Eye Gaze Recognition System to Assist Paralyzed Patients

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Abstract: Eyes are like window to this large universe. The Advancements in the field of biomedical electronics and in the field of electronics and communication system have changed the perception of eye. People suffering from paralysis do not have sensation to make any motion using hands or legs. It results them of being dependent on others. Failing them being independent .using of joystick cannot be implemented too since they can't move their hand. It is estimated 150, 00 severely disabled persons able to control only the muscles of their eyes without any problem. Hence using eye gaze we can develop wheelchair that moves on the motion of the eye gaze.

Keywords: Eye movement detection; Video processing; Wheelchair control.

I. INTRODUCTION

Individuals experiencing loss of motion don't have sensation to make any movement utilizing hands or legs. People with extreme engine inabilities are not ready to move their appendages wilfully and discourse plainly, however the subjective parts of their cerebrum are interface The significant issue confronted by loss of motion patients are correspondence and commuting.[1] For communication, blind framework exists. But each time utilizing flickers to control a wheelchair winds up plainly tiring for the eyes It comes about them of being reliant on others; fizzling them being independent. Therefore another framework ought to be recognized for helping the deadened to move their wheelchair. Since pushing the wheelchair himself is out of question[5]. Using of joystick can't be executed too since they cannot move their hand, Even however their subjective parts of the cerebrum is intuitive.[6]

II. LITERATURE SURVEY

A few inquires about have been done as of late to develop Human Computer Interface [HCI][4]. Human Computer Interface as an assistive innovation helps the general population with engine incapacities and who can't move their arms thus mind boggling human PC interface must be more developed, specific to that of the information charges, adjusted - to the incapacity of the user, designed in a sheltered and straightforward way. Under to human PC interface the most developed procedures are eye [EOG] Electrooculography is the strategy used to gauge the resting capability of the retina. The subsequent flag is known as an Electro gram flag. This strategy was proposed by Emil-du-Bois Reymond (1848) he watched that the cornea of the eye is electrically positive in respect to the dark of the eye. In this the cathodes are set around the eye and fore set out toward recording the eye development [EOG] Electrooculography flag has an extensive variety of uses such has location and following. Videooculography [VOG] and Electrooculography [EOG] are two noteworthy strategies in the ebb and flow look into utilized for the recognition of the eye course[3].

- Electrooculographic direction of a wheelchair utilizing eye development
- A convenient remote eye development controlled Human Computer Interface (HCI) for debilitated individual
- Eye controlled turning on and off the electronic gadgets
- Launching the rocket utilizing look in war field.

The disadvantages in EOG are:

- There will be changes in the look amid the head development.
- The potential distinction between the retina and cornea changes with the element, for example, lighting, temperature varied

As far as bio signs to gauge the eye development the system utilized is electrooculography [EOG]. The recording of the eye development should be possible through videooculography [VOG][3]. The adjust related issues and identification of nystagmus is done through the technique called Electronystagmography [ENG].

III. SETUP

The paralyzed person is made to sit in front of camera on wheelchair. The face captured by the camera. The camera sends to real time video of his face to video processor, this video processor has an algorithm that can identify the gaze based on which the motor connected to the wheels of the wheel chair can be controlled. The wheelchair moves according to motion of the eye.
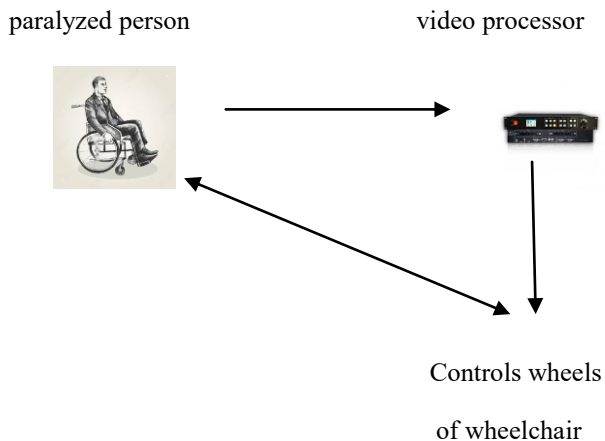
paralyzed person   video processor

