CRANIOMETRIX: Developing Innovative Cognitive Tests to Diagnose Alzheimer's Early, Year Four

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Studies have shown that, if started early enough, drugs and therapies can significantly slow the progression of Alzheimer’s disease. However, there are currently no easy ways to identify the condition early. This study develops and examines the effectiveness of a battery of tests, including an automatic scoring system for the Clock Drawing Test (CDT), a platform for sensory dissonance monitoring, and an instantaneous recall assessment, to identify Alzheimer’s significantly earlier than it is being detected now. The study started with the purpose of developing an automatic, objective scoring system for the CDT – a subjective test currently used to identify cognitive impairment. To do that, an iPad app was created that reproduces a subject’s pen-and-paper drawing and automatically calculates various metrics, such as the cognitive processing time of a subject, that cannot be captured by the current test. It was found that the active writing times of groups with and without early-stage cognitive impairment were roughly equal, but the think time of the impaired subjects was over twice as long as that of the control group. Logistic regressions revealed that the think time is a strong predictor of early-stage cognitive impairment. By combining the new CDT scoring system with the sensory dissonance and instantaneous recall assessments, it is possible to obtain an overall picture of a subject’s cognitive state – that is currently only possible through a series of MRIs, EEGs, and consultations with neurologists. Those procedures lead to an average cost of $9000 to diagnose Alzheimer’s – 600 times more than the developed battery of tests, which costs $15 and can identify Alzheimer’s non-invasively, inexpensively, and easily 10-20 years earlier than it is being detected now.

Awards Won:

Patent and Trademark Office Society: First Award of $3,000