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SMART WHEELCHAIR IMPLEMENTED FOR IMPAIRED VISUALLY PEOPLES

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ABSTRACT

In this paper, we proposed an assessment robotic system for wheelchair control based on the touchscreen. This project is a more important issue in this day because of they are competing the normal persons in all the aspects by ignoring their disability. So that they need a personal assistive system which will help them to move from one place to another in their homes and offices. The implemented robotic wheelchair is having a capacitive touchscreen for controlling the movement of the wheelchair. There is also a voice playback module which is prerecorded with the voices like asking water, food and medicines. When the person needs something to bring, then simply he/she can tap a button on the touch screen, so that the other persons or care takers can hear the voice regarding their requirements and can assist them. The robotic vehicle will move according to the prerecorded paths in the home or office by giving the instruction on touch screen.

Keywords: Microcontroller, Touch Screen, Voice Module And Ultrasonic Sensor.

I. INTRODUCTION

Now a days disabled person is facing numerous difficulties.They usually be influenced by others. In order to overcome the difficult we proposed the system with touch screen and additional adding some extra sensor like an ultrasonic to detect the obstacle nearby surrounding area. As previously ,we have physical operation keys . By using such keys we can control the chair manually, which depends on the person. The person will acquire pressure every time by applying force on wheelchair. It is so difficult for operating a wheelchair. So to avoid that problem we proposed the project based on the touch screen.

As we have seen mobile phone in anywhere, i.e. touch screen plays a significant role. By expending touchscreen we can switch the movement of vehicle position depending upon our requirement. The person doesn't feel stressed by utilizing this sensor. It also consists of voice module which is used to hear the voice regarding their requirement and easy way to assist the person. It is simply self dependable. Whenever the person tab a button on the touch screen, the corresponding prerecorded voice will announce to the person. Then it is easy to recognize the person identification of any object or anything.

In the system also consists of ultrasonic sensor which is used to detect the obstacle occurred to the person near by area. By using this sensor we can easy to identify the object nearer to the person. With the help of the micro-controller the system can provide a desired task. The micro-controller we used in this system, i.e. ARM 7 LPC2148. It has several inbuilt features. It consumes less power compared to other controllers. The micro-controller is the heart of each and every component which plays a vital role and performs the predefined task.

II. PROPOSED SYSTEM

The proposed system is an advanced assistance, wheelchair based on a robotic platform. The system consists of a robotic wheelchair, which is controlled by a touch screen command given by the micro-controller. The micro-controller is loaded with all the predefined paths in regularly visited places of the disabled persons and when they press a command on the touch screen, the vehicle will move according to the path and if any obstacles are found in that path, the robotic vehicle will automatically stop. A voice playback module is connected for giving the voice info regarding the primary needs of the disabled person by getting a command from the touch screen.

