SMARTPHONE BASED WHEELCHAIR

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Abstract - *In this paper Smartphone based wheelchair is designed to build an automated wheelchair that helps the physically disabled peoples. Many wheelchairs are available with various running technologies, but the cost is very high and it is not much effective. The wheelchair is controlled with the help of an android mobile application. The purpose of selecting the android platform is that nowadays android mobile phones are commonly used. The user has to first get connected with the wheelchair with the help of application .This system allows the user to interact with the wheelchair at different levels of the control like left, right, forward, backward and stop. The other components that are required in the system are microcontroller, DC motors,servo motors,Bluetooth and GSM module,ADXL335 Accelerometer. The main aim is to make the system more simple and efficient.*

Key Words: Bluetooth module, GSM Module, Microcontroller, DC motor, Servo motor and ADXL335 Accelerometer.

1. INTRODUCTION

Many disabled people usually depend on others in their daily life especially in getting from one place to another. For the wheelchair users, they need continuously someone to help them in going the wheelchair moving. This wheelchair control system will help handicapped persons become independent. The system is a wireless wheelchair control system which employs Smartphone for controlling all its movements..The basic movement functions includes forward and reverse direction, left and right turns and stop. To accomplish this task, an assembly language program is written and stored in the controller's memory. With the introduction of android Smartphone in the system, the working becomes less complex. The system becomes quite user-friendly to the user. Servo motors are used which automatically corrects the position of the chair. Thus reducing back and hip pain occurred due to sitting in incorrect posture

1.1 RELATED WORK

1.1.1 MEMS based hand gesture wheel chair movement control for disable persons

In this paper movement of wheelchair is controlled by MEMS technology and accelerometer sensor is used to change direction of wheelchair according to the tilt.Here

microcontroller is programmed by using embedded C instructions.Here microcontroller is used to communicate with the ADC and motor driver. Tilt is detected with the help of sensor and direction is controlled according to instruction whether it is right movement or left movement.

1.1.2 VOICE CONTROLLED WHEELCHAIR

This paper describes intelligent voice controlled wheelchair which operates on user's voice commands. This system can be controlled by the simple voice commands given by the user. Depending upon the direction specified in the commands, the Arduino will drive the motors. The speech recognition is done by voice recognition module, connected with Arduino. The wheelchair would operate on real analogous voice signal of patient or user using the wheelchair.

1.1.3 JOYSTICK CONTROL WHEELCHAIR

In this paper movement of wheelchair can be control manually by the joystick. The command is implemented by using joystick and then the command is sent to the Arduino board where the controller ATMega328p will process the command. After processing the controller send the command in the form of digital signal to the motor driving IC and the motor driving IC control the movement of wheelchair. In joystick based wheelchair person with different disabilities may find it difficult to move joystick as it requires considerable amount of force moreover it may affect the reaction time of the wheelchair which may be dangerous.

2. HARDWARE REQUIREMENTS

- ADXL335-Accelerometer
- Dc motor
- ATMega328 Microcontroller
- GSM module
- L293D motor driver
- Servo Motor
- Bluetooth HC05
- Battery
- Servo Motor driver

3. SOFTWARE REQUIREMENTS

- Arduino IDE
- Blue term android application
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4. PROPOSED DESIGN

The block diagram of the proposed system consist of arduino uno,HC05 bluetooth module,GSM module,L293D driver, DC motor, Battery,Servo motors,ADXL335 Accelerometer.
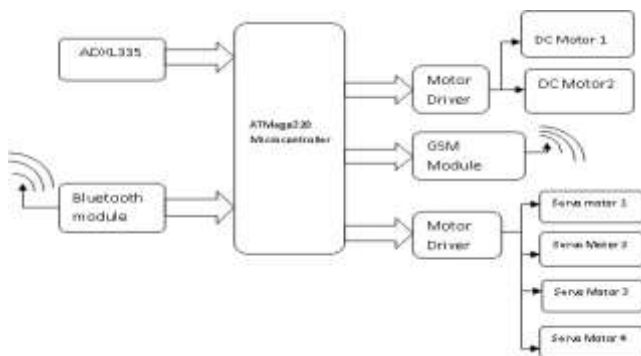

Fig-1: Block Diagram

Android mobile is used as an input. when the application is opened at that time an announcement comes to turn on the mobile Bluetooth .After turning on the Bluetooth of mobile the user has to pair the device for connecting the Bluetooth of android with the HC05 module. After making the connection the user can click on the numbers to make movement, here 1 is for forward direction,2 for backward direction,3 for moving right,4 for left turn,5 for backright, and 6 for backleft and 7 for stop. when the user needs some help then he can press number 8 to send the message for help. Accelerometer will sense the change in position of wheelchair and here servo motors are used to show the automatic correction of position of chair.

5. EXPERIMENTAL SETUP

Fig-2: Experimental Setup

6. RESULTS

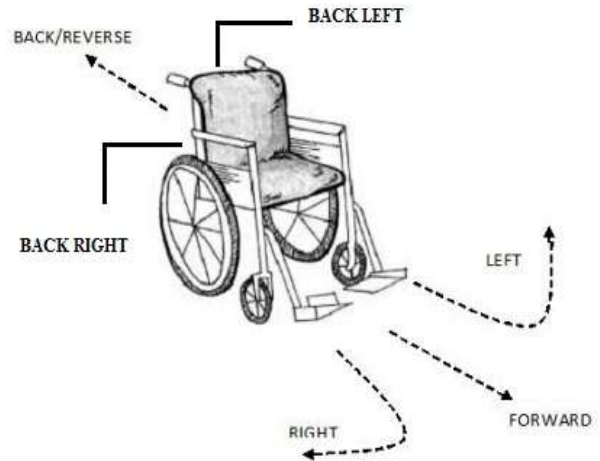By using this system we can control the wheelchair movement in the directions shown in fig below

Fig-3: Wheelchair Movement Paths

Table : Numbers and its operations

NUMBERS	OPERATION
1	Move forward
2	Move backward
3	Move Right
4	Move Left
5	Move Back Right
6	Move Back Left
7	Stop
8	Help Alert

7. ADVANTAGES

- More efficient way of working compared to manually operated wheelchair.
- This system is most suitable for elderly and physically challenged person those who have difficulty in moving around from place to place
- Less expensive then the conventional automatic wheel chairs.
- User friendly.

8. CONCLUSION

According to all these advancements and progressions especially for the disabled people, this project is an innovative idea that will help the life of the disabled persons. they will exert less effort as the wheelchair will be controlled via a specific android application.   Using

Smartphone controlled wheelchair disabled people can locomote from one place to another without requiring help from other person and also without requiring physical stress. The user interface of android application is simple and easy to use. The response is quick and accurate.

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