Wheelchair For Incapacitate Human Beings

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Abstract- This design is consist of 4 parameters and can be used simultaneously I. Control by eye (IR sensors): Guiding and controlling the wheelchair movement by the eye for differently abled human beings, especially those are distress by paralysis. IR sensors are placed on goggle and it detects the retina movement and then the resultant output is forwarded to the circuit that controls the movement of the wheelchair. II. Control by speech (VR3): a speech recognition circuit is implemented on the wheelchair so that one can control the movement of the wheelchair by the voice instruction. III. Detection of the obstacle: this parameter is used to detect the obstacles and uneven level of the surfaces such as holes. IV. Generating the vibration: It helps in giving the signal as vibration to acknowledge the wheelman about the obstacles or any other malfunctioning.

Keywords- Disabled people, IR sensor, eye control, speech instruction control, wheelchair, obstacles, vibration generator

I. INTRODUCTION

This design exhort about the attendant and motion controlling of the wheel chair for the differently abled human beings by eye movement and speech instructions. The proposed design is sort with 4 elements that are IR based eye control sensor, speech instructions chipset, Obstacles detector, vibration generator. People having different disabilities mainly for whom ambulate is not possible, use the wheelchair. Cheapest wheelchairs that are normally available are basically having two small wheels on the rear and on the front side there are two large wheels. There are other wheelchairs also that are elaborately customizing the need of the person. This kind of changes with different parameter for different people is hectic for the manufactures. After that, joystick controlled wheelchair are released in the market that controls the wheelchair movement with the small joystick in the hand. Therefore, who is distress by the paralysis or any other diseases where they are not able to use their hands to handle joysticks thus they can control the motion of the wheelchair by their eye movement control and speech instructions control wheelchair. By using this wheelchair, one can easily do their work on their own and the basic function of using this wheelchair for the disabled one is that they can ambulate from place to another without needing help of the others. As this wheelchair is compact and has less hardware compare to other wheelchair. It is compact and has less weight as one can easily lift the wheelchair.

Table 1. Dominant Components

No.	Name	Outlook	Description
1.	IR sensor based Eye control		Operating vtg- 3-5V, Current usage-at 3.3V:23mA, at 5V:43mA
2.	Speech recognition unit (VR3)		80 commands storage, Can fetch 7 commands at a time
3.	IR proximity based Obstacles detector		Range:2cm-30cm, Operating vtg:3-5V
4.	Vibration generator(mini vibrator motor)		RPM:12000 rpm, Operating vtg:3Vdc

II. HARDWARE FRAMEWORK

A. EYE CONTROL (IR SENSORS)

For controlling the wheelchair with eye movement, this proposed design has Infrared sensors because it is not visible to the human eye. As human eye consists of 2 color mainly black and white. Retina color is mainly black for most the human and rest of the part of the eye are white. IR sensor transmitter will continuously sends the signal on eye, and if, that signal will reflects back towards the IR receiver, then this case is said to be white part of the human eye, but if, that signal is not received by the IR receiver then continuous sensing will break off and this case is said to be retina

detected. As the white surface reflects the signal and black color absorbs the same. On the basis of this process, movement of the wheelchair will control.
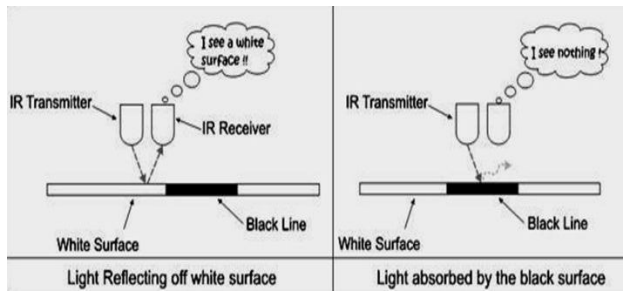

Fig 1. Working of IR Sensor

B. SPEECH RECOGNIZATION UNIT (VR3)

For the speech recognition unit, this proposed system has VR3 module. VR3 is the enhanced version of the VR2, as VR3 has capacity to store 80 voice commands which is more sufficient for this proposed project. The main reason of using VR3 is that it does not add much weight to the wheelchair and it is compact and 99% efficient. This module can fetch 7 speech commands simultaneously which the biggest advantage of using this module. It has 2 blocks mainly named as library and recognizer. Library stores all the 80 commands and any 7 commands can be fetched at a time into recognizer.
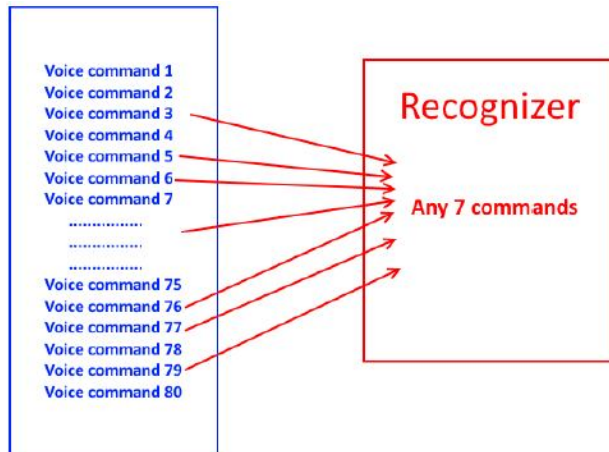

Fig 2. VR3 (library and recognizer)

