Eye Monitored Wheel Chair Control for People Suffering from Quadriplegia

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ABSTRACT

The Eye Directive wheelchair is a mobility-aided device for persons with moderate/severe physical disabilities or chronic disease such as Quadriplegia. In this model, we use the optical-type eye tracking system to control powered wheel chair. User's eye movements are translated to screen position using the optical type eye tracking system, without any direct contact. When user looks at appropriate angle, then computer input system will send command to the software based on the angle of rotation of pupil i.e., when user moves his eye balls left (move left), right (move right), straight (move forward) in all other cases wheel chair will stop. Similarly, by blinking or simply closing his eyes and user can stop the wheelchair.

Keywords : Flex Sensor, Arduino Uno, Voice Module.

I. INTRODUCTION

- The Eye Directive wheelchair is a mobilty-aided device for persons with moderate/severe physical disabilities or chronic disease such as Quadriplegia.

- In this model, we use the optical-type eye tracking system to control powered wheel chair.

- User's eye movements are translated to screen position using the optical type eye tracking system, without any direct contact.

- When user looks at appropriate angle, then computer input system will send command to the software based on the angle of rotation of pupil i.e., when user moves his eye balls left (move left), right (move right), straight (move forward) in all other cases wheel chair will stop.

- Similarly, by blinking or simply closing his eyes and user can stop the wheelchair. Says commands clearly, moves left, right and forward. The wheelchair.
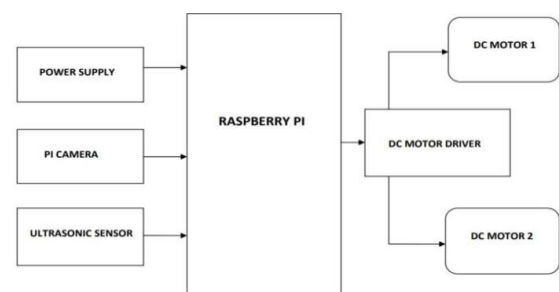
II. PROPOSED SYSTEM

Fig1. Block diagram of system

III. SYSTEM DESCRIPTION

The Raspberry Pi Camera Board plugs directly into the CSI connector on the Raspberry Pi. It's able to deliver a crystal clear 5MP resolution image, or 1080p HD video recording at 30fps! Latest Version 1.3! Custom designed and manufactured by the Raspberry Pi Foundation in the UK, the Raspberry Pi Camera Board features a 5MP (2592 1944 pixels) Omnivision 5647 sensor in a fixed focus module. The module attaches to Raspberry Pi, by way of a 15 Pin Ribbon Cable, to the dedicated 15-pin MIPI Camera Serial Interface (CSI), which was designed especially for interfacing to cameras. Battery Connection Lead-acid are normally available in blocks of 2V, 6V or 12V. In most cases, to generate the necessary operating voltage and the capacity of the batteries for the Solar Inverter, many batteries have to be connected together in parallel and/or in series. Dc motor is use to drive the robot for that we Use 500 rpm 4 dc motor. The speed of motor is depend on diameter of wheel and Rpm (Resolution per minute) of motor . Rpm is inversely proportional to torque . If the speed of motor is gradually increase torque of motor will be decrease. Suppose the diameter of motor is 8cm. then distance travelled per rotation is = Wheel diameter X 3.14 =8 X 3.14=25.12cm Speed of robot/ Sec= (Distance travelled per rotation *RPM of motor)/60sec An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance between sending out a sound wave a specific frequency and listening for that sound wave to bounce back by recording the elapsed time between the sound wave being generated and the sound wave bouncing back it is possible to calculate the distance between the sonar sensor and the object L293D motor driver is interface to drive the motor The L293 and L293D are quadruple high current half - H drivers. The L293 is designed to provide bidirectional drive currents of up to 1A at voltages from 4.5V to 36V.The L293D is designed to provide bidirectional drive currents of up to 600mA at voltages from 4.5V to 36V.

