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Voice Controlled Wheel Chair using LabVIEW

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Abstract: In our day-to-day life many accidents are happening all-over the world. Quadriplegia, also known as Tetraplegia, is defined as paralysis caused by illness or injury to a human that result in the partial or total loss of use of all their limbs and torso. Those who are affected by this problem are taken care and given training to learn how to use wheel chairs. Our project mainly focuses on helping them to move around by using a Voice controlled wheel chair by just simply using voice commands. In this way it easier for them to move effortlessly.

Keywords: NI-myRIO, NI LabVIEW, Quadriplegia, Voice control

I. INTRODUCTION

Quadriplegia, also known as Tetraplegia, is defined as paralysis caused by illness or injury to a human that result in the partial or total loss of use of all their limbs and torso. Paraplegia is also similar to Quadriplegia but does not affect the arms. The loss is usually sensory and motor, which means that both sensation and control are lost. Tetraparesis or quadriparesis, on the other hand, means muscle weakness affecting all four limbs. Similarly for people whose Spinal cord has been injured, their lower body gets paralyzed and will not be able to move. These accidents have reduced slightly in India but still many people are suffering from the aftermath of their accidents. The statics of the accident happening to the age of the people is,

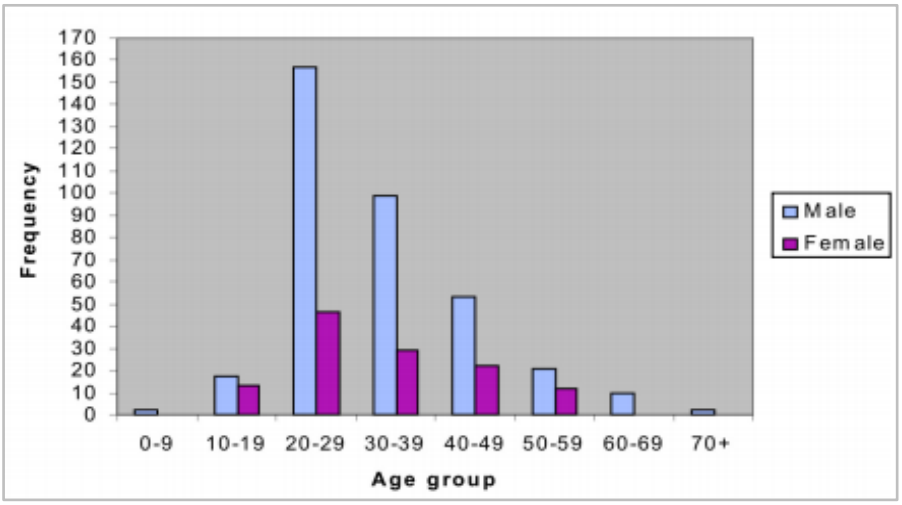

Figure 1: Occurance of Spinal Cord Injuries Respect to Age

In this project, we combined the concepts of voice recognition and electrical wheel chair. This is one of the efficient solution to this problem because the effort of the victim. From this solution the victim can decide over the wheel chair by themselves without relying on others. Here we give the user the choice of using the wheel in either manually/pushing mode or voice control mode.

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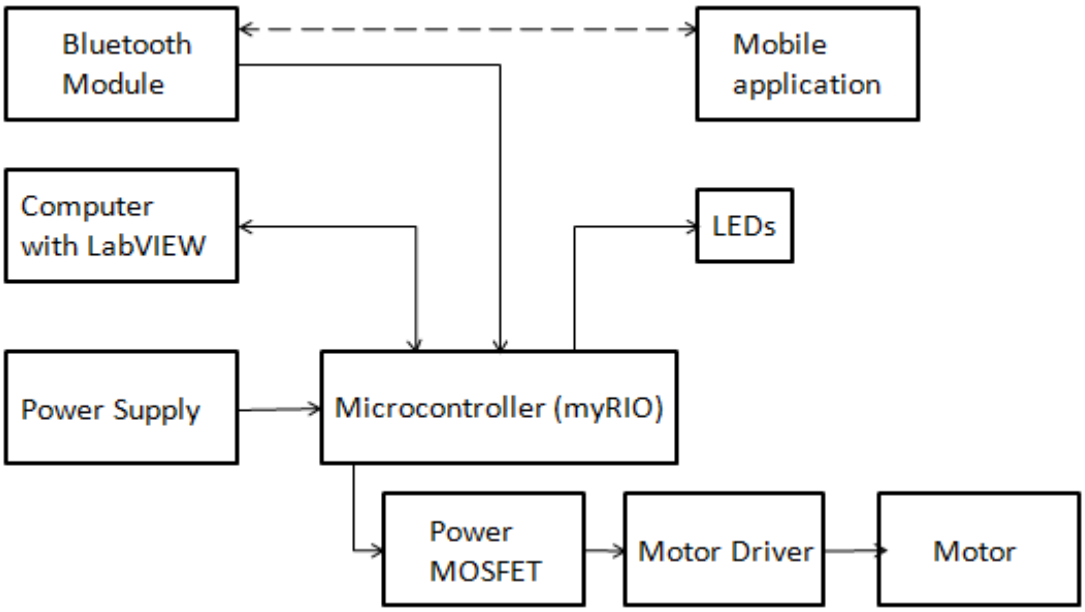

