



이름: 조백환 / Baek Hwan Cho

직위: 부교수 / Associate Professor

소속: 차의과학대학교 의학전문대학원 정보의학교실

Dept. of Biomedical Informatics, School of
Medicine, CHA University

국문 강연제목: 헬스케어를 위한 디지털 바이오 마커로서 키스트로크 다이내믹스 연구

영문 강연제목: A Study on keystroke Dynamics as a Digital Biomarker for
Healthcare

Abstract

Recently, there has been a growing interest in studying digital phenotypes that can be collected from mobile devices. These data are easy to obtain and offer the potential for long-term unconscious monitoring. Keystroke dynamics, extracted from smartphone keyboard typing data, can reflect the user's daily life and are associated with fine motor function, cognitive function, and mood. This study investigated the use of keystroke dynamics for health monitoring. We collected keyboard typing data on healthy Koreans using a custom keyboard for 6 weeks. We first analyzed the association between age and keystroke dynamics and developed a regression model to predict age. The results showed that all continuous keystroke feature values increased with age, while keystroke count tended to decrease. This suggests that typing speed-related keystroke feature distribution changes are linked to cognitive and fine motor brain function changes with age. We also investigated keystroke features for long-term stress monitoring. We classified the features according to Perceived Stress Scale (PSS) scores based on a machine learning model. As a result, 12 out of 102 features showed significant differences, and when stress was low, all features showed slower typing speed and broader distribution. In conclusion, our study underscores the potential utility of keystroke dynamics as a valuable tool for individual healthcare monitoring. The capacity to estimate an individual's mental stress condition and predict chronological age using keystroke dynamics offers promise for enhancing overall well-being and health. This research opens new horizons in the field of digital phenotyping, allowing for unobtrusive data collection from mobile devices and offering valuable insights into subtle physical and mental changes within an individual's daily life.

Brief Biosketch

Baek Hwan Cho currently holds the position of an associate professor at CHA University since 2022. Previously, he contributed his expertise to the Samsung Advanced Institute of Technology, where his research efforts were dedicated to deep learning-based breast ultrasound image analysis, gesture recognition, and autonomous driving technologies. Following this, Prof. Cho transitioned to the Samsung Medical Center, where he held positions as a research assistant and associate professor. Since then, his research has focused on the applications of artificial intelligence (AI) in the realm of medicine and healthcare. His work encompassed a wide range of medical data types, including medical images (MRI, CT, X-ray images, OCT images, endoscopy images, etc.), biosignals (EEG, ECG, etc.), and clinical structured data. He remains actively

engaged in advancing AI applications within the medical field and continues to explore the potential of digital biomarkers for healthcare purposes.