FLOW CHART:
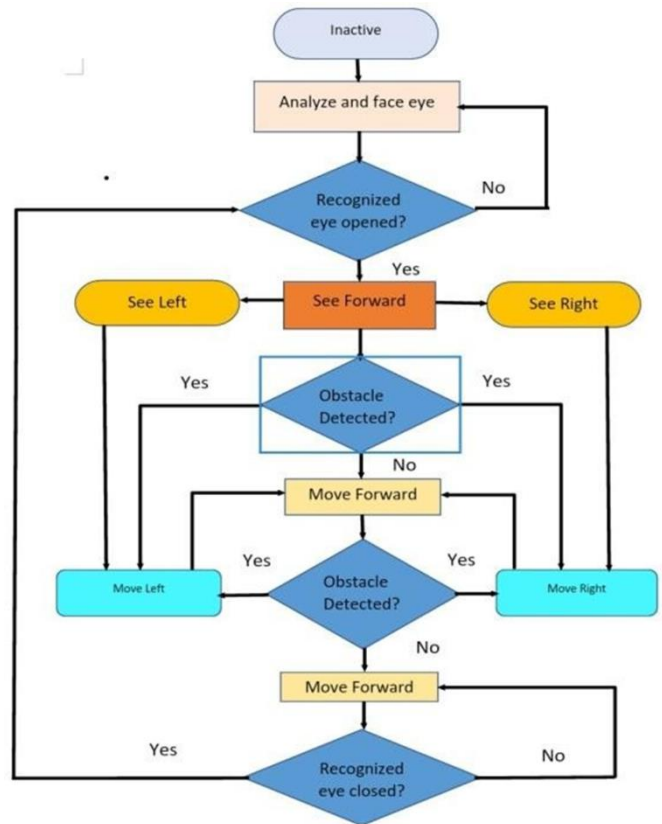
IV. HARDWARE REQUIREMENT

4.1 RASPBERRY PI

Fig 2. Raspberry Pi

The Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. It replaced the

Raspberry Pi 2 Model B in February 2016. See also the Raspberry Pi 3 Model B+ , the latest product in the Raspberry Pi 3 range.

Features:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

4.2 MOTOR DRIVER L293D

Fig 3. L393D

L293D motor driver is interface to drive the motor The L293 and L293D are quadruple high current half - H drivers. The L293 is designed to provide

bidirectional drive currents of up to 1A at voltages from 4.5V to 36V.The L293D is designed to provide bidirectional drive currents of up to 600mA at voltages from 4.5V to 36V.

4.3 DC MOTOR

Fig 4. 12V DC Gear Motor

Dc motor is use to drive the robot for that we Use 500 rpm 4 dc motor. The speed of motor is depend on diameter of wheel and Rpm (Resolution per minute) of motor . Rpm is inversely proportional to torque . If the speed of motor is gradually increase torque of motor will be decrease. Suppose the diameter of motor is 8cm then distance travelled per rotation is = Wheel diameter X 3.14 =8 X 3.14=25.12cm Speed of robot/ Sec= (Distance travelled per rotation *RPM of motor)/60sec.
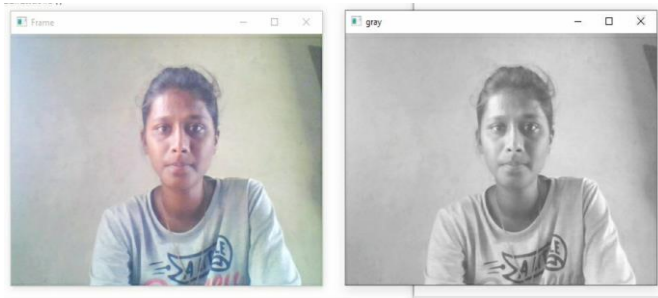
4.4 BATTERY

