Evaluation of Autism Spectrum Disorder Diagnosis (ASD) Using Machine Learning Models

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Abstract

The study of Autism Spectrum Disorder (ASD) has witnessed several developments since its first study in 1908 by Eugen Bleuler. However, since the diagnosis of ASD does not follow the traditional medical protocol, diagnosis is difficult and often delayed. This paper conducts predictive analysis by applying Machine Learning Models to data across four age groups viz: Toddlers, Children, Adolescents and Adults. The machine learning models implemented were derived from 4 categories: Linear Models, Tree Models, Non-Linear Models and Ensemble Models. It was observed based on the AUC Score, Precision, Recall and F1 Score of the models that the Logistic Regression, Naïve Bayes and AdaBoost Classifier Models had the best predictive ability. Chi-Square Test of Independence was conducted to explore the relationship between ASD and some socio-demographic variables, Neonatal Jaundice and Genetics. The results established a significant relationship between genetics and ASD, Jaundice and ASD, indicating that a known family history of autism increases the likelihood of a positive autism diagnosis. In addition, the results recorded a statistically significant relationship between Gender and ASD diagnosis in Toddlers, but not in Children, Adolescents and Adults.