Electrooculography (EOG)

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definition

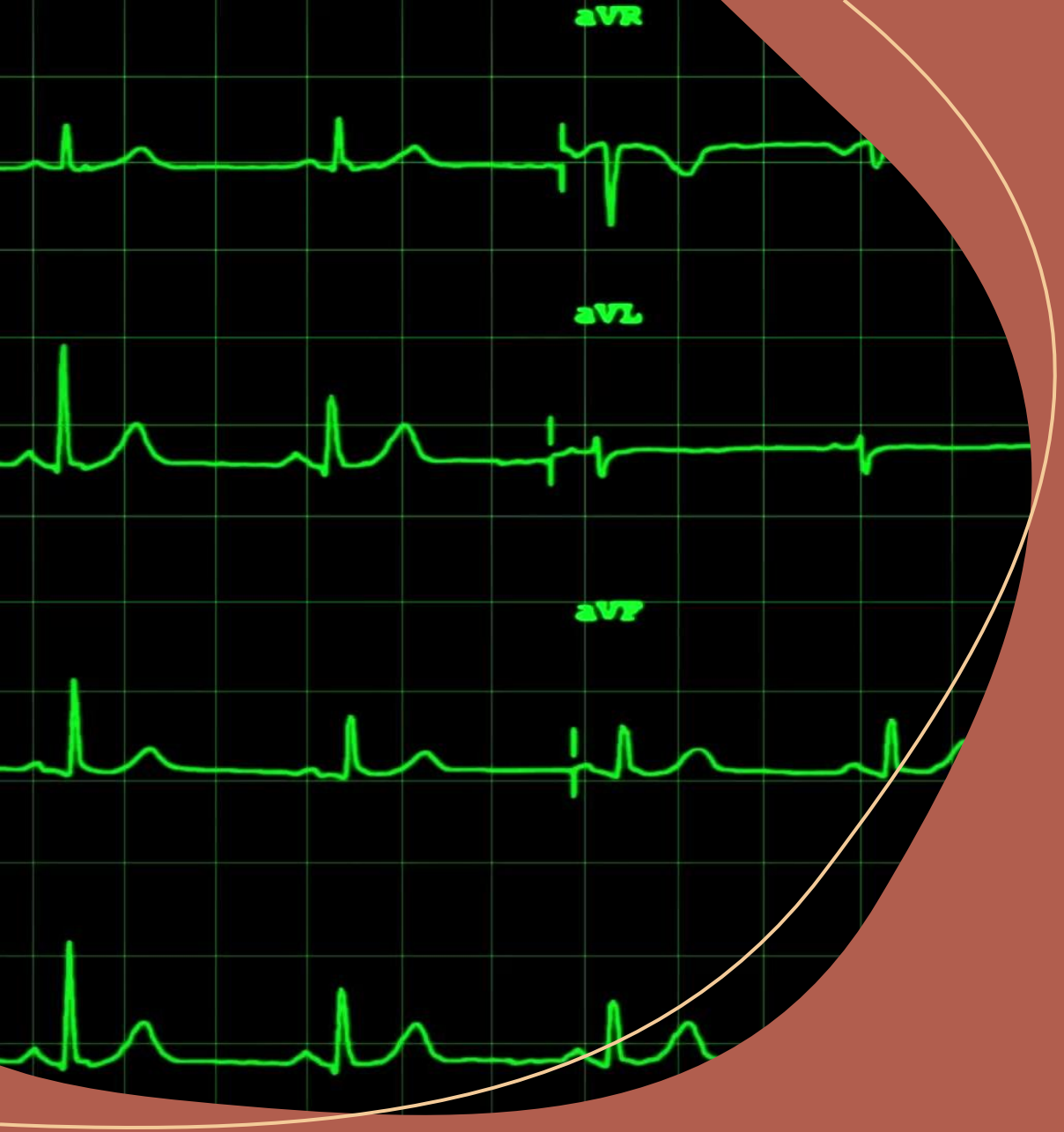
- Electrooculography (EOG) is a technique to measure electrical activity resulting from eye movement.
- They are used to record eye movement and gaze direction, and form them by measuring potential differences between specific points on the skin around the eye.

goal

- the main goal of EEG is to provide important information about retinal health and function in a non-invasive and painless manner, which helps doctors diagnose various eye and vision-related conditions.

some solutions from the literature

- Independent Component Analysis (ICA)
- Wavelet Transform
- Machine Learning and Pattern Recognition
- Adaptive Filtering Techniques
- Deep Learning Approaches



Corneal-Retinal Potential Method

- Electrooculography (EOG) is a fascinating technique for measuring the resting potential of the retina. One of the different techniques available to solve problems with EOG is called the corneal-retinal potential method.
- In this technique, the electrodes are placed on the surface of the cornea and around the eye. The corneal-retinal potential is the electrical potential generated by the cornea and the retina, which results from the constant polarization of the cornea and the retinal pigment epithelium with respect to the posterior pole of the eye.

