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Assessing Motor Function in Parkinsons Disease using a Web-based, Computerized and User-friendly Tool

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Abstract: Abstract: Parkinsons disease (PD) is a neurodegenerative disease resulting in motor- and movement-related impairments. A clinical diagnosis of Parkinsons disease requires clinically detectable motor symptoms, which do not occur until six to eight years after the nigral neurons in the brain begin to degenerate. By detecting PD at an earlier stage, patients can begin therapy sooner, and consequently receive better treatment and care. Therefore, in order to detect motor defects prior to clinical detection, we developed a web-based, user-friendly computer task called Predictive Movement and Trajectory Tracking (PMATT). This task was administered to 23 PD patients and 14 normal controls while recording computer cursor movements. Using machine learning techniques, we calculated fifteen significant motor-related behavioral metrics which strongly distinguish the two groups of patients. By implementing a J48 classifier with these behavioral metrics, over 97% of subjects were correctly classified with an AUC of 0.992. From these results, we conclude that PMATT may be a helpful tool in screening for PD. Since it is easily scalable and automated for individual use, PMATT can be effortlessly administered to the general population. Furthermore, its use in research may help provide insights into the development of motor impairment in pre-clinical PD and help track symptom progression with a higher precision than is currently possible.​

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