Diagnosing Autism with Machine Learning: Binary Classification for Eye Movement in Virtual Reality Environment

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According to the CDC, about 1 in 59 children has been identified with autism spectrum disorder (ASD). However, the CDC describes how the current tools for diagnosing autism require time and effort of professionals through close monitoring of a person's behavior. As a result, many cases of autism go undiagnosed, which can cause anxiety and various other problems. In particular, autism diagnosis is known to be significantly delayed for minorities and girls. This project tackles the problem of diagnosing autism in a cheaper and faster way. The goal is achieved by using the eye movement data of human participants with autism and human participants without autism in a virtual reality task, and then using a binary classification algorithm to create a high-performance diagnosing model. This is done by determining where the participant is looking at in the virtual reality world in comparison to where they should be looking at over the course of time. Multiple machine learning models are evaluated to come up with the best final classification model. The findings in this project also reveal underlying patterns in the eye movement of those with autism, many of which would be almost impossible for a human observer to detect. Hence, novel results regarding behavior of children with ASD are uncovered in this project. The societal implications are a more efficient autism diagnosis that can be administered at a larger scale to diagnose children, which will prevent them from having to face problems associated with delayed autism diagnosis in the future.

Awards Won:

Second Award of $1,500

Association for the Advancement of Artificial Intelligence: Honorable Mention

American Psychological Association: Certificate of Honorable Mention