A Novel Wheel Chair Movement Control System

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Abstract:

The objective of Eye movement based control wheel chair would eliminate the necessity of the assistance required for the disabled person. And it provides great chance for the disabled to feel independent accessible existence. The implemented system will allow the disabled person to manage the motorized wheel chair with the no help of other persons. Within this system controlling of wheelchair transported out according to Eye actions. Your camera is mounted in front of the user, to capture the image of any one of the Eye and tracks the positioning of eye pupil with using Image processing techniques. Based on the position of the eye, motorized wheel chair motor is going to be in forward, left, right. Additionally for this, safety purpose ultrasonic sensor is mounted before motorized wheel chair to identify the obstacles and instantly steer clear of the motorized wheel chair movement.

Keywords:-Image Processing, Open Computer Vision Library, Python, Raspberry Pi, Wheelchair.

I. INTRODUCTION

The Motorized wheel chair controlled system utilized by seniors and physical disable persons. Here presenting the design implementation of totally independent Eye control motorized wheel chair. According to dependence on the disabilities different types of automatic systems can be found in market. Sometime for totally paralysis person might be have tough to use that type of systems. Here the attention control system provides the independence to create their existence simple and easy. For that advance degree of Image Processing open computer vision (Open CV) library can be used for Face and Eye

recognition. And many application and calculations are utilized to find out accurate pupil location recognition and monitoring of this. One of them is Haar cascade like features recognition formula used to detects face.

To discovering the precise Eye pupil and look for its centerpiece is ultimate objective of this technique. For instantly tracking and monitoring eye pupil many computer vision library of Image processing are utilized like object recognition, motion detection, Image color conversion, edge recognition, pattern matching etc. One of these ECG, EEG and EOG sensor based eye pupil recognition strategy is available, where voltage variation based output assumed to determine the place of pupil. However for different user, different output current will be generates, resulting faulty location from the eye pupil. The mind movement based system have limitation, when user can unable to connect to the system physically. Furthermore, voice triggered power motorized wheel chair which works properly, when user speak the command system works according into it like left, right, forward, stop.

However a noisy environment throws the machine, and system cannot respond properly. Along with other infrared reflection based eye pupil detection system supplying accurate recognition from the eye pupil center location, in addition to system can track the attention movement. However the infrared radiations affected the attention and user may loss the eye visibility. Therefore, a highly effective camera capture image based eye pupil recognition and monitoring system is introduced. This really is efficient in addition to economical system. Here real time video image recording according to Eye and Eye Pupil detection

with minimum delay of your time can be used . The system includes multistage that's mainly track the attention pupil center. A manuscript Eye monitoring technique, which capture the image and detects the human face. It detects part of the eye location evidently detected image, and performs several operation of fundamental image processing like color image to gray conversion, filtering, threshold, pattern matching, noise reduction and circle recognition onto it. The Raspberry pi board can be used to do the charge of the complete system operation. Digital Image processing based output signal delivered to the Raspberry pi board. The Raspberry pi acquired the information and analyses it. Raspberry pi send the control signal to motor driving circuit in line with the location of eye pupil. This can choose to perform operation on motor like run the motor in clock voice direction, anti-clock voice direction and steer clear of the motor .. The Ultrasound sensor is also mounted in front of the motorized wheel chair for recognition of a obstacle. If sensor detects obstacle beyond certain limit in forward direction then microcontroller stops wheel chair.

II. HARDWARE AND SOFTWARE IMPLEMENTATION

A. Raspberry Pi

The Raspberry Pi 2 delivers 6 times the processing capacity of previous models. This second generation Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz.

Fig.1 Raspberry PI Board

B. Camera

supports Windows Vista , Windows 7,Windows 8.Interfaces with USB2.0, Night vision, 6 bright light switch ON through switch and potentiometer
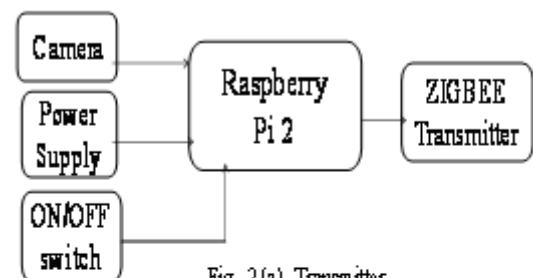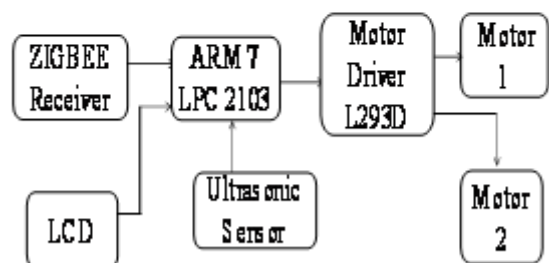

Fig. .2 (a) . Transmitter

Fig. .2 (b). Receiver

Fig.2 Block diagram of A Novel wheel chair movement control system

C. ARM7 LPC2103

16-bit/32-bit ARM7 TDMI-S microcontroller in a tiny LPQFP48 package . 2KB /4KB /8KB of on-chip static RAM and 8KB/16KB/32KB of on-chip flash program memory.128-bit wide interface/accelerator enables high-speed 70 MHz operation. ISP/IAP via on-chip boot loader software.

D. Ultrasonic sensor

ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor , measuring the time interval between sending the signal and receiving the echo to determine the distance to an object.

