Phase II: Predicting Early Onset Alzheimer's with Wearable Technology

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Alzheimer's Disease (AD), the sixth leading cause of death in the United States, is estimated to affect 13.8 million American seniors by 2050 (alz.org). A growing body of evidence indicates that sensory and motor changes may precede AD's clinical manifestations, and can help detect it 10 to 15 years prior to typical clinical diagnosis. Early diagnosis enables patients and future caregivers to take measures to prevent the onset of the disease and improve quality of life and mortality. Last year, the research project included creating a prototype of a Fitbit app to passively monitor digital biomarkers (i.e. heart rate variability and gait speed) and notify the user if their longitudinal progression of neurological health mirrors that of a typical Mild Cognitive Impairment (MCI) patient who will have AD. This year, the project expanded upon the number of digital biomarkers the app measures (i.e. adding a sleep score biomarker) and aimed to test the app's accuracy at detecting trends in digital biomarker data. The app was tested through a computer simulation against two years worth of health data for various sample users and analyzed trends in six types of situations. The sample Fitbit user data for healthy aging users and potential Alzheimer patients were either generated using parameters and baselines from previous literature in the field or, in some cases, incorporated data from national studies. The simulations yielded a high accuracy rate for trend detection across various scenarios, a critical step towards future clinical testing and eventual public use.

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