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MULTICLASS CLASSIFICATION APPROACH TO IDENTIFY THE STAGE OF AUTISM SPECTRUM DISORDER

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Autism Spectrum Disorder (ASD) is known as a neurodevelopmental disorder that affects communication, social interaction and behavioural skills. ASD affects the children at the age of two years old and continues lifelong. Medicines can not cure ASD, but early interventions can be helpful to reduce the behaviours of ASD. Since ASD is a spectrum disorder, it can be classified as mild, moderate and severe stages. Based on the ASD stage, the appropriate therapies can be prescribed to ASD diagnosed child. Nowadays, screening methods such as Screening Tool for Autism in Toddlers and Young Children (STAT), Childhood Autism Rating Scale (CARS-2), and Autism Spectrum Quotient (AQ) have been used to diagnose the ASD, which rely on the experience of the clinician and the number of designed tools. For efficient decision making in ASD diagnoses, the machine learning techniques, namely automated classification methods, have been used by many researchers in recent literature. In this research, we apply multiclass classification techniques such as Ordinal Logistic regression, Decision tree, Conditional Inference Trees and Random Forest to identify the stage of ASD. Further, we analyse the prediction accuracