Eye movements help diagnose neurological disorders

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PARIS – Researchers at the University of Southern California (USC) claimed they have defined a low-cost method for detecting certain neurological disorders through the study of eye movements.

Many high-prevalence neurological disorders involve dysfunctions of oculomotor control and attention, including attention deficit hyperactivity disorder (ADHD), fetal alcohol spectrum disorder (FASD), and Parkinson's disease (PD).

Researchers asked participants in the study "to watch and enjoy" television clips for 20 minutes while their eye movements were recorded. Then, they combined eye-tracking data from patients and controls with a computational model of visual attention to extract 224 quantitative features. Using machine learning in a workflow inspired by microarray analysis, researchers identified critical features that differentiate patients from control subjects.

With eye movement data from 108 subjects, the team was able to identify older adults with Parkinson's Disease with 89.6 percent accuracy, and children with either ADHD or FASD with 77.3 percent accuracy. The technique provides new quantitative insights into which aspects of attention and gaze control are affected by specific disorders, researchers concluded.

"For the first time, we can actually decode a person's neurological state from their everyday behavior, without having to subject them to difficult or time-consuming tests," commented doctoral student Po-He Tseng and Professor Laurent Itti of the Department of Computer Science at the USC Viterbi School of Engineering.

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