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Smart Wheelchair

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ABSTRACT

This project is about developing a smart wheelchair which operates on voice of patient or user and mobile touchpad on that wheelchair. Few patient such as quadriplegics and multiple sclerosis type cannot drive joystick operated wheelchair so they are dependent on other people or helpers to move from one place to another and in such way they don't have mobility. The motor control and drive system wheelchair which consist of microcontroller, DC motor and sensor circuitry. The voice recognition system is used to detect and recognize the patient's voice and its output in digital form will sent to microcontroller which then controls the wheelchair according to its program.

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I. INTRODUCTION

This system includes the wheelchair that can control using voice or touchpad and it monitor the patient conditions like temperature ,heartbeat...etc. And according to patient/user health conditions it will inform the doctor and family member via text message. People with disabilities meet barriers of all type. As per the survey more than 7 percent of manual wheelchair users will develop shoulder pain at some in their life. But anyways the quadriplegic patients cannot move hence manual and even joystick operated wheelchair are out of question for the quadriplegic patients .So the voice operated wheelchair or smart wheelchair will solve the all query about the mobility of handicap patient and make them independent of mobility. In present world the medical field is very much focuses about to care the patients and the handicapped one are like to leave individually without the help of any others so, this system will be very usefull and effective for those patients.

II. LITERATURE SURVEY

Authors in [1] have explained various solutions of relevant problems. The main issues in number plate recognition are climate conditions, environmental interference, and

accuracy of number plate localization. One of the methods of recognizing the number plate is utilizing the color characteristics and probability distribution of the license plate between the two lights. Another popular method of number plate recognition algorithm is template matching. The License Plate Detection algorithm based on template matching was designed and written for managing the parking lot system by identifying the unregistered cars from off campus. At the same time vertical edges-based car license plate detection are popular too. However, other prefers to find the location number plate using horizontal and vertical projections of image. The Genetic Algorithm and Hough transform can be applied to detect the license plate area. At the same time, the combination of edge statistics and mathematical morphology showed good results and they use block based algorithm. Another algorithm, which is based on rows' distances counts the existent edges and if this number is more than some threshold value then number plate is recognized. Wavelet transform-based algorithm extract the important features to be used for number plate localization. The advantages of this algorithm, it will allow to find more than one number plates in the frame.

Authors in [2] have presented a new method of segmenting the characters of the license plate based on a majority pixel

value data. They have also addressed the issue of building the databases as per user convenience so that the user has the option to train the neural network with the fonts those are more relevant and mostly used in any particular geographical location. This is totally optional i.e. the user can change the network if they want to for better results. This algorithm has been tested on 150 images and it is found that the accuracy of the system is about 91.59%. The major sources of error were the skewness of the number plate and extreme variation in illumination conditions, which can be aptly removed by enhancing the approach further.

Authors in [3] has proposed a feed-forward ANN-based OCR algorithm that meets the requirements of a real-time ANPR system. A parallel and pipelined architecture based on the proposed algorithm has also been presented and it has been successfully implemented and tested using the Mentor Graphics RC240 FPGA development board. The proposed architecture requires only 23% of the available on-chip resources of a Virtex-4 FPGA, runs with a maximum frequency of 65.7 MHz and is capable of processing one character image in 0.7 ms with a successful character recognition rate of 97.3% when using a database of 3570 UK character images. The 23% usage gives enough room for the entire ANPR system to be implemented on a single FPGA chip that can be placed within an ANPR camera housing to create a stand-alone unit that can drastically improve energy efficiency and remove the installation and cabling costs of bulky PCs situated in expensive, cooled and waterproof Road side cabinets.

III. EXPERIMENTAL PROCEDURE

A. Methodology:

We have built the multipurpose wheelchair system which is useful for handicapped person as well as mentally disable person. This system is going to be used in hospitals or oldage homes and also in industries as a trolley movement. There are two main sub parts of system . 1st is voice kit which opeates on patient voice. 2nd is mobile touchpad. We are using microcontroller pic16f877a for process all signals. we can measure patient parameter such as temperature pluse rate of patient. it also detect object with the help of ultrasonic sensor.

B. Block diagram:

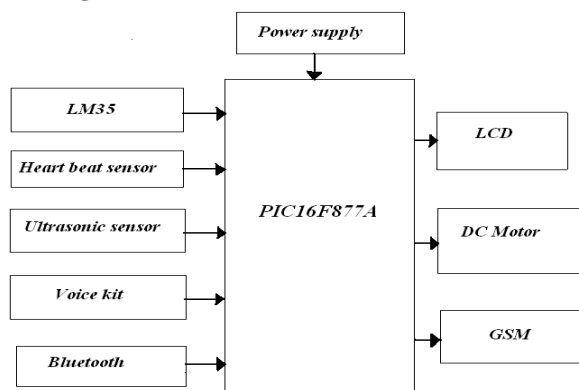


fig.1: Block diagram

Power supply:

The operation of power supply circuits built using filters, rectifiers, and then voltage regulators. Device in circuitry

needs dc power to operate in above system some device needs 5V to operate in power supply IC 7805 is used to provide regulated 5v dc.

