An Automated Wheelchair with Temperature Detection System

Sangeetha C N [1], S. Trilochana [2] & Gonepelly Kasthuri Goud[3]

[1], [2] Assistant Professors, Dept. of EEE, St. Martin's Engineering College, Secunderabad, Telengana, India.

[3] U.G. Student, Dept. of EEE, St. Martin's Engineering College, Secunderabad, Telengana, India.

sangeethaeee@smec.ac.in

trilochanaeee@smec.ac.in

gonepellykasthuri1@gmail.com

***ABSTRACT*:In recent days persons with motor disability and venerablemankind using motility dependable devices such as wheelchair are increasing. Many physically handicapped people are impotent to operate anelectrically energized wheelchair easily without making injuries to others. Also in the presently existing devices there is no provision to measure the body temperature of the person who is using the wheelchair, which is highly inevitable in this pandemic situation. This paper presents about hardware modelling of an Automated smart wheelchair with different control strategies and Temperature sensing. A prototype model of proposed system has been developed based on conventional wheelchair available in market. This model integrateda configured Electronic System, Obstacle motion control by Joystick. Experiments have been conducted on the developed automated smart wheelchair for testing its proper functionality.**

***KEYWORDS*:SmartWheelchair, Motor Disability, Obstacle detection,Temperature detection, Voice detection system**

I. INTRODUCTION

Physically handicapped people are unable to perform regular tasks firmly. The people especially with motor disabilities need assistance from chaperone for their daily activities. For such kind of people if there is an access to a means of independent mobility it can increase the productivity in many fields, for example vocational and educational field. Many technologies and several applications are available in recent days which helpphysically disabled handicapped people to carry out their tasks. Powered wheelchairs can be designed using intelligent system and robotics. This project is mainly focused to develop a smart wheelchair that incorporates multiple control strategies such as voice control of wheelchair, motion control by Joystickcontrol, Obstacledetection system,Temperature detection, etc. Obstacle detection system incorporates ultrasonic sensors. This will ease needy people with safe riding by recording the obstacles present on the way. Based on the movement of joystick the motors will drive wheelchair in any four directions and speed on each direction increases as far the one presses joystick controller. The presence of obstacle on the way is detected by ultrasonic sensor and the motion in all three directions except backward direction ceases, and system if on motion comes to rest.

II. PROPOSED SYSTEM

Till todayvarious kind of wheelchair prototype model have been developed. The proposed system comprisesa Temperature sensor for body temperature detection and consists a Voice Command interfacing system.This leads to a self- standing system as the user do not require any assistance for their movement. Temperature sensors measures the body temperature or even coldness that is generated and detect any physical change and produces digital or analogue output.

