

Touchpad and Voice Command Based Wheelchair

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Abstract - Our project is related to touch-pad and voice command based wheelchair. The voice controlled wheelchair system is by using the Bluetooth module. The system is designed to control a wheelchair using the voice of users. Wheelchair is facilitating the movement of people who are disabled or handicapped and elderly people. The wheelchair design will allow a people who are dependent on other. In our project, we are using AURDINO UNO microcontroller and direct current motor to movement of wheelchair. In this project we also use touch-pad for move wheelchair in different direction. In these we also add a more safety for a human for this purpose we are using IR sensor. Wheelchair stops automatically if there are some objects in front of the wheelchair. The system has been designed and implemented in a cost effective way so that if our project is commercialized the needy users in developing countries will benefit from it.

Keyword- Voice Controlled Wheelchair, Arduino Uno Microcontroller, Touch Pad, Bluetooth Module

I. INTRODUCTION

Our domain is Wheelchair. Wheelchair is used by the physically handicapped or paralyzed persons which are unable to walk or move their hands to drive the wheelchair and for this such type of peoples we have designed the circuit for wheelchair which is operated by his or her own hand gestures as well as by his or her Voice. It is cooperative for the handicapped people to make their life comfortable and simple. The design of Wheelchair uses less muscle movement and pressure than the self with the increase of elderly and incapacitated people, a wide range of support devices and modern apparatus has been developed to help to be improving their quality of their life. Some patients cannot be manipulating the wheelchair with their arms due to a lack of required force.

By using this method the wheel chair for handicapped person using their own voice and touch screen technology. It will enable a disabled person to move around independently using a touch screen and voice reorganization application which is interfaced with motors through microcontroller. When we want to change the direction, the touch screen sensor is modeled to direct the user to required destination using direction keys on the screen and that values are given to microcontroller. Depending on the direction selected on the touch screen, microcontroller controls the wheel chair directions. This can also be controlled through simple voice commands using voice controller. A speech reorganization system is easy to use programmable speech reorganization circuit that is the system to be trained the words the user wants the circuit to recognize. A speed controller works by varying the average voltage send to the motor.

II. EXPERIMENTAL METHOD

a) Arduino Uno Microcontroller

This microcontroller is the latest version after the Duemilanove with an improved USB interface chip. Like the Duemilanove, it not only has an expanded shield header with a 3.3V reference and a RESET pin AND a 500mA fuse to protect your computer's USB port, but ALSO an automatic circuit to select USB or DC power without a jumper.



Fig: Arduino Uno Microcontroller

Arduino is an open-source electronics prototyping platform which is based on flexible, easy-to-use hardware and software The Uno is pin and code-compatible with the Duemilanove, Diecimilla and older arduino so all your shields, libraries, code will still work. The Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller which is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment.

Microcontroller	ATmega8
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
Analog Input Pins	6
DC Current per I/O Pin	40 Ma
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega8) of which 0.5 KB used boot loader
SRAM	2 KB (ATmega8)
EEPROM	1 KB (ATmega8)
Clock Speed	16 MH

Table: Pin details of Arduino Uno microcontroller

b) Bluetooth module

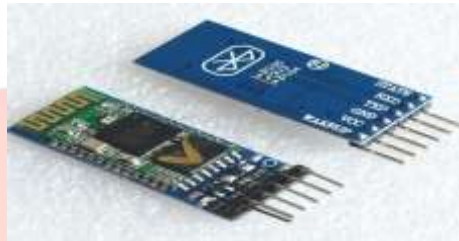


Fig: Bluetooth module

Here the HC serial Bluetooth product consists of Bluetooth serial interface module and Bluetooth adapter such as:-

1. Bluetooth serial interface module:-
Industrial level:-HC-03, HC-04 (HC-04-M, HC-04-5)
Civil level:-HC-05-D, HC-05(HC-06-M, HC-06-5)
HC-05-D, HC-06-D (with base board, for test and evaluation)
2. Bluetooth adapter:-
HC-M4, HC-M6

For converting serial port to Bluetooth we use Bluetooth module. These Bluetooth modules have two types one is master and other is salver device. Which is basically introduces Bluetooth serial module. The device named after even number is defined to be master or salver when out of factory and cannot be changed to the other made. But for the device named after odd number. By AT commands users can set the work.

