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## Presentation Abstract

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Presentation Title: Development of an eyewear to detect movement of eyes and body

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Topic: ++D.06.a. Eye movements: Central mechanisms

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**Abstract:** Observing mental and physical states of humans in daily life can help us to improve safety and efficiency. To realize such a mental and physical monitoring of humans, we have been developing the JINS MEME, an eyewear with a capability to detect eye and body movements. To identify user's mental states like drowsiness, sleepiness, mental fatigue, or interest to objects, the eye movements and eye blinks are measured and detected by using EOG (electrooculogram). In the conventional method of to measure horizontal and vertical rotations of eyeballs, EOG is measured by using four electrodes. Two electrodes are placed to outer edges of the right and left eyes to measure horizontal EOG, and vertical EOG is measured by two electrodes placed on the top and bottom parts of one of the eyes. However, this placement is not cosmetically suitable for daily use, because the electrodes and lead wires are located to the center of the face. To enable the cosmetically acceptable wireless EOG measurement in a daily life, we proposed the new placement the electrode for EOG measurement. The horizontal and vertical EOG signals are measured and amplified with three metal dry electrodes placed near nasion and both sides of rhinion, of which positions correspond to the bridge and nose pads of eyewear, respectively. And the six-axis motion sensor (three-axis accelerometer and three-axis gyroscope) mounted in the eyewear measures the body motion. As the sensor located near the head is on the body axis, this eyewear is suitable to measure user's movement or shift of center of gravity during physical exercise with a high precision. The measured signals are used to extract various events of eye and body movement by the mounted MPU chip, or can be transmitted to the external devices via Bluetooth communication. This device can enable you to look into "yourself", as well as outer scenes. In this presentation, the outline of the eyewear is introduced and some applications are shown.



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EYE MOVEMENT  
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