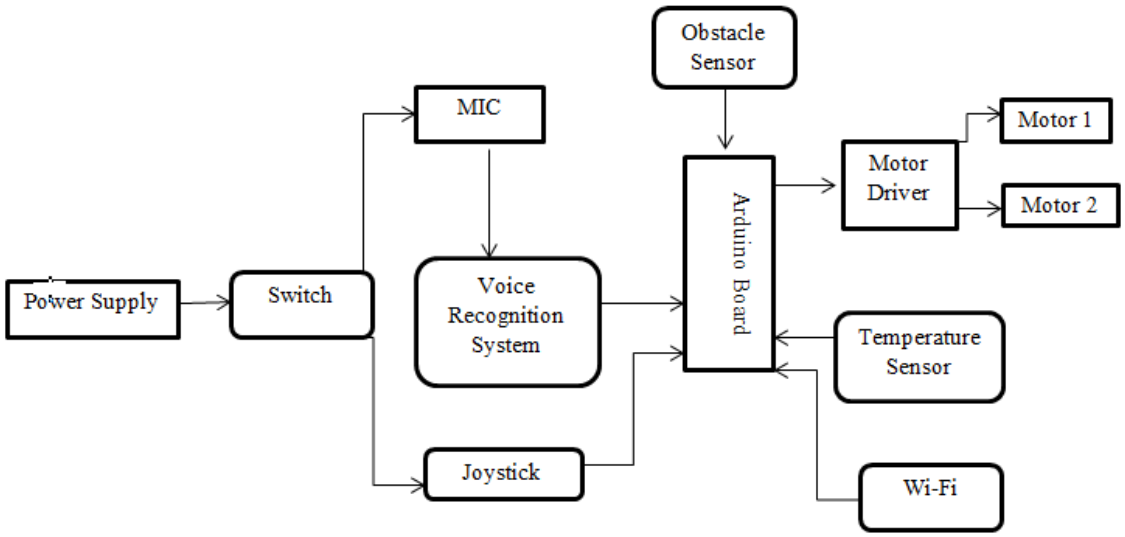


Fig 1.Proposed System Block Diagram

III. **WORKING**

Voice recognition system and Motor drive system are the important part of the proposed system. Wheelchair movement is based on user commands. The user can give five commands. Once the voice detection system recognizes the voice command, the commands are converted into its equivalent instructions. The output of voice recognition system has been transferred to Arduino which is being connected to a motor driver system,driving the motors.

A unilateral mic, voice recognition system, Arduino and motors are the main parts of a voice controlled wheelchair. Unilateral mic is the system input. It's efficient to take user's voice commands and neglect other noises. The voice signal output from the mic is transferred to the voice recognition system which acts as an interface between mic and Arduino. The Arduino then receive the output from voice recognition system thus converting it into machine understandable form. The Aurduino output is connected to a drive system which helps motors to drive the wheelchair anywhere. This system uses two motors connected with motor driver. Motor can work according to five different instructions they are forward, backward, left, right and stop. These five commands control the movement of wheelchair. The wheelchair responds to the voice command from its user to perform any movement's functions. Forward direction, left and right turns and stop are the basic movement functions. In order to recognize the spoken words, the voice recognition processor must be trained with the word spoken out by the user who is going to use the wheelchair.

Fig.2 Voice detection system

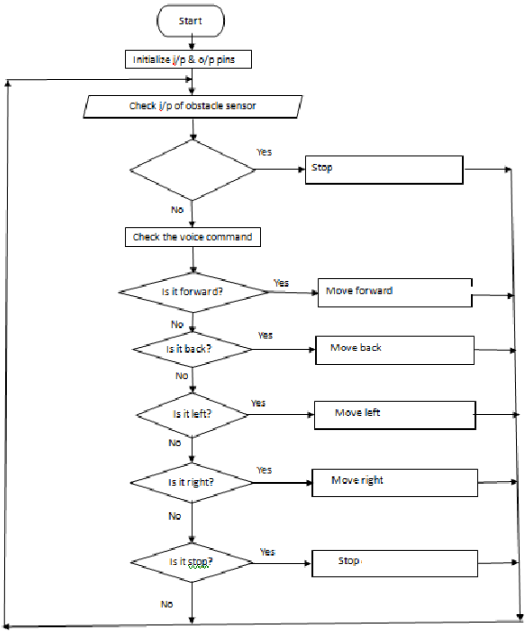


Fig.3 Flow chart

IV. EXPERIMENTAL RESULTS

A Joystick control also incorporated in the proposed system. The user can apply the command through joystick. The commands are then given to Arduino. Here execution of command happens. After execution, the controller sends the command in the form of digital signal to the drive system, which will control the movement of the dc motors. Hence dc motor rotation can control according to the command of the joystick.Generally smart wheelchairs have used wide range of sensors such as IR sensors, sonars, bumbers etc to find the hurdles in its path. This paper focuses on modelling wheelchair that provides crash free movement at minimum expenditure with limitedmodifications in currently available wheelchairs. Obstacle Detection system is an added advantage of the proposed model. Four Ultrasonic Sensors are the important component of obstacle detection system. These sensors where placed on four sidesin such a way to cover maximum area around. The output of the obstacle detection system is directed to Arduino. The structure of the system allows continuous communication with all sensor monitoring the presence of obstacles, to send the information received by sensors to the Arduino. If the sensor sensed an obstacle the microcontroller disables commands and directions that lead to the obstacle and kept only enabled commands in which the sensors have not detected anything.

The proposed system consists a temperature detection system that detects body temperature of the user.The body temperature is detecting by sensors which is attached to the wheelchair. A temperature display also incorporated in this project.Resistance temperature detectors (RTDs), thermocouples, thermistors, infrared sensor, and semiconductor sensors are the re different types of temperature sensors available in the market. Each of them has a particular operating parameters.

JOYSTCK CONTROL UNIT

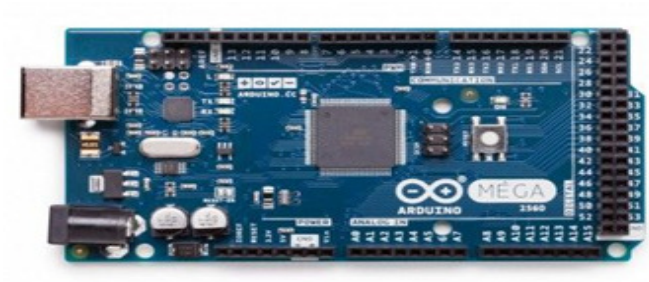
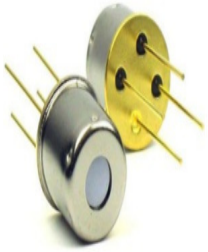


Fig 4.Joystick control unit

Resistor Temperature Detector (RTD)



IR sensor

.

Fig 5.Temperature sensors

Fig. (a) (b) (c) Testing results of joystick

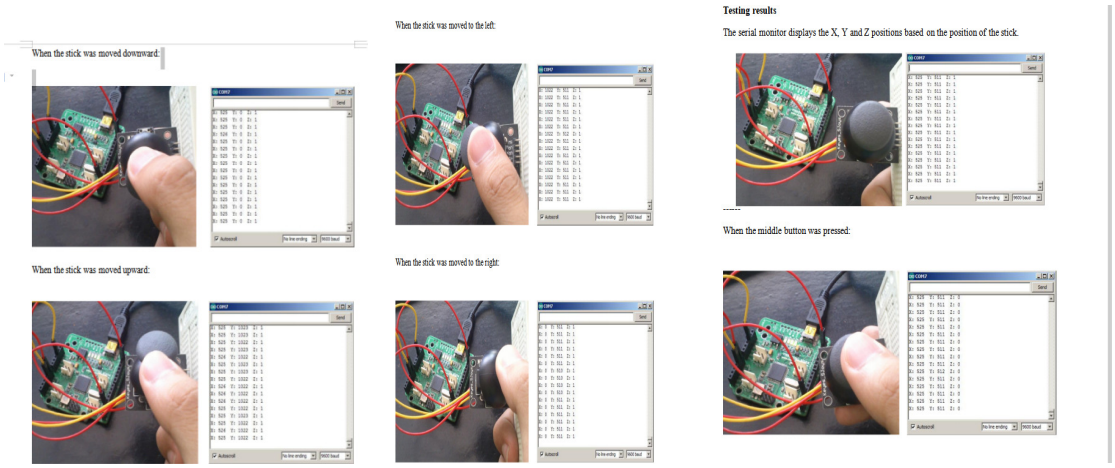


Fig.6 Test results

V. CONCLUSION

By incorporating Voice control, Obstacle detection system, Joystick Control and Temperature detection system we have designed a Smart wheelchair which helps the physically handicapped people more independent. This proposed system has some added advantages such as

- Effortless movement.
- Simplicity in design.
- Can implement in conventional wheelchair.
- Wireless control helps to monitor the wheelchair.
- Reduces manpower and dependency on other human drive.
- Can detect body temperature

Future Scope Of The Project

This project can further improved by a gesture control system for its movement , a system that gives voice message to health department if body temperature is high, also Solar Panels and Super Capacitors as battery backup for its continuous functioning.

REFERENCES

[1]. Puneet Dobhal, Rajesh Singh, Bhupendra Singh, Shubham Murari, 'Smart wheelchair for physically handicapped people using tilt sensor and IEEE 802.15.4 standard protocol', Conf. in Advances in Communication and Control System, 2013.

[2]. Arvind Prasad , Snehal Shah, Priyanka Ruparelia, Ashish Sawant, 'Powered Wheelchair', International Journal of Scientific and Technology Research, Vol. 2, No. 11,2013.

[3]. Yokoto S, Ohyama Y, Hashimoto H, Jin-hua She, 'Development of electric wheelchair controlled by human body motion', SIEC Annual Conf. 2008.

[4]. "Design and development of voice/joystick operated microcontroller based intelligent motorized wheelchair" H.R. Singh, Abdul Mobin, Sanjeev Kumar, Sundeep Chauhan" and S.S. Agrawal Central Electronics Engineering Research Institute, CSIR Complex, Hillside Road, New Delhi-110 012, India.