PIC16F877A:

PIC16F877A has been used as a controller in the proposed system. It used to process all the signals in the system. All the voice commands and control signal through microcontroller.

LM35:

We can measure temperature more accurately than a using a thermistor. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified

Voice kit:

Voice recognition kit processes voice analysis, recognition process and system control functions. 40 isolated voice word voice recognition system can be composed of external micro-phone, Keyboard, 64K SRAM and some other components. Here we are using HM2007 IC for voice recognition.

Heartbeat sensor:

It is used to detect the heart pluses using sensor. The sensor consists of a light source and photo detector; light is shone through the tissues and variation in blood volume alters the amount of light falling on the detector.

GSM:

GSM module is used to send SMS to others mobile no which are stored in database. It is used in emergency need. When the emergency key is press the SMS will send in particular mobile no through GSM module. Particular no assign to the wheelchair also if person can send SMS by their voice by saying help.

Ultrasonic Sensor:

Ultrasonic Sensor which is used for object detection by Transmitting and receiving rays

.Bluetooth:

Bluetooth is a universal radio interface in the 2.4 GHz frequency band that enables electronic devices to connect and communicate wireless via short-range.

DC Motor :

Wheelchair is operated by 2 DC motors. The μ c operates these DC motors and controls the wheel chair accordingly. The output current of the controller is inefficient to drive dc motor so motor driver IC is used to provide required current to the motor.

LCD:

The LCD display is used for indication purpose. All the direction command can be displayed on LCD and all the messages are displayed.

III. TEST AND RESULTS

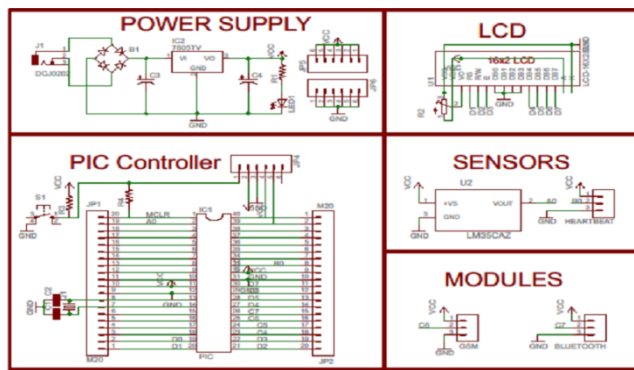


Fig 2: Schematic of system

- I. The proposed microcontroller design is synthesized using Eagle simulation tool(Eagle7.2.0.) The Eagle simulation tool is used for development environment

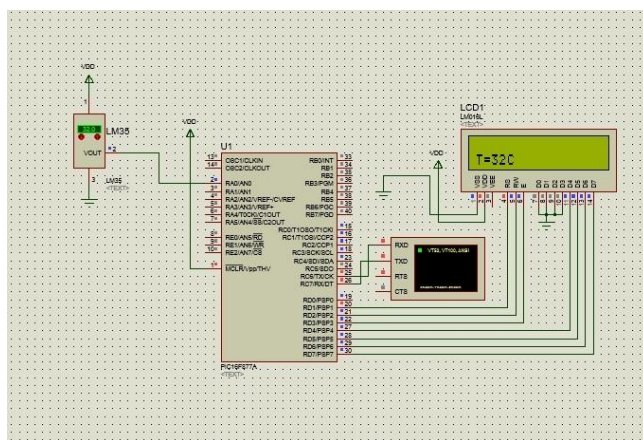


Fig 3: Simulation of system

The microcontroller design is simulated by using proteus simulation tool. The result of the simulation are shown in fig

IV. CONCLUSION

The Designed of Wheelchair is the multifunctioning(temperature monitoring, mobile touchpad, voice recognized kit, object detection sensor) modified version of Wheelchair .These wheelchair does not required external assistance to navigate or to move the Wheelchair. This system reduces the physical efforts of physically disabled/handicapped people. Our project is the powerful sight for the quadriplegic, deaf and dumb for the physically handicapped persons. Such type of product plays an important role in life of disable persons. Their social life will tend to develop using this gadget. Such types of device will be helpful in the hospitals where the quadriplegics are surviving and also helpful in industries to move material from one place to another.This device will help to survive and move anywhere. Also dumb people can use this product using matrix keypad to use wheelchair. GSM is used in emergency need

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