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A Review on EOG

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Abstract: Electrooculography (EOG) is a technique to measure the corneo-retinal standing potential which exists between the front and the back of the human eye. The Electrographic signal is measured by moving the eyes from left to right or up and down which create an electrical deflection. The main objective of this paper to review the different approaches of EOG for Parkinson's patients and voluntary movements are examined.

Keywords: *Electrooculography (EOG), Parkinson's disease*

I. INTRODUCTION

Electrooculography (EOG) is a technique to measure the corneo-retinal standing potential which exists between the front and the back of the human eye. The Electrographic signal is measured by moving the eyes from left to right or up and down which create an electrical deflection. The set of three Ag/AgCl electrodes are placed in both the sides of the eye to detect the left and right movement [1].The value of the voltages generated by the eye movement are detected by the potential difference between a measuring electrode and a reference electrode. A conducting gel is used to enhance the contact between the skin and surface electrode which helps to reduce artifacts due to noise. Adjustable bands with conducting electrodes are placed in the forehead of the subject. The central electrode is connected to ground. . The left and right electrodes are connected to Vcc and reference respectively. The signal captured by electrodes is provided to EOG amplifier for further processing. The term angles of rotation of eyes are used to measure the movement of eye.The EOG signal is used to study the eye movement pattern and related aspects.

The main advantage of EOG is the techniques used for recording are simple and cheap and done with minimal discomfort. The readings of the EOG can be measured even when the eye is closed.The EOG can be utilized as an aid to detect the neurological disorder.The EOG can be operated in modeling ophthalmic instruments which is capable of accompanying in disease.The block diagram of an EOG based stand alone HCL system is shown in Fig.1. Further, this article discuss about different reviews and methods of EOG.

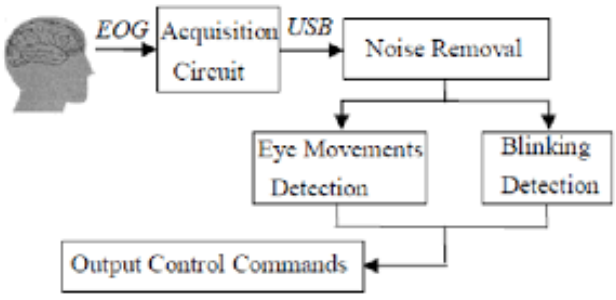

Fig.1Block diagram of EOG

II. REVIEW ON EOG

PanosM.Pandalos et.al, proposes the amplification orientation of electric dipole for patient who affected neuro generative disease. It can be measured by surface electrodes on the skin around the eyes then the severity of disease and abnormality of Arousal Ocular is clearly identified [2]. Rune Frandson et.al, test the neuro generative patientsto evaluate the potential of sleep using a topic modeling and unsupervised learning approach. This concluded the amount of N3 and ability to maintain NREM & REM sleep have equal potential as PD biomarkers. Sue Lord,et.al [3], suggests the detection of Saccades within raw mobile EOG datasets. The EOG signal measured during static and dynamic task using wireless electrodes of EOG and an algorithm developed to detect saccades in EOG data.

AdasGelzin et.al, suggestsrecording the signals from neuro generative patients disease through acoustic cardioid and smart phone electrodes. Thus the rate of performance was better in AC than SP microphones. Christensen, et.al [5-7], analyze normal as well as pathological patient sleep to identify the alteration in sleep pattern using EOG electrodes. It helps to identify sleep alteration within the peak detection, latency and variance. EranciscoFerrero,et.al, 2019, proposed the software applications of bio potentials with acquired, processed and analyzed using EOG electrodes. It calculates the sensitivity, specificity and accuracy to indicate the proposed system viability as an affordable method for evaluation of disorders.

The electromagnetic peak detection are contributed by Albert F.Fuchs,et.al,to record the Ocular movements and motor behaviors of motor disabilities patients who affected from Parkinson's disease [8-10]. A.C.Downing,et.al, analyze the eye movements of patients who affected by Parkinson's disease. Then the overall tracking time lag for each condition was determined. K.A. Flowers et.al, examine the subjects which performed through sensory monitoring systems, muscle contractions, sensory monitoring systems, accuracy and oscilloscope. Then the ability of patients with two kinds of movement disorder to make simple voluntary movements is examined [17-21].

III. CONCLUSION

Electrooculography (EOG) is a technique to measure the corneo-retinal standing potential which exists between the front and the back of the human eye. The Electrographic signal is measured by moving the eyes from left to right or up and down which create an electrical deflection. The main objective of this paper to review the different approaches of EOG for Parkinson's patients and voluntary movements are examined interms of accuracy, object detection and latency.

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