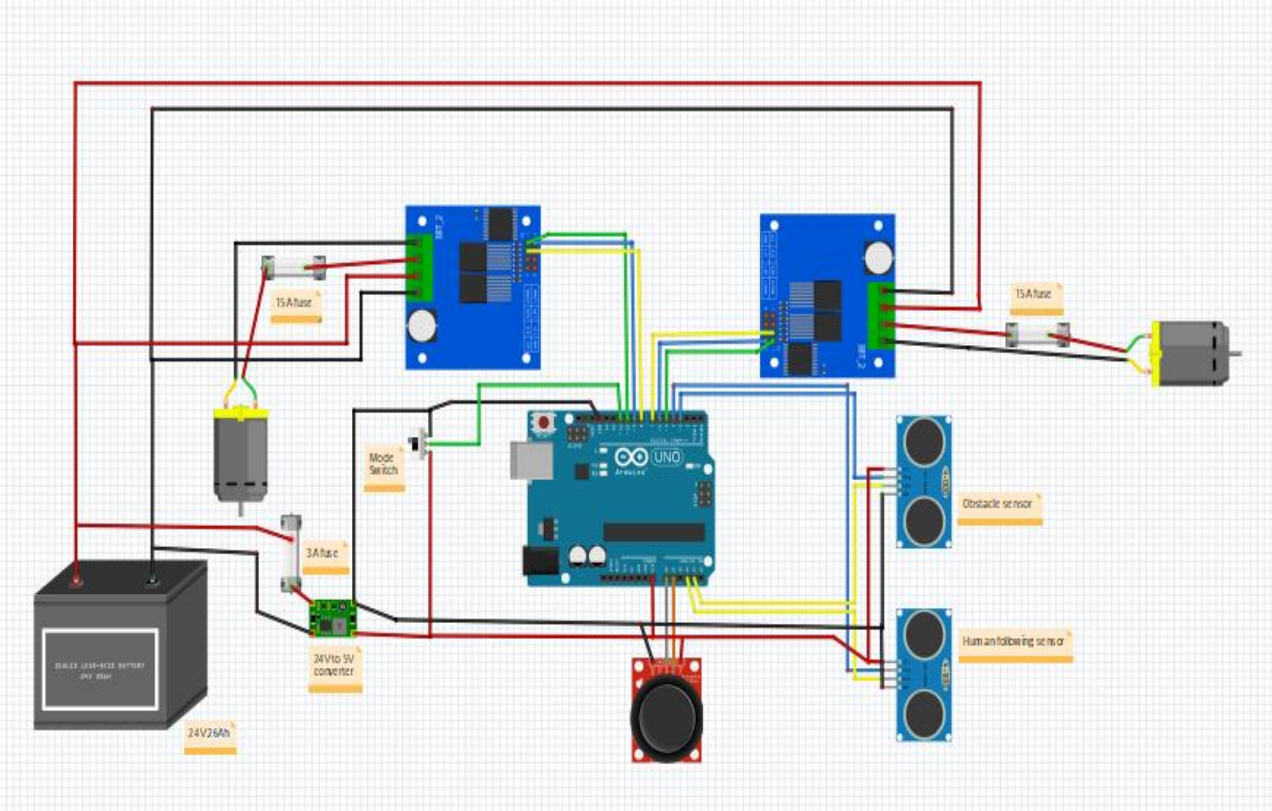


Fig. Circuit Diagram Inside control box

Electronic Design defines it has a control box in which all the electronic components are placed like microcontroller, motor driver, buck converter, fuse, power supply module etc. all the sensor, controller and motors are interfaced via control box. Arduino UNO is microcontroller we used to interface with all the sensors and motor driver, the control box we design in such a way that it is more reliable when it comes to updating wheelchair or upgrading wheelchair with extra features, and also if any short circuit or overload problem led to burnt of fuse which can easily replaceable by the owner by himself. Handle controller has Battery level indicator, Mode Switch, Master switch, Emergency alarm, Joystick controller.

## **9)Results and Conclusions**

Our prototype is one of a variant in the present-day Automatic wheelchair types so by using the Ultrasonic sensors, an Arduino Uno, DC motor driver modules, Joystick, human following system, emergency indication, obstacle avoidance and two DC motors the normal functioning of an Electric Wheelchair is best delivered efficiently to a person. The prototype is built with a microcontroller so including extra parts or features may require very small modifications on the main hardware like connecting the STOP button, Ultrasonic sensor, and ESC to the I/O pins of the microcontroller. For more stability, speed, and torque we can replace the motors of the wheelchair with a 24V dc geared motor as geared motors have smooth movement and provide good speed and torque. Also, in place of two single-channel DC motor drivers of 43A, we can use one speed and direction for both the motors flexibly. Ultrasonic Obstacle avoiding sensors can be placed for the safety of the model wherever it travels in mode-2. The performance of the system can be further improved in terms of the operating speed, features with feedback sensors and instruction cycle period of the microcontroller by using other controllers.

Handle controller has Battery level indicator which indicates the voltage level of battery and also charge in the battery. Master switch is used to turn on and off the wheelchair. Mode switch which has 3 state front state(mode-1) is for joystick control which is used to control the chair via joystick to move front, back, right and left, middle state is for null and back state(mode-2) it is used to control wheelchair via human following, it has ultrasonic sensor calculates the distance from the person who is standing behind the wheel chair and when the person move forward wheelchair will move forward along which the person walking behind the wheelchair, when wheelchair is in the mode-2, if the person or any wall is appeared in front of wheelchair it will stop due to obstacle detection though we implemented obstacle sensor.

## **10)Scope for future work**

This project is focused on Disabled people more helpful of old age people who lose their strength even to move hand or finger or paralyzed. We can upgrade this project to better version in upcoming future by implementing Artificial Intelligence Technology which make human following system more reliable and face recognition, path finder many features can be implemented. It is possible to upgrade with a smaller number of only required features so that which efficient enough to purchase by the lower class or poor people. In this project, the Arduino will be used as a controller of a wheelchair which will be controlled using joystick, human following as person walk from behind chair will move front, emergency indication and it will have a feature of obstacle avoidance system.

