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Microcontroller Based Wheelchair

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Abstract: **Technology has seen major change in last decade, because of rapid growth in the automation sector. We have to provide access to technology to all sorts of people. It is observed that healthy normal people are easily able to take good advantage of upcoming technology. But it is the poor, the disabled who are not able to take advantage of the upcoming technologies. So it is our motive to provide access to new technologies to the poor, handicapped, disabled etc. It can be done by introducing technologies into daily objects they use or work with. So we decided to introduce a new technological development which is used by handicap person. Designing a Motion Controlled wheelchair for handicap person is our major objective. The head movement of the user along the x-y axis will now drive the wheelchair. We are controlling the wheelchair movements using Microcontroller Atmega8 as it is easily available and very popular in the market. The primary sensor we are going to use is the accelerometer who's output will be the microcontroller's input which will drive the motor-driver circuit so as to drive the motors to move the wheelchair. Various methods have been proposed for allowing disabled persons, including a quadriplegic to control a motorized wheelchair. There are proposed methodologies in recent times which involve various gestures like hand gesture, accelerometer & voice controlled, EEG based system etc. A. Head Gesture In this paper, they utilized the acceleration data to recognize the hand gestures and then transfer the gesture information which indicates certain motion commands into the wheelchair's smooth motions. It's a trial method to realize the natural interaction for the older and handicapped with the wheelchair through the hand gestures [4]. B. Accelerometer and Voice Controlled This work describes a wheelchair for physically disabled people & developed it using voice recognition kit and MEMS motion sensor. A user dependent voice recognition system had been integrated in the wheelchair. In this way they had obtained a wheelchair which can be driven using both motion and voice commands [5]. C. EEG System This system proposes two control modes: Use of the gyroscope Emotive EPOC headset in order to detect head movements.**

Keywords: **Microcontroller Based Wheelchair, Microcontroller Atmega8, EEG System.**

1. INTRODUCTION

Wheel Chair is a mobility device designed for shifting patients, moving physically challenged people from one place to another with the help of attendee or by means of self-propelling. The wheel chair is divided into two different types based on the power used for mobility:

1. Manually powered wheelchairs.

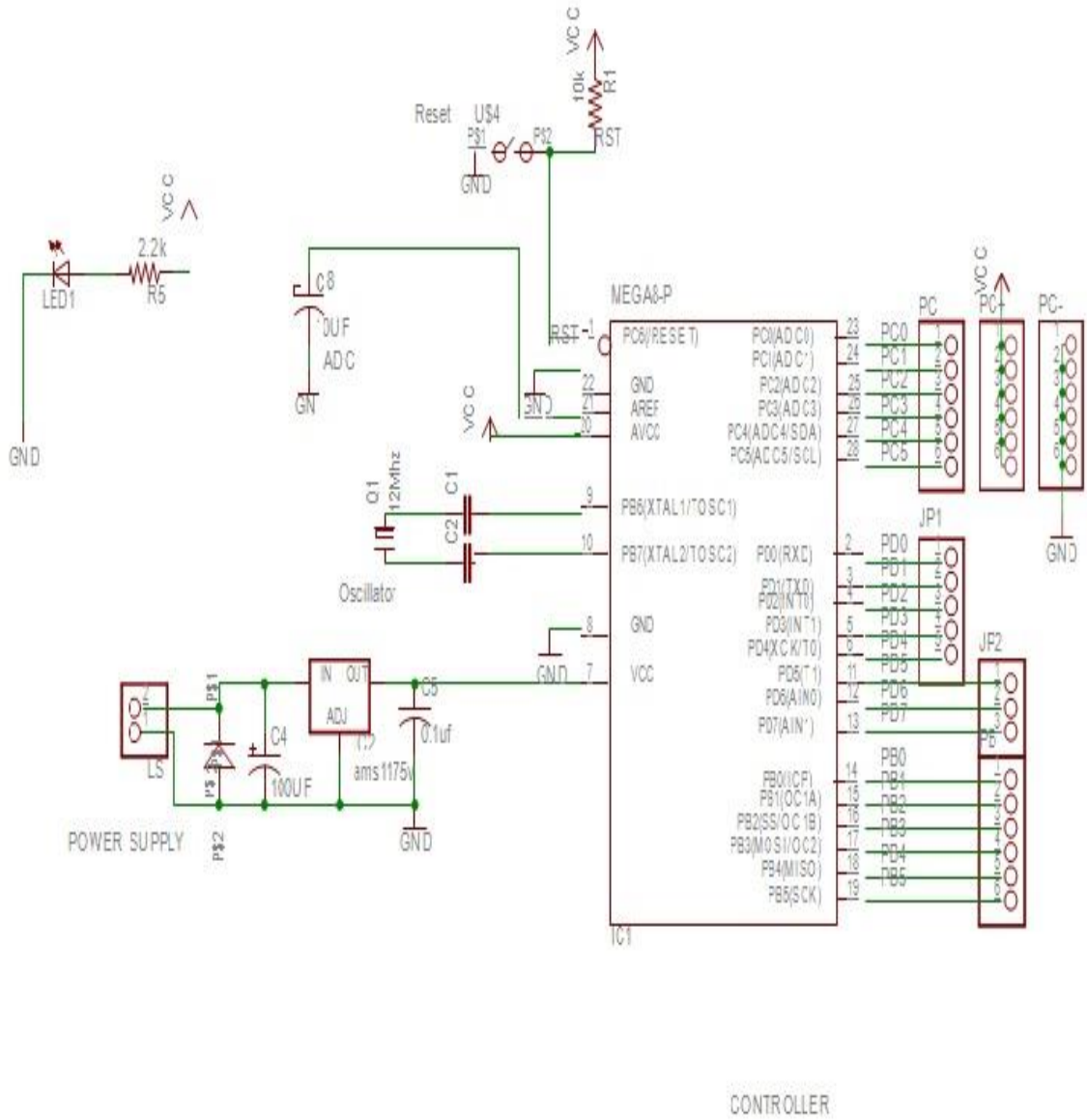
2. Electric powered wheelchairs (automated).

Manual powered wheelchairs are driven by manual power which is again classified into foldable and non-foldable with or without commode design. Electrical powered wheel chairs runs with electric power and operation of chair depend upon the instruction given by the patient hand or head movement or any other mechanism.

In this project we have deisgned a wheelchair which drives through head movement and hence the hands need not be used .So this wheelchair is best suited for a person with disabled hands. In our project we are using the head movement which give directions to microcontroller. The microcontroller produces 4 outputs which drive the motor driver circuit. The motor driver circuit is a circuit which converts the output of microcontroller into an electrical signal which will dive the dc motors according to the output of microcontroller. The accelerometer can be placed on a cap which the user will wear. So

the head movements will directly be sensed by the accelerometer. Accelerometers can be used to measure vehicle acceleration. They allow for evaluation of overall vehicle performance and response.[4] This information can then be used to make adjustments to various vehicle subsystems as needed. Accelerometers can be used to measure vibration on cars, machines, buildings, process control systems and safety installations. They can also be used to measure seismic activity, inclination, machine vibration, dynamic distance and speed with or without the influence of gravity.

2. CIRCUIT DIAGRAM



3. WORKING

The accelerometer mounted on the head gives four possible outputs to the microcontroller .Here only the outputs of x-y axis are considered and z axis output is eliminated. Head motion recognition is based on the forcemeasurements yielded by an accelerometer attached to the head. As mentioned, there are only four members of the motion set, which represent head leaned in four possible directions. This means that the algorithm needs to estimate when the head is leaned in one of the four directions. In other words, it is sufficient to read only the accelerometer data of two axes: in this case, x and y. The position of the accelerometer and the axes are defined in Fig. 3. The thresholds are accelerometer output values that the user defined at system startup. These represent the angles in all four directions by which the head needs to be leaned in order to issue a command to the system.

4. ADVANTAGES

1. No requirement to push wheels automatically
2. It provides wireless control so increases flexibility
3. Increases range of communication
4. Wireless communication offers less wear and tear
5. DC mototrs are easy to mount on the assembly

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