Figure 2: Block Diagram of Voice Controlled Wheel Chair Using Labview

Here the project is connected to the smart phone through the mobile application, Arduino voice control, which converts the voice input into text by using a Google service application, Google Speech-to-Text service, which converts the voice to text provided the Network connection is available. Through this mobile application the converted text can be sent through Bluetooth communication to the myRIO which is attached with a Bluetooth Module. Based upon the input to myRIO from the Bluetooth module the respective response is given by the myRIO to the hardware of the project. The digital out is used for speed and direction control of the motor using Power MOSFET (TIP120G) and Motor driver (LM293D).

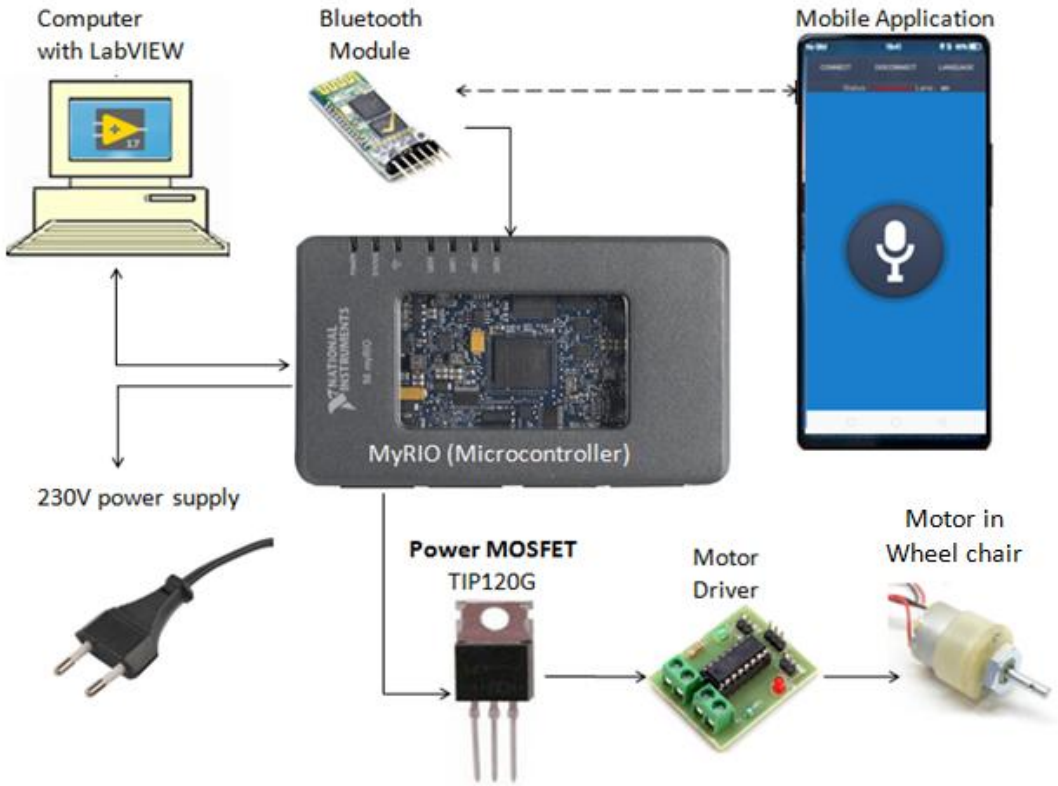

Figure 3: Schematic Diagram of Voice Controlled Wheel Chair Using Labview

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The Bluetooth module HC-05 is a MASTER/SLAVE module. By default, the factory setting is SLAVE. The Role of the module (Master or Slave) is often configured only by AT COMMANDS. The slave modules cannot initiate a connection to a different Bluetooth device, but can accept connections. Master module can initiate a connection to other devices. The user can use it simply for a interface replacement to determine connection between MCU and GPS, PC to your embedded project, etc. Hardware Features like typical - 80dbm sensitivity, up to +4dbm RF transmit power, 3.3 to 5 V I/O, PIO (Programmable Input/output) control, UART interface with programmable baud rate, with integrated antenna, with an edge connector.