Fig 5. Battery

Battery Connection Lead-acid batteries are normally available in blocks of 2V, 6V or 12V. In most cases, to generate the necessary operating voltage and the capacity of the batteries for the Solar Inverter, many batteries have to be connected together in parallel and/or in series.
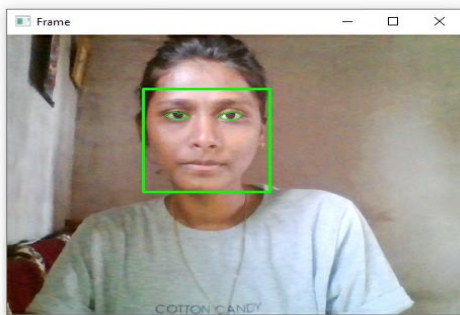
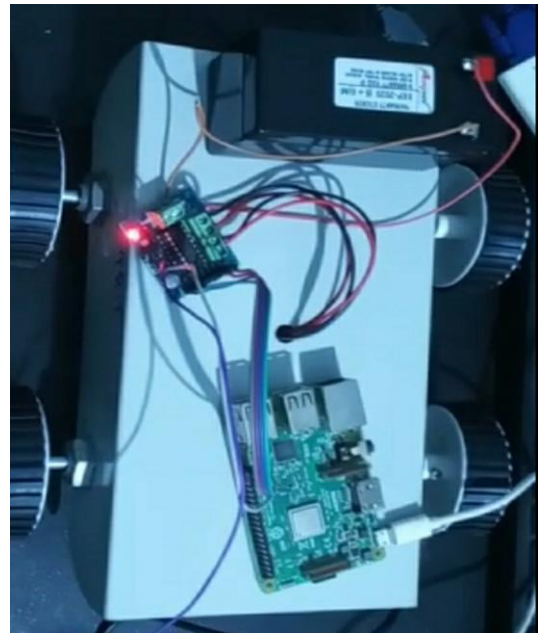## V. RESULT AND ANALYSIS

To Convert Image Output

To Detect Face Output
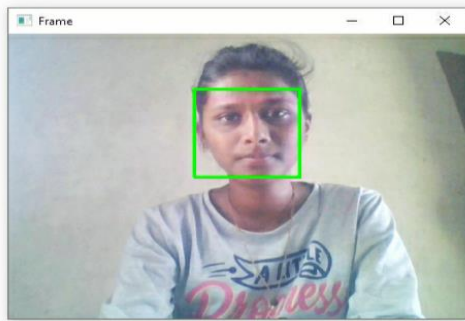
To Detect Eye Output

VI. HARDWARE RESULT

VII. CONCLUSION

The system consists of eye tracking webcam, microcontroller, motor, chair image processing unit and associated circuits. The system works by tracking the motion of eyeball using a webcam. The image is processed with the help of Python software and corresponding movement is obtained. This set up is meant for paralyzed people and person having loco-motor disabilities. The hardware along with the software is great tool which makes the life of paralytic people independent. A wheelchair prototype incorporating the above mentioned specifications was designed and found to be working successfully

VIII. REFERENCES

[1]. https://scholar.google.com/scholar?as_q=Towards+a+Brain-Activated+and+Eye

[2]. https://ieeexplore.ieee.org/xpl/conhome/7829191/proceeding

[3]. https://github.com/AugustoEst/gazetrack

[4]. https://learnopencv.com/wpcontent/uploads/20
18/11/OpenCV-RaspberryPi.jpg

[5]. https://www.semanticscholar.org/paper/EYEM
OTION-TRACKING-FOR-
WHEELCHAIRCONTROL-
GajwaniChbria/24184da83b209b03e644cae2338
dae20ef0be62f#citing-papers

[6]. https://www.erpublication.org/published_paper
/IJETR041367.pdf

[7]. https://www.ijert.org/research/advance-eye-
controlled-wheelchair-for-disabled-person-
IJERTCONV5IS01181.pdf

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