Symposium

Sat. Sep 27, 2025 2:10 PM - 3:40 PM JST | Sat. Sep 27, 2025 5:10 AM - 6:40 AM UTC Session Room 2 (Main Hall B)

[Symposium 66] Digital Frontiers in Psychiatry: Innovative Approaches from Asia

Moderator: Taishiro Kishimoto (Keio University School of Medicine)

[SY-66]

Digital Frontiers in Psychiatry: Innovative Approaches from Asia

Taishiro Kishimoto[1], Hwa-Young Lee[2], Hsin-An Chang[3], Hironobu Nakamura[4] (1.Keio University School of Medicine(Japan), 2.Soonchunhyang University Hospital(Korea), 3.Tri-Service General Hospital(Taiwan), 4.Institute of Science Tokyo(Japan))

[SY-66-01]

Development of software as a medical device for depression screening

*Taishiro Kishimoto (Keio University School of Medicine(Japan))

[SY-66-02]

Diagnosing and Treating Major Depressive Disorder Using EEG-Based Machine Learning

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Keywords：digital technology、AI、prediction

Information and communication technology advancement has significantly transformed our daily lives, making them more convenient. This evolution has also impacted the field of psychiatry, where clinical practices are undergoing remarkable changes. Innovations such as telemedicine, hospital system support, prognosis prediction, diagnostic assistance, and app-based therapies are reshaping the landscape. This symposium will focus on cutting-edge initiatives in psychiatry across Asia that leverage digital technologies. Each presenter will share insights into their notable achievements.Dr. Kishimoto will open the symposium by summarizing the applications of digital technology in psychiatry and presenting the development of a wearable wristband device for depression screening. Dr. Chang will discuss EEG-based diagnostic technologies for depression, while Dr. Nakamura will present quantitative techniques for assessing schizophrenia symptoms using natural language processing. Dr. Lee will introduce a system designed for predicting suicide and aggressive behaviors in psychiatric wards.

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[SY-66-01] Development of software as a medical device for depression screening

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Keywords：depression、AI、wearable device

Background: Few biomarkers can be used clinically to diagnose and assess the severity of depression. However, a decrease in activity and sleep efficiency is often observed in depressed patients. In addition, autonomic nerve symptoms, such as changes in heart rate variability, can be used to distinguish depressed patients from healthy people; these parameters can be used to improve diagnostic accuracy.
Method: Patients with depressive symptoms and healthy subjects are asked to wear a wristband-type wearable device for 7 days and data on triaxial acceleration, pulse rate, skin temperature, and ultraviolet light are collected. On the seventh day of wearing, clinical assessments are conducted using Structured Clinical Interview for DSM-5 (SCID-5), Hamilton Depression Rating Scale (HAMD), and other scales. Using wearable device data associated with clinical symptoms as supervisory data, a machine learning model capable of identifying the presence or absence of depressive episodes and predicting the HAMD scores is developed.
Results: As of November 2024, over 800 data sets were collected from approximately 250 subjects.
Conclusion: Data from the pilot study of this study (86 subjects) showed a screening accuracy of 76% for depression identification. While there is room for improvement, the results indicate that screening and severity assessment of depression can be performed at a certain level using wearable devices.

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[SY-66-02] Diagnosing and Treating Major Depressive Disorder Using EEG-Based Machine Learning

*Hsin-An Chang[1], Yi-Hung Liu[2] (1.Department of Psychiatry, Tri-Service General Hospital, National Defense Medical Center, Taipei(Taiwan), 2.Institute of Electrical and Control Engineering, National Yang Ming Chiao Tung University, Hsinchu(Taiwan))

Keywords：Major depressive disorder、EEG、Machine learning

Electroencephalography is a widely used research and clinical tool to monitor and record the electrical activity of the brain – the electroencephalogram (EEG). Machine learning algorithms have been developed to extract features from the EEG to identify various brain states from different neuropsychiatric disorders. Major depressive disorder (MDD) is a leading mental disorder worldwide. According to the World Health Organization, the annual global economic impact of depression is estimated at $1 trillion and is projected to be the leading cause of disability by 2020. Nowadays, the role of artificial intelligence in efforts to diagnose and treat MDD is getting more and more important. A growing body of research aims to better predict, diagnose, and treat MDD by using EEG-based machine learning as a potential solution. Our research team aims to explore the role of EEG-based machine learning in supporting depression diagnosis and treatment response prediction. We previously used EEG-based machine learning model to classify MDD patients versus healthy controls with acceptable accuracy. We subsequently used the combination of EEG-based machine learning plus self-reported depression severity to predict MDD patients with suicidal risks. In real-world observational studies, we tested the performance of the models of machine learning trained from the resting-state EEG data at baseline to predict treatment response to either 8–week antidepressant treatment in MDD patients or 30-session repetitive transcranial magnetic stimulation (rTMS) in treatment-resistant MDD patients. The results showed that specific machine learning classifiers can effectively predict treatment response in these patients. EEG-based machine learning shows substantial promise in the diagnosis and management of depression. However, the applications of EEG-based machine learning require further validation before they can be relied upon as diagnostic tools or a biomarker to predict treatment response.