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Easy to Wear Dry EEG Sensors for Human–Computer Interactions

Tech ID: 30185 / UC Case 2018-186-0

BACKGROUND

Measurements based on electroencephalogram (EEG) are made by placing electrodes over a human scalp to apply and receive electrical signals. Various implementations of EEG sensors are available. The electroencephalogram (EEG) has recently gained popularity for use in various non-clinical studies but still lacks any robust, single application outside well-controlled laboratory environments. As the limitations of EEG are mostly due to the low spatial resolution, using multiple bio-sensing modalities proves to be better performing than EEG alone

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a novel dry miniscule sensor that can reliably measure electroencephalogram (EEG) from human scalp in real-time. The features are listed below.

▶ Active noise filtering - use of a faraday cage around the sensor, filters noise out right at the sensor level, eliminating ambient noise in the environment. Most other existing EEG systems filter the noise after transmission which can lead to the introduction of more noise in the process.

▶ Longer life - the novel sensor design is superior to Ag/AgCl based coatings used by other dry sensors.

▶ Easy to wear dry sensor -- design allows for sensor to penetrate hairs to remain in continuous contact for better scalp contact WITHOUT any application of liquid gels.

APPLICATIONS

The EEG sensors can be used for multi-modal bio-sensing in a wearable manner outside controlled laboratory environments to produce clean, research-grade measurements and is capable of synchronizing, recording and transmitting data from multiple bio-sensors - PPG, EEG, eye-gaze headset, body motion capture, GSR, etc. - while also providing task modulation features including visual stimulus tagging

ADVANTAGES

EEG sensor designs can use dry electrodes without application of a liquid and provide various features to improve the EEG measurements.

STATE OF DEVELOPMENT

The current system is in the experimental data stage. We have created a prototype and are collecting pilot data to evaluate our system.

INTELLECTUAL PROPERTY INFO

This technology is patent pending and available for licensing and/or research sponsorship.

RELATED MATERIALS

▶ Siddharth S, Patel A, Jung TP, Sejnowski T. A Wearable Multi-modal Bio-sensing System Towards Real-world Applications. IEEE Trans Biomed Eng. 2018 Sep 4. doi:10.1109/TBME.2018.2868759. - 09/04/2018

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Published Application	2019/200362 A1	04/12/2019	2018-186

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OTHER INFORMATION

KEYWORDS

Human-computer interface, Brain-Computer Interface (BCI), Bio-sensing, EEG, Pupillometry, Multi-modality, photoplethysmogram (PPG), Eye-gaze, Stimulus Tagging, Gaming, affective computing

CATEGORIZED AS

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