AN EFFICIENT OPTIMIESED UNIVERSAL WHEELCHAIR

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ABSTRACT

In the world, there are so many people they are suffering from paralysis and the disabilities. This paper provides manual control system and wireless system that can be used by the disabled people to control the direction of wheelchair by the motion of their hands. This system comprises of three applications to control the directions of wheelchair. This technology is designed to be safe to operate and easy to use. The RF module and Bluetooth operated Android application is used to operate wheelchair wirelessly. Here an Android app is created on the smartphone which utilize the phone's sensors and Bluetooth technology to control the motor control system wirelessly. When this application is turned off, the wheelchair operates using the manual control system. In manual control system, we are using a keypad which consist of four keys. These keys are used to control the direction of wheelchair.

KEYWORDS: Android Application, Wheelchair, Physically handicapped, RF Transmitter, RF Receiver, Bluetooth module, etc.
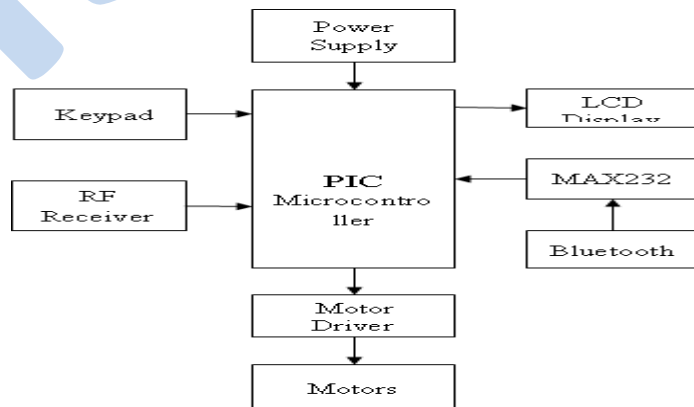
INTRODUCTION

An Efficient Optimised Universal Wheel Chair, means it is concept of packing three different modules or controlling ways together in a single unit to help the physically impaired people in their mobility. This combination will not only help them to boost their moral returning them their access to free mobility as well as making them independent. The project is based on Pic Microcontroller. It provides so many features. The concept uses a manual keypad control in the form of push buttons for the control in the four directions that is left, right, forward and backward. Also, the project contains wireless technology, here we are using RF radio frequency module as well as a Bluetooth controlled android application. The manual keypad used by the people who have access to their hands can control the chair by them. The wireless technology helps to reduce their time and energy in pulling the chair and the distance of access also becomes easy. The concept of android will give the access of the chair to every person easily. Today, everyone uses smartphones and so this application will make things easier than a remote control and will also make the access easy, as phone can be reached easily every time.

LITERATURE REVIEW

We studied the various literature survey that uses different technologies to control wheelchair. Here we are controlling wheelchair using PIC Microcontroller. Here, we are controlling the directions of wheelchair using three modes. Firstly, we are controlling the directions manually using keys [1]. In second mode, we are using RF receiver and transmitter [3]. It is a wireless technology. In third mode, we are operating the wheelchair through Bluetooth module. Here we are transmitting the signals from Android app. Android app is designed for a smartphone. And now days, everyone uses smartphone, so Android app will be easy to operate wheelchair for handicapped person [2].

METHODOLOGY
a. HARDWARE

Fig.1 Block Diagram

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B. TECHNICAL SPECIFICATIONS OF HARDWARE

Table No.1 Technical Specifications of Components

Sr. No.	Components	Specifications
1.	LCD Display	• No. of characters : 16 channels *2lines • Module Size : 80.0W*36H*14.0D(max) mm • Power supply current:VDD:5.0v,typ:1.0 • Clock oscillation frequency: 270khz
2.	PIC Microcontroller 18F4550	• Flash(bytes): 32K • Single word instruction:16384 • SRAM(bytes):2048 • EEPROM(bytes):256 • I /O:35 • 10 bit A/D :13 channels • Operating frequency:DC-48MHz
3.	Bluetooth HC05	• Typical:80dBm sensitivity • Up to +4dBm RF Transmit power • Low power :1.8v • Slave default baud rate:9600 • Data bits:8 • Stop bit:1
4.	HT12E	• Operating voltage:2.4-12v • Operating current: 3v no load :40uAtyp • Fosc=3khz • Output drive current: (source)-1.6mA (sink) 1.6mA
5.	HT12D	• Operating voltage :2.4-12v • Operating current:200-400uA • Oscillator frequency:150kHz
6.	L293D Motor driver	• Supply voltage:36v • Turn-on delay:750ns • Turn-off delay:200ns • 600mA peak output current capability per channel • 1.2A peak output current per channel
7.	MAX232	• Power supply:5v • Charge pump capacitor:1.0uF • Operates up to 120kbits/s • Low supply current:8mA
8.	DC Motor	• 30 rpm geared • Supply current:500mA • Low power:12v • Torque 1Kg

c. SOFTWARE

Here we use MPLAB IDE software version 8.89. MPLAB Integrated Development Environment (IDE) is a free, integrated toolset for the development of embedded applications employing Microchip's PIC and ds PIC microcontrollers. MPLAB IDE runs as a 32-bit application on MS Windows, is easy to use and includes a host of free software components for fast application development and super-charged debugging.