How It Works

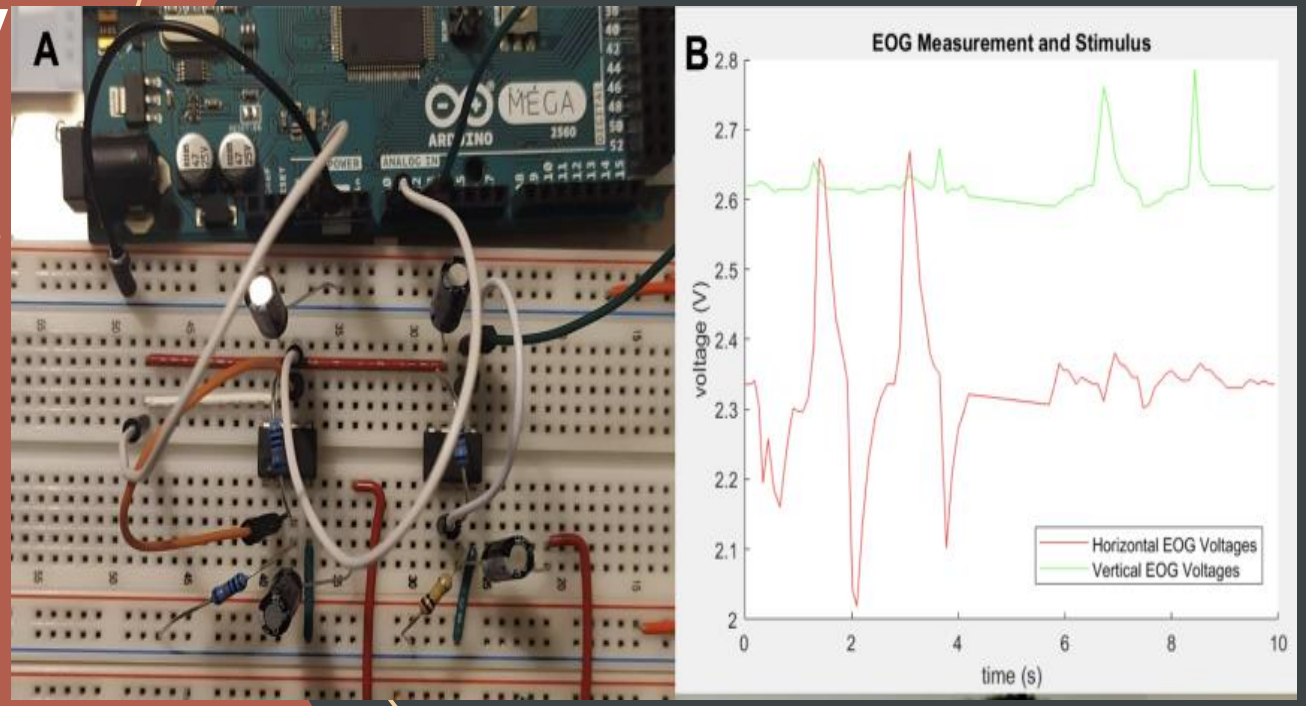
- When the eye moves, the eye muscles cause a shift in the electric potential of the eye. By measuring the electrical potential around the eye, the movements of the eyeball can be detected, allowing for the analysis of various eye movement patterns.

Use Cases

- This method is often used in fields such as ophthalmology, neurology, and human-computer interaction. It can help in diagnosing conditions such as nystagmus, deconjugate eye movements, and other eye movement disorders. Moreover, the corneal-retinal potential method is also helpful in developing assistive technologies like eye-controlled computer interfaces.

Building the EOG circuitry

- (A) The circuitry for the modified EOG, level-set circuits, and connection to the Arduino.
- (B) Graphed recorded EOG signals on MATLAB using standard pediatric-grade Ag/AgCl electrodes. We are able to see some leakage of azimuth and elevation movement, as the subject is not moving their eyes precisely along these axes and the electrode placement is also not precise.



- Experimental set-up of the modified EOG circuit.

Thank you for watching