C. OBSTACLE DETECTOR

IR proximity sensor is implemented in this design to detect the obstacle for the wheelchair. This sensor has transmitter and receiver, transmitter will continuously transmits the signal, as the object comes into the influence then because of that object, signal will get reflected towards in the range of the receiver and sends the resultant output to the controller and ask to stop and indicate the user. It is efficient and cheap and adds negligible weight to the wheelchair.
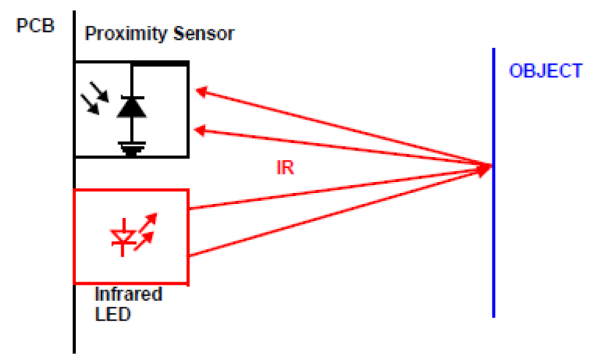

Fig 3. Working of IR Proximity Sensor

D. VIBRATION GENERATOR

As the indication to the user of the wheelchair for malfunctioning or obstacles detection, etc. mini vibrator motor is implemented in this proposed system. It do not generate vibration at higher extent because it may consequence the negative changes in the disabled one, henceforth, mini vibrator motor is used. It converts the unbalanced mass into a force that creates vibration.
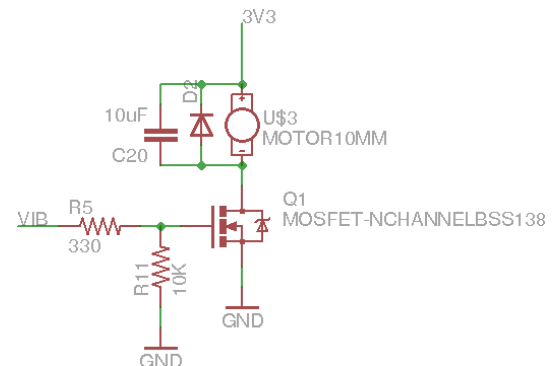

Fig 4. Circuit diagram of Mini Vibrator Motor

III. SOFTWARE FRAMEWORK

Several softwares have been used during the fabrication of the proposed system. The peak roles played by the software were Project Management software which is mainly used for controlling cost and budget of the whole proposed system. PMS is used because proposed system bend the whole focus on reduction in the cost of the wheelchair so that it is affordable to the maximum number of the disable human beings. For the PCBs layout i.e. printed circuit board, EAGLE (Easily Applicable Graphical Layout Editor) software is used as it is user friendly and it involves a schematic editor designing the circuit layout. EAGLE also shows the actual simulation of the PCB layout. For interfacing the software with the hardware, KEIL software is used as the controller for proposed system is LPC2138, henceforth, KEIL is used as it has tools like linkers, simulators ANSI C compiler, macro

assemblers, integrated development environment(IDE). In KEIL, programming and interfacing is a time savior.
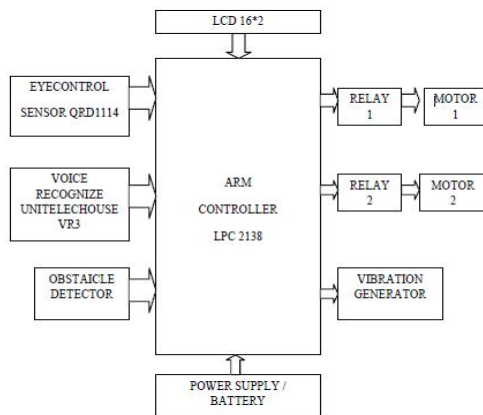

Fig 5. Block Diagram

IV. UNBORN WORK

As this system has lot of positive consequences for the incapacitate people. The proposed wheelchair has 4 main parameters i.e. eye control, speech control, and obstacle detector and vibration generator. The wheelchair can be control by eye movement, voice instructions, obstacles detection. But for the future work, some more features can be added like mind controlling and finger movement can be implemented to control the motion of the wheelchair according to their mind and they don't have to do physical work for the motion of the wheelchair. Same commands in different languages can be introduce so that one have not to learn the recommended language as described by the manufacturer of the wheelchair. The speed of the wheelchair at different level can be introduced in the system which will bring ease in the life of the disable people.

V. CONCLUSION

This proposed project is basically for those who are differently able or we can say people who cannot move from one place to another on their own. Wheelchair is designed for people like mentioned above, now they do not need a helper to take them one place to another and now they can be more self-independent. With the help of the eye control and voice commands, they can control the motion of the wheelchair with additional features like obstacles detector and vibration generator for the indication of malfunctioning, obstacles, etc. to the user.   As this wheelchair is more economical, more and more people can afford this. The main purpose of this project was to make this wheelchair compact and economical.

VI. ACKNOWLEDGMENT

REFFERENCES

[1] Prof. Pranita Bhosale. "**Wheelchair for Physically Disabled People with Voice & Eye Control**" GRD Journals- Global Research and Development Journal For Engineering, Department of Electronics and Telecommunication Engineering, Volume 1 | Issue 6 | May 2016, ISSN: 2455-5703.

[2] G Azam and M T Islam, "**Design and Fabrication of A Voice Controlled Wheelchair for Physically Disabled People**", Department of Mechanical Engineering, CUET, Chittagong-4349, Bangladesh.

[3] Ms. S. D. Suryawanshi, Mr. J. S. Chitode and Ms. S. S. Pethkar. "**Voice Operated Intelligent Wheelchair**", IJARCSSE, May- 2013.

[4] G. Pires, N. Honorio, C. Lopes, U. Nunes, A. T Almeida: "**Autonomous Wheelchair for Disabled People**", University of Coimbra, Protugal.

[5] M. nishimori, T. Saitoh and R. Konishi: "**Voice Controlled Intelligent Wheelchair**", Kagawa University, Japan, September-2007