DysDiag: A Novel Risk Assessment and Screening Tool for Learning Disorders in Children

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Learning disorders (LDs) are neurodevelopmental disabilities with a worldwide prevalence of 5-15%. Lack of awareness paired with heterogeneity in testing methods results in non-identification of LDs in children. Assessment tests presently used to diagnose LDs require the physical presence of a medical professional, are time-consuming and expensive and adopt a non-child-centric approach. DysDiag proposes novel, accessible and easy-to-administer risk-assessment and screening tests (based on DSM-5 criteria), for LDs in children (5-8 years). DysDiag's test for Dyslexia consists of a gamified, visual-based quiz that accesses the child's phonemic, auditory and visual-based skills followed by a pronunciation test and parental questionnaire. The test for Dysgraphia includes 2 Machine Learning Image Classification Models that classify the child's handwritten sample as Dysgraphic or normal and further evaluate the sample for 6 diagnostic symptoms. The models recorded F1 scores of 0.785 and 0.964 respectively. The test of Dyscalculia includes a facial emotion recognition model alongside a response-time-based math quiz and a parental questionnaire. DysDiag was tested on 40 children consisting of a case-group of pre-diagnosed children (n=20, mean age=6yrs) and a control-group (n=20, mean age=7yrs). The children were tested by the registered medical professional followed by DysDiag's screening tests. DysDiag recorded a sensitivity and specificity of 90%, a Positive Predictive Value of 94.73% and a Negative Predictive Value of 90.47%. DysDiag was also reviewed and rated by 15 psychologists and pediatricians. DysDiag proved to be a clinically viable tool, that can aid in the early identification and mass screenings for LDs at elementary schools.

Awards Won:

American Psychological Association: Complimentary student affiliate memberships

American Psychological Association: Third Award of $500

University of Texas at Dallas: Back-up scholarship recipients