Bluetooth serial module's operation doesn't need drive, and can communicate with the other Bluetooth device that has the serial. But communication between two Bluetooth modules requires at least two conditions:-

1. The password must be correct.
2. The communication must be between master and salve.

When HC-03 and HC-05 are out of factory, one part of parameter are set for activating the device. The work mode is not set, since user can set the mode of HC-03, HC-05 as they want.

c) Touch screen display

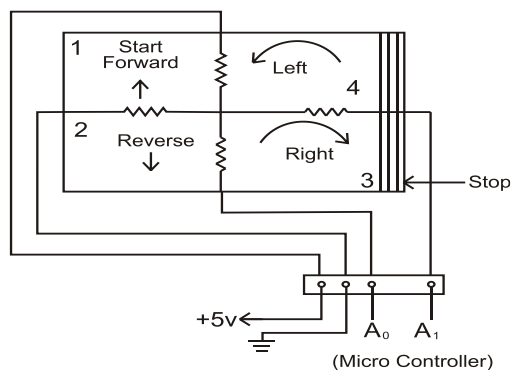


Fig: Touch screen display

Output of touch screen display is analog. To convert it into digital, output of touch screen display is given to microcontroller's pin analog to digital converter A0 and A1.

d) Motor driver circuit

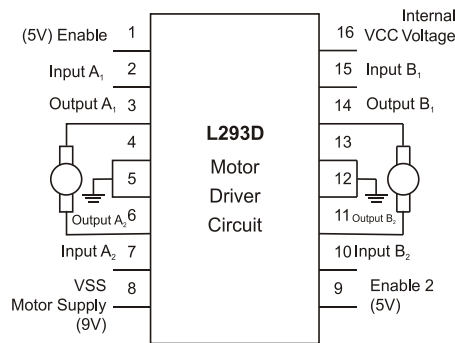


Fig: Motor driver circuit

In above circuit L293D motor driver IC is used. In which +VCC pin is given 5 volt. L293D is given supply through 9 V batteries to motor. Pin of L293D which are 4 & 5 are grounded and pin 13 & 14 are grounded. Two motor are connected with L293D. Output A1 and A2 are connected with motor A. output B1 and B2 is connected with motor B

e) DC Gear motor(30 RPM)



Fig 5.1.10 D.C. gear motor

The DC Gear Motors can be defined as an extension of dc motor which already had its insight details demystified here. A geared dc motor has a gear assembly of attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque in known as gear reduction.

III. BLOCK DIAGRAM

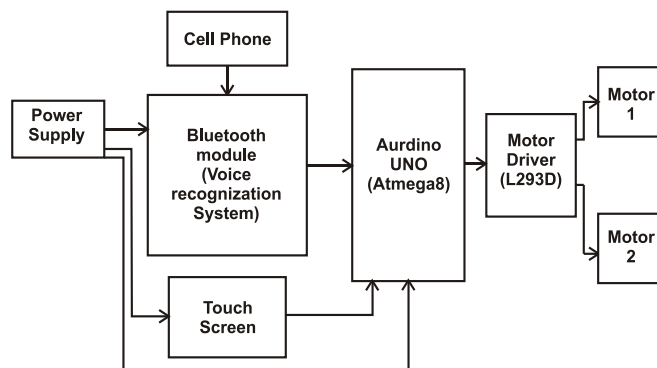


Fig: Block-Diagram

In above block diagram there are two input devices, voice reorganization system and touch screen display. In order to select a specific input device. We are using cell phone or touchpad device. The output of the touch screen is analog in nature, to

digitalize these signals we are using in built 6 channels Analog to digital converter (ADC) AURDINO UNO ATMEGA 8 microcontroller. On receiving the signal the microcontroller gives control signal to the motors through the control circuit. In this system, two D.C. Gear motor of 30rpm are used for controlling the two wheels of the chair independently.

For voice reorganization voice command is given to Bluetooth module by the cell phone. Bluetooth module is gives this command to micro controller. Microcontroller converts this command from analog to digital. And this signal controls the motor's direction. The systems have two input devices, voice reorganization system and touch screen display. In order to select a specific input device. We are using cell phone or touchpad device. The output of the touch screen is analog in nature, to digitalize these signals we are using in built 6 channels Analog to digital converter (ADC) AURDINO UNO ATMEGA 8 microcontroller. By receiving the signal the microcontroller gives control signal to the motors through the control circuit. In this, two D.C. Gear motor of 30rpm are used for controlling the two wheels of the chair independently. For voice reorganization voice command is given to Bluetooth module by cell phone. Bluetooth module is gives this command to micro controller. Microcontroller converts this command from analog to digital. And this signal controls the motor's direction.

IV. RESULTS



Fig: Exprimental model for touch-pad and voice command based wheelchair

V. CONCLUSION

Speech can be one of the desirable interfaces for wheelchair. When this project used by disabled person, he will be more comfortable, and self-dependent in his life. There is possibility to run the chair at different speeds and choose between joystick and voice control methods.

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