A study on electrode placement in EOG systems for medical applications

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The eye acts as a dipole between the cornea (positive potential) and the retina (negative potential) which causes an electric field around the eyeball. Therefore, when humans make saccadic eye movements, they generate signals relative to this potential called electrooculography (EOG) signals. These signals can be measured by placing electrodes near the eye. Different electrode configurations can be employed to acquire the EOG signals. The properties of these signals change depending on the number and placement of the electrodes. Therefore, this paper presents a comparative study of electrode placement used to measure EOG signals. In order to support this study a low-cost signal acquisition hardware was developed. It enables the comparison of different electrode placements while showing the particularities of each one. The aim of this study is to analyse which electrode configuration could be best for medical applications.

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I. Introduction

Electrooculography (EOG) is one of the oculography methods used for the estimation of eye orientation. The EOG measurements are based on

the voltage amplitude modulation between two electrodes placed around an eye. This voltage depends directly on the angle of the eye (Fig. 1).

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