Google Text-to-Speech may be a screen reader application developed by Google for its Android OS. It powers applications to read aloud (speak) the text on the screen with support for several languages. Text-to-Speech could also be employed by apps like Google Play Books for reading books aloud, by Google Translate for reading aloud translations providing useful insight to the pronunciation of words, by Google Talkback and other spoken feedback accessibility-based applications, also as by third-party apps. Users must install voice data.

It is a mobile application which uses the Google Text-to-Speech service to convert the input voice into a text. The voices will be stored in your G-Drive and will be converted and then the text is transmitted to the NI MyRIO through Bluetooth module.

Pulse Width Modulation (PWM), or pulse-duration modulation (PDM), may be a method of reducing the typical power delivered by an electrical signal, by effectively chopping it up into discrete parts. Duty cycle is changed according to the speed of the vehicle displayed in the program and then it will be given to MyRIO according to that, speed of the vehicle is adjusted.

This board allows control up to two 12V DC motors individually. Each motor are often driven at a maximum of 750mA offering an honest driving current for the motors. It supports both clock-wise and anti-clockwise rotation and speed control. It can easily be interfaced with a microcontroller such as 8051or with any DAQ. A DC motor is any of a category of electrical machines that converts DC electric power into a mechanical rotation.

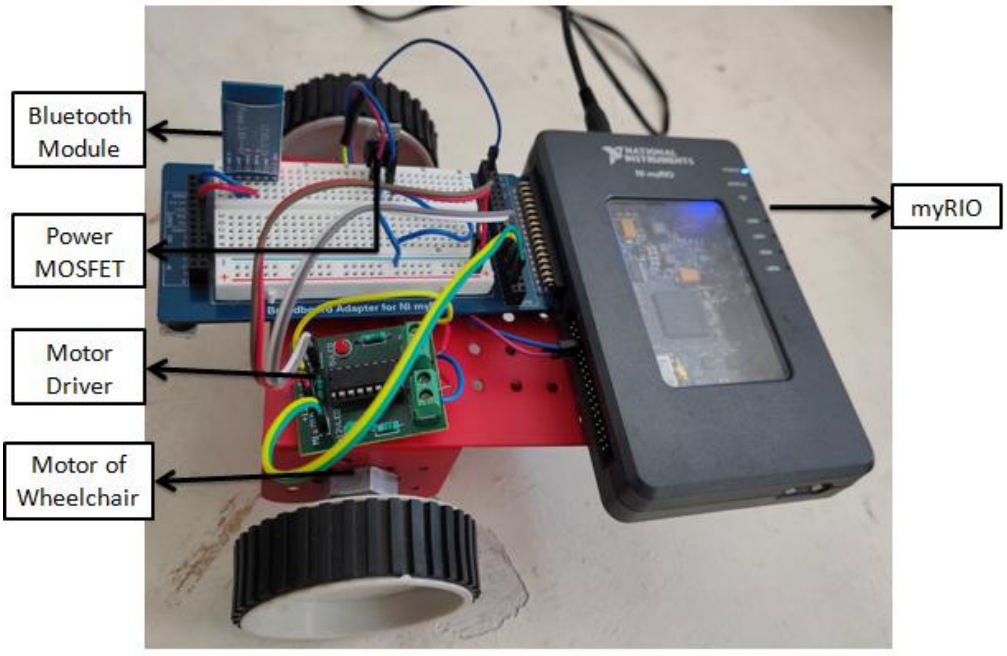

Figure 4: Voice Controlled Wheel Chair using Labview

II. RESULTS AND DISCUSSION

The prototype as shown within the figure above accepts the subsequent voice commands, supported which the various directions of motions possible within the DC motor are:

- **Reverse:** Both the motors within the reverse direction.
- **Turn Left:** Left motor in backward direction/Right motor within the forward direction.

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- **Turn Right:** Right motor in backward direction/Left motor within the forward direction.
- **Front:** All the motors within the forward direction and rotates at full speed.
- **Stop:** All the motors are stopped.

III. CONCLUSION

We conclude that this project will make the victim independent of others for their mobility and at the same time controlling the Wheel chair using commands gives them an ease for controlling the same.
Adding the feature of detecting the obstacle will improve the efficiency of the project.
Using eye-blinking sensor we can disable the command mode based in the victim's behavior.
Using image processing we can sense the inclination thus we can improve the functionality of the wheel chair.

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