

Tab-Net Powered Assessment for Early Recognition of Neurodevelopmental Disorders in Children Below Three Years using Symptom Analytics

Chamoda B.P.^{1*}, Vasanthapriyan S.², and Dampalessa D. R. C. G. K³

¹Department of Computing and Information Systems,
Faculty of Computing, Sabaragamuwa University of Sri Lanka, Sri Lanka

²Department of Data Science,
Faculty of Computing, Sabaragamuwa University of Sri Lanka, Sri Lanka

³School of Information Technology, SLIIT City UNI

*bpchamoda@std.appsc.sab.ac.lk

Neurons are the basic building blocks of the human brain and nervous system. In the past few years, Neurodevelopmental Disorders (NDD) in toddlers has been increasing in the world year by year and this is becoming a major issue in pediatric portion health. Specifically, Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD), are significantly affecting complex disorders, for children's main motor function. Early intervention for these disorders is strictly effective to improve outcomes of toddlers. However, due to the traditional screening techniques and lack of clinical resources in Sri Lanka, there is a massive delay in diagnosis. This research aims to fill this gap by early recognition disorders and providing more accurate results. This exploratory study proposes a static, Tab-Net based interpretable deep learning model by analysing behavioral symptoms and signs in children below 36 months age. Evaluated the model using quantitative strategy applied a merged dataset of behavioral analytics. Tab-Net model differs from the traditional black box classifications by interpretable feature selection evaluations. Various models were built using same dataset including Decision Trees (95.40%), SVM (95.40%) and Random Forest (95.82%) to compare the performance of the TabNet model. The Tab-Net model achieved impressive performance with 97.07% testing accuracy, 97.08% precision, 97.07% recall and F1-score, and 99.46% ROC-AUC. The results demonstrate that Tab-Net provides competitive performance with early NDD diagnosis in resource limited settings.

Keywords: *Attention Deficit Hyperactivity Disorder (ADHD); Autism Spectrum Disorder (ASD); Early Childhood Symptoms; Neurodevelopmental Disorders (NDDs); Tab-Net*