Early Diagnosis of Parkinsonism via a Smartphone Application

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More than 10 million people worldwide live with Parkinson's Disease. Receiving an early diagnosis is critical to a patient's prognosis and quality of life. However, existing diagnostic protocols too often lead to late or inaccurate diagnoses. To help people at-risk of developing Parkinson's, I have created an iPhone app that can remotely screen patients for Parkinson's. Embedded into the app are basic data collection and screening protocols for tremor, rigidity, bradykinesia and other common and distinctive symptoms for Parkinson's. Users enter data fields and perform screenings which are analyzed by computer models for signs of Parkinsonism. Using data from Parkinson's patients and healthy controls, the app's computer models learned how to detect signs of Parkinsonism and discriminate between Parkinson's patients and healthy controls. All computer models significantly outperformed a chance-predictor and in some cases outperformed models created by other researchers. The app also collects demographic data and long-term health data that can aid in diagnosis. In total, the app creates a "summary statistic" risk profile: the estimated probability that the patient has Parkinson's disease, generated by considering demographic factors, health log data, and screening results in tandem. This is the first contribution of this research, while the second contribution is the demonstration of collecting long-term health data which can be used by clinicians in diagnosis. The third contribution of this research is the use of patient's demographic data to inform not only the risk profile but also the parameters of individual screenings.

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