E. Python programming language

Python is a general purpose, high level programming language that is used in a wide variety of applications. Code readability ,Very easy to code in Python, Less coding required

F. Open CV

In Computer vision(CV) is a field that includes methods for acquiring , processing , analyzing and understanding images. In general, high dimensional data from the real world in order to produce numerical or symbolic information.
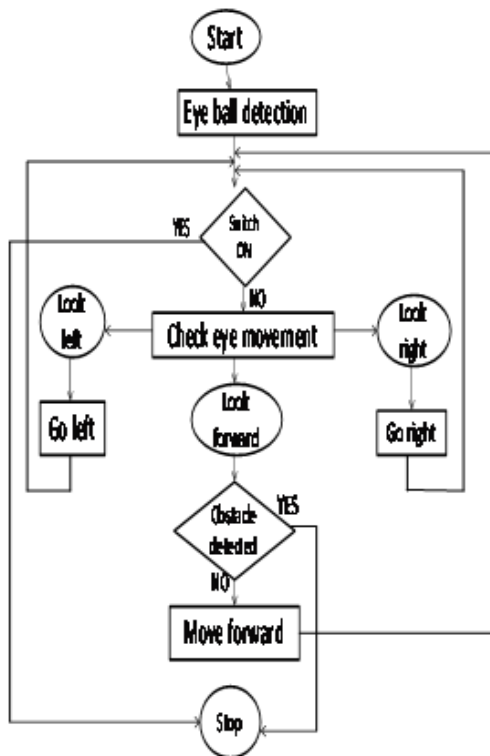
III. PROJECT DESCRIPTION

Fig.3 Flow chart

The key of the product is eye pupil recognition and eye tracking according to computer vision technology. A new algorithm introduced for discovering the attention pupil location by Image processing. Within this technique several stages accustomed to find out the movement of eye, for example Eye detection, color conversion, Edge recognition, Hough Transformed, motion recognition and object monitoring. First camera module will begin to capture the pictures.. Now, the primary target is to detects the attention pupil and define its center points. There is several image processing operation carried out in system, such as blur Image, color conversion, thresholding , filtering.
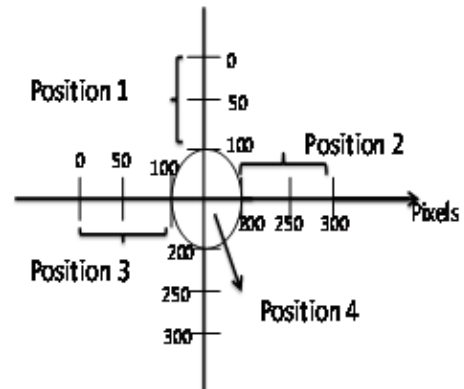
For position1 : Move forward
For position2 : Move right
For position3 : Move left
For position4 : Stop

Fig.4 Wheel chair movements

Based on the eye pupil actions, the wheel chair moves either in forward, right , left and when there is no actions from the eye, than it concludes eye is incorporated in the middle position. A method began with recording images continuously by camera. And taken images processed in Raspbian system.USB camera can be used to capture the look at high pixel rates. In idle condition the attention is going to be considering open. Once the power provided is on, the machine will begin working, and moves to the command values system will labored.

V. RESULTS
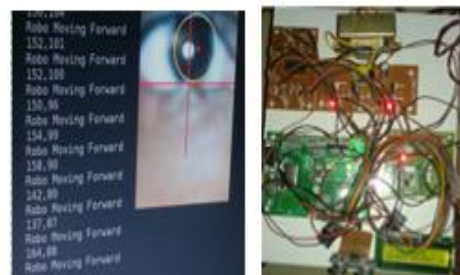Results of this paper is as shown below
(a)wheel chair moving forward

Fig.5 Wheel chair moving forward
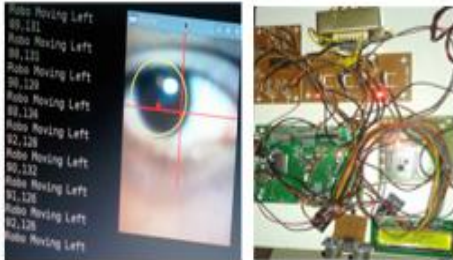
(b)wheel chair moving left

Fig.6 Wheel chair moving left
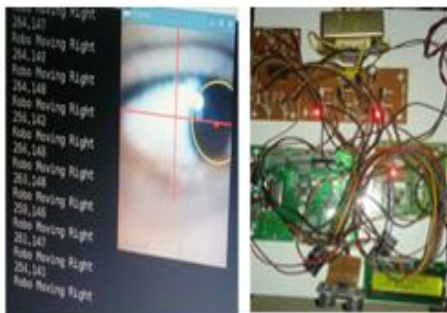
(c)wheel chair moving right

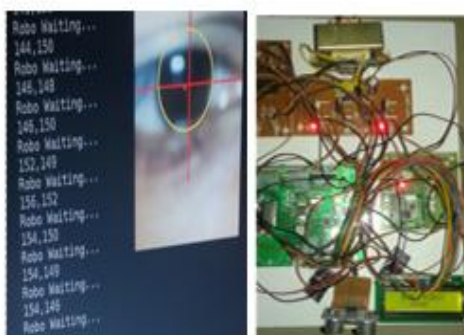Fig.7 Wheel chair moving right

(d)wheel chair stops

Fig.8 Wheel chair stops

VI. CONCLUSION

The aim of applying an autonomous eye controlled wheel chair is to focus on the characteristics of digital Image processing. The idea of the attention controlled motorized wheel chair isn't only represents the choice

sources but more essential to help physically disabled persons to create their existence independent. There are some real-time design constants measured just like a system takes a while (4second) to complete the machine for processing. And so the system perform the Motorized wheel chair movement operation with a few delay time.

It's very difficult to track the attention pupil in dark light places, therefore the system works perfect on ecological light as well as in a room light with fluorescent mercury vapor lights, which is low in infrared.

VI. REFERENCES

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