이름: Hyojeong Moon

직위: Researcher

소속: Daegu-Gyeongbuk Medical Innovation Foundation

기타소속: Medical Device Development Center

강연제목: Depressive Disorder Data based Digital Biomarker Detection

Abstract: Recently, as depression has spread to the younger generation for social and economic reasons caused by the COVID-19, the number of patients with depression is increasing rapidly. Moreover, Korea has a higher rate of increase in the number of patients with depressive disorder compared to other countries. Existing self-reported depression scale tests have a problem in that the test results are biased depending on the tester's condition or environment. To prevent this problem, a new approach to diagnosis and treatment using digital technology is urgently needed. We intend to develop a system that allows subjects who experienced depression or patients diagnosed with depressive disorders to receive training for treatment purpose and self-diagnose. In order to accurately screen for depressive disorder, it is essential to detect digital biomarkers that can measure and evaluate symptoms of depressive disorder. In this study, we conducted a pilot study to explore digital biomarkers by adding functions related to depressive disorder, such as cognitive screening tests using games, survey, and digital devices. PHQ-9 for the subjects with depression is designated as a label, and games, behavior, and mood data are designated as feature sets. The collected 1,000 data were preprocessed and then split by training and test sets to perform machine learning. Performance was evaluated using Random Forest algorithm. We also confirmed feature importance to detect digital phenotypes that affect learning results. The prediction accuracy was 96.14%, and the most important feature was 'the highest level of success in the game', followed by 'daily mood data'. There is also a previous study result that 'the highest level of success in the game' shows the most important feature when predicting cognitive impairment that is deeply related to depressive disorder. Further studies should collect more patient and normal group data for digital biomarker detection, and labels should adopt clinically used test methods. Nevertheless, it is expected that this study will be able to detect digital biomarkers that can diagnose and predict depressive disorder.

Brief Biosketch

- "Development of mobile app-based DTx with 3 types digital bio-markers and cognitive and behavioral activation for depressive disorder," National R&D project, Principal investigator, '21 - '23.
- "Parkinson disease-related pattern of glucose metabolism associated with the potential of motor improvement after deep brain stimulation," Co-author, Neurosurgery, '20, 86.4, 492-499.
- "Presynaptic dopamine depletion determines the timing of levodopa-induced dyskinesia onset in Parkinson's disease," Co-author, European journal of nuclear medicine and molecular imaging, '18, 45.3, 423-431.
- "A Study of Development of Personal Authentication Method using Photoplethysmography," Lead author, Journal of Rehabilitation Welfare Engineering & Assistive Technology, '18, 12.4, 291-299.