d. FLOWCHART OF SYSTEM
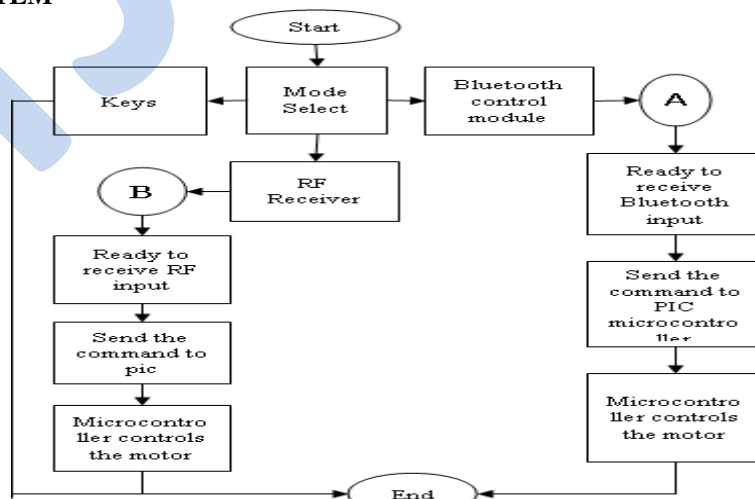
Fig.2 Flowchart of a project

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RESULT

We have tested that our wheelchair is operating with the specified results

Table No.2 Results

Sr. No.	Parameters	Result
1.	Total load carried by wheelchair	Up to 3.5 Kg
2.	Bluetooth range	1m
3.	RF module range	100m

Fig.3 Wheelchair

When the application mode is selected it will displays:

Fig.4 When wheelchair starts

Fig.5 When first mode is selected

Fig.6 when second mode is selected

Fig.7 When third mode is selected

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When the directions of wheelchair is selected it will displays:
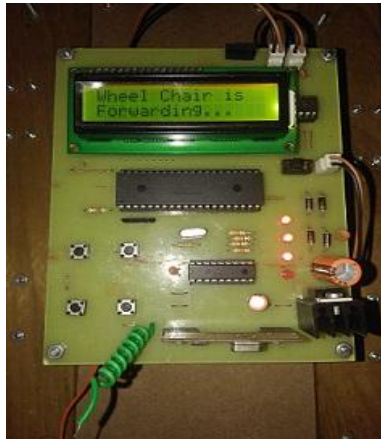

Fig.8 When Forward direction selected

Fig.9 When Backward direction selected

Fig.10 When turning left

Fig.11 When turning right

CONCLUSION

In this paper, a wheelchair is proposed with a three applications which are safe and easy to operate by disabled person. A wheelchair is controlled by either manual control keypad or by RF module or Bluetooth controlled Android application. A wireless communication provides an extra advantage, if wheelchair is not with them they can control wheelchair very easily.

REFERENCES

1) Ujjwal Aima, Snehal Choudhary, Deepali R. Wakadkar, "Universal Wheelchair", IJARIIE, ISSN(O)-2395-4396 , Vol-2, Issue-3, year 2016.
2) Prof. Rakhi Bharadwaj, Poonam Gupta, Pooja Jadhav, Bhagyashree Kadam, Amruta Kedari,"Android based Automated smart wheelchair", IJIRCCE,ISSN(O)-2320-9801,Vol-4,Issue-3,year 2016.
3) Puneet Dobhal, Nishant Singh Bist, Rajesh singh, Bhupendra Singh, Shubham Murari, "Smart Wheelchair for Physically Handicapped People using tilt sensor and IEEE 802.15.4 standard protocol", CAC2S 2013.
4) Khushboo Pasari, Madhura Patil, Kalpana Rokade, Pranali Yewle, "Android based Wheelchair", IJERT, ISSN-2278-0181, Vol-5, Issue-03, year 2016.
5) Manual Mazo, Francisco J. Rodriguez, Jose L. Lazaro, Jeus Urena, Juan C. Garcia, Enrique Santiso, Pedro Revenga, J. Jeus Garcia, "Wheelchair for Physically Disabled People with Voice, Ultrasonic and Infrared Sensor Control", Autonomous Robots, 2, 203-224(1995).
6) Rahul Das, Amit Agarwal, Amit Kumar Ray, "Smart Wheelchair Using Android Based Messenger System", IJLTET, ISSN-2278-621X.
7) Mohammad Hayyan Al Sibai, Sulastri Abdul Manap, "A Study on Smart Wheelchair Systems", IJETS, Vol-4, December 2015.
8) Muhammad Ali Mazidi, PIC MICROCONTROLLER, pages 451-475, 613= 649, Pearson Education International Publications.

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