DyslexAI: A Novel Approach for Dyslexia Diagnosis and Treatment Using a Computer Webcam via Machine Learning

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Over 2 million children in the United States have dyslexia; however, the diagnosis process is very subjective and inaccurate at 85% accuracy and costs on average of $1000-5000 for diagnosis and $10,000 a year for treatment. The overall goal of this project is to create a cheap, sophisticated, accessible, and accurate model of diagnosing and treating dyslexia in children. Analysis of eye-movement while reading can indicate dyslexia. In order to meet these criteria, I have created a frame-by-frame analysis based diagnosis that only requires the patient to simply read 5 passages and answer corresponding questions, while their computer webcam, or any other video-capturing source, scan their eyes for predictable eye movements and bases the diagnosis on this along with other factors including age and correlated disorders. After diagnosis, my website will create a personalized training program for dyslexic kids to become more proficient readers and match non-dyslexic peers their age through reading by chunking and phonetic exercises. I have done this using standard Machine Learning algorithms and an interactive website. Specifically, I created three machine learning algorithms: one that accurately tracks pupil movement from a video, one that uses the data returned from the first algorithm to diagnose the patient, and one that generates the correct training process for dyslexic kids. Additionally, all of these features are accessible to the user through the website. The accuracy of dyslexia diagnosis on the model I have created is 93.87%: 8.87% higher than the current standardized methods. The design criteria I set for my product was met, and ultimately, the impact this project brings allows any family to test their kids for dyslexia accurately, efficiently, and free of cost.

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