2.1 Block Diagram

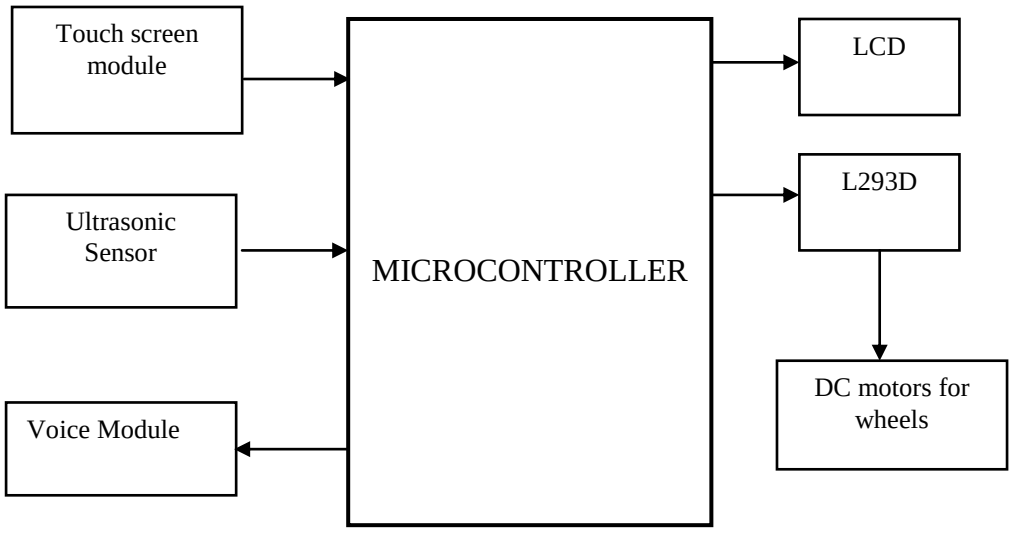

Fig 1 : Block Diagram of Proposed Method

The system includes micro-controller, touchscreen, ultrasonic sensor, voice module, LCD, L293D, and DC Motor. The micro-controller is an important role in all components. It is a mediator of all of devices, interfaces with them. The controls we are using in this project ARM 7 LPC2148. It consumes less power compared to different controllers. The controller is the main part of the product which performs all the required operations and will control all the remaining modules.

The touch screen is interfaced to controller for communicating with people in an easy manner. Previously we have buttons to control the specific task. Instead of buttons we use touch screen. Now a days touch screen mobiles plays an important role. By using the concept of the touch screen module we can implement in this project. By using this module the person can easy to communicate the devices by touch itself.

The ultrasonic sensor is going to give information about the distance of another vehicle from our vehicle. It needs to be placed on the front side of the vehicle; it is going to send pulses continuously in the straight path. The sensor is going to calculate the distance of the obstacle, according to the time taken for the rays to reflect back. If the object is within the prescribed range (predefined distance) then it is going to inform the driver that there might be a chance of accident or else it is going to leave that and again going to check for the distance of the vehicle.

DC Motors are used to create a movement in the wheel of the wheelchair. Motors will operate at high voltage, restrict these high voltages to the interface board by using this DC Motor driver board i.e. L293D.

Voice module is capable of recording the voices intended for eight dissimilar channels. We can prerecord the voices in eight dissimilar channels and play them whenever we wanted to play the voice. We can record the five voices for five sides. In case of voice recording and playing we have a major problem known as noise problem. Voice module consists of inbuilt amplifier. So we don't require any external amplifier. We can directly play from headphone speaker to large speaker size of 4W. We don't need an amplifier externally. Since we have an Integrated circuit it results in less power consumption and also a significant result in reduction of noise. Voice module is compatible of playing a small speaker to large speaker like 4W, by not using any interface like audio amplifier etc. This reduces the noises while recording and playing of audio signals.

III. WORKING

The system which provides security for disabled persons. In this rapid improvement in the modern world, people need to be updated in the technological form. The aim of our project is to develop a robotic wheelchair controlled by touch screen to be useful for severely disabled persons in doing their daily activities. The advanced intelligent robotic platform gives us an efficient moving in the robotic wheel chair. The following flow chart describes the overall step by step procedure of system design.