Controls wheels

of wheelchair
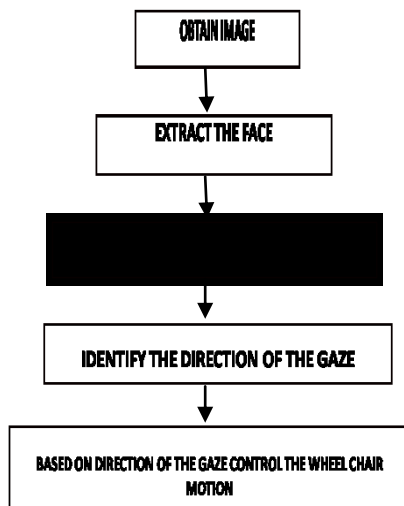
Fig 1.   Block Diagram

IV. METHODOLOGY

Fig 2.   Flowchart

The paralyzed person who can't move himself can be provided this module to make him independent. The paralyzed person is made to sit on the wheelchair the camera is placed in front of him. The camera first obtains the image of face and extracts the face and identify where the eyes are. The camera captures the motion of eye gaze. Then the camera feeds the signal to video processor. The video processor process the input signal and sends to the motor coupled wheelchair. the motor acts according to the motion of eye gaze and wheel chair moves according to

paralyzed person turns his eye gaze. Hence he can be independent he can move himself without any help.

V. CONCLUSION

Utilizing the approach of EOG, VOG and ENG we can help the development of the wheelchair we remove the development of the eye utilizing the MATLAB and after that synced with the equipment part Arduino is the equipment utilized which is being helped by the development of the eye. Henceforth a continuous video handling based eye stare acknowledgment framework to help incapacitated patient is finished.

VI. FUTURE WORK

At the point when the head is moved there will changes in look likewise this outcome in downside in acknowledgment framework so in future the framework needs to create which is absolutely free head movement, programmed eye stare securing , binocular eye following ,high look point following precision with the goal that wheelchair can be controlled by the movement of eye.

REFERENCES

[1] Prajna Suvarsha and Arunraj Jathanna,"A simple Approach to Detect Eye Movements". International Conference for Convergence of Technology – 2014, 978-1-4799-3759-2/14/$31.00©2014 IEEE

[2] S.S.Deepika and G.Murugesan, "A Novel Approach for Human Computer Interface Based on Eye Movements for Disabled People", Department of Electronics and Communication Engineering Kongu Engineering College Erode, Tamil Nadu, India 978-1-4799-6085-9/15/$31.00 ©2015 IEEE

[3] Shang-Lin Wu, Lun-De Liao, Shao-Wei Lu, Wei-Ling Jiang, ShiAn Chen and Chin-Teng Lin, "Controlling a Human-Computer Interface System With a Novel Classification Method that Uses Electrooculography Signals," IEEE transactions on biomedical engineering, vol. 60, no. 8, pp. 2133-2141, August 2013.

[4] A. Lopez, 1. Rodriguez, FJ. Ferrero, M. Valledor and lC. Campo, "Low-Cost System Based on Electro-oculography for Communication of Disabled People," Proceedings of the IEEE II th International Multi Conference on Systems, Signals and Devices, Feb 2014, pp. 1-6.

[5] Sima Soltani and Amin Mahnam, "Design of a Novel Wearable Human omputer Interface based on Electrooculograghy," Proceedings of the 21st IEEE Iranian Conference on Electrical Engineering, May 2013, pp. 1-5.

[6] Ali Bulent Usakli and Serkan Gurkan, "Design of a Novel Efficient Human-Computer Interface: An Electrooculogram Based Virtual Keyboard," IEEE transactions on instrumentation and measurement, vol. 59, no. 8, pp. 2099-2108, August 2010.