

## **An assessment of machine learning-based training tools to assist Dyslexic patients**

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### **Abstract**

Dyslexia is a language based disability, where the patients often have difficulties with reading, spelling, writing and pronouncing words. The reading speed of Dyslexics tend to be lower than their equivalents, because of slow letter and word processing. In spite of this disorder, a dyslexic person can be trained to read in normal speed. There are manual methods and some technical improvements can be reported such as the live-scribe smart pen, Dragon Naturally Speaking, Word processors, and Video Games. This study provides an assessment about the Machine Learning (ML) based techniques used for Dyslexic patients via a systematic review of literature, and a proposed ML based algorithm that will lay foundation for future research in the areas of machine learning, augmented and healthcare training devices.

**Keywords:** Dyslexia, Machine learning, Training tools

### **Introduction**

In Diagnostic and Statistical Manual of Mental Disorders (DSM-V), dyslexia is listed as a specific learning disorder having a neurological origin. Dyslexia is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling. These difficulties typically present as a deficit in the phonological component of language that is unexpected in relation to other cognitive abilities (Rello et al., 2016).

The impact of Dyslexia can alter during different stages of the life, but its effects last throughout an individual's life. Dyslexia is referred to as a learning disability, since its effects make it very difficult to succeed academically due to the typical environment in schools. It is a known fact that they feel humiliated and stressed, because of their reading speed. The causes for Dyslexia are still not completely clear. Most people affected with Dyslexia have been found to have problems identifying the separate speech sounds within a word or learning how letters represent those sounds, which is a key factor in their reading difficulties. The fact is that Dyslexia is not due to either lack of intelligence or desire to learn. With appropriate teaching methods, Dyslexic patients can learn successfully (Dickinson et al., 2002).

Students with dyslexia have poor fluency in reading, writing, spelling detection, short-term memory and also other related disorders. Additionally, they often suffer from emotions like frustration and low self-esteem due to lack of achievement, which in the end develop behavioral difficulties (Hamid et al., 2015). There are several training methods to improve the reading speed of a Dyslexic person. Mainly the Dyslexic people are trained in special education environments with the support of trained teachers. Video games designed for dyslexic people also play a major role in training those people. In addition, there are some tools to help them with their