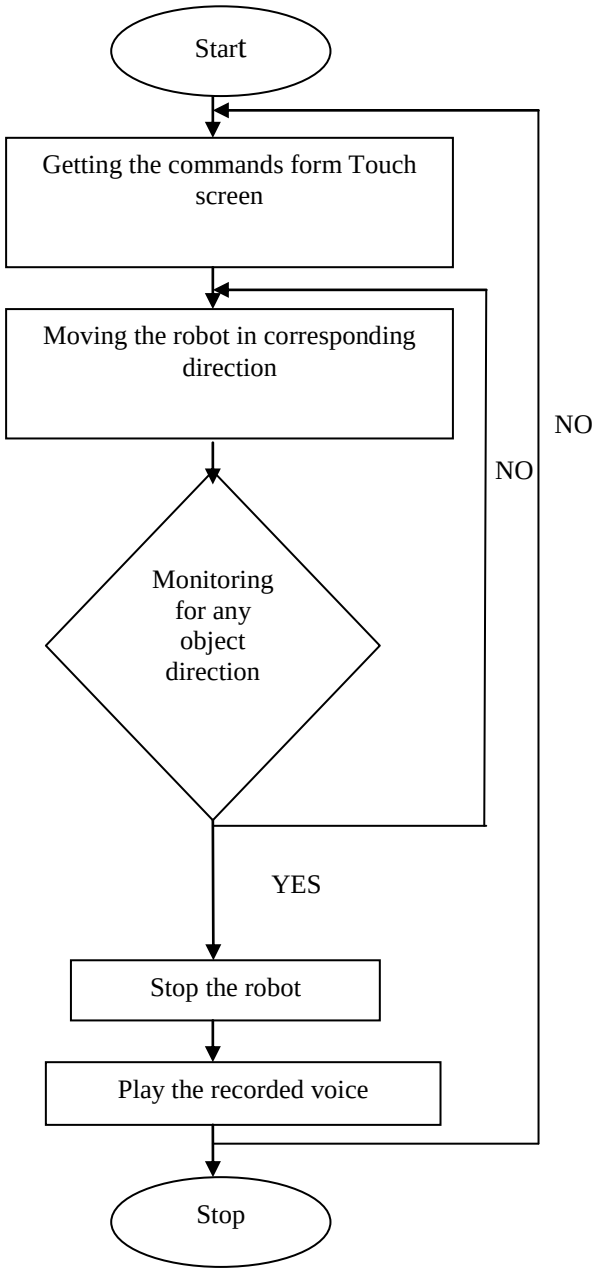

Fig 2 : Flowchart of System Design Model

IV. SOFTWARE IMPLEMENTATION

In order to communicate with the hardware we require a predefined software. An embedded system we require both hardware and software, it is mandatory to perform a specific application. The hardware components will run according to the instruction given to the program. The software tools should be selected based on micro-controller using in this application. The following some of software tools are used in this project.

1) MDK Keil µVision

2) Flash Magic

4.1 Keil µVision

The Keil µVision is an IDE which will consist of complete programming environment for various micro-controllers. Keil is having a C editor, ANSI C cross compiler, debugger, and a hex file generator in it. It supports programming for various 8-bit, 16-bit and 32-bit micro-controllers.

4.2 Flash Magic

It is simply a programming dumping software. Micro-controllers can only understand machine language. Whatever we are writing in the program, that we need to convert into machine level language. That machine level language format of the program, we call it as Hex file. After completion of writing all the code, the programmer needs to write the hex file into the micro-controller.

V. RESULTS

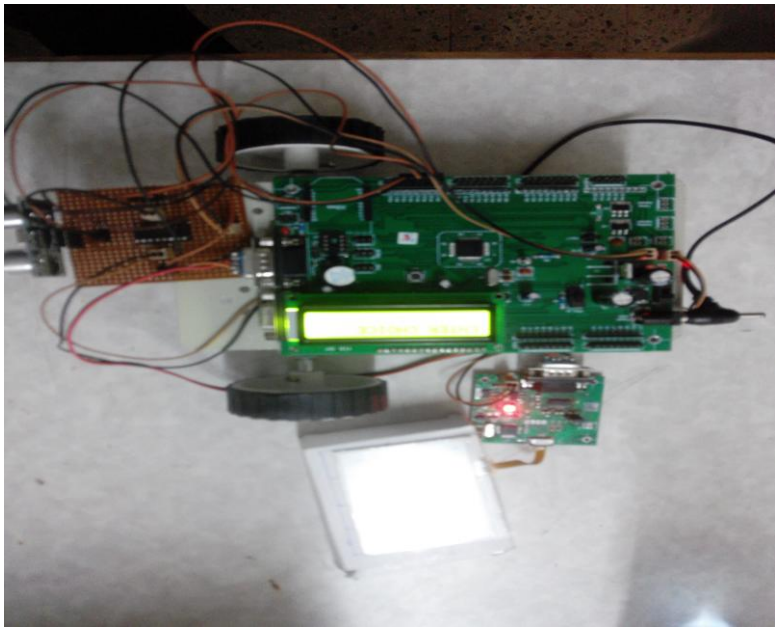

Fig 1: System Design Model

VI. CONCLUSION

In the real time application, we can use long range ultrasonic for the sensing of obstacles in a little far distance and always monitor the position of the wheelchair like as it turn front or back or right or left movement of directions. Therefore, this project supports to assist the physically challenged persons to move freely with their own control of the wheelchair by using the touch screen and simultaneously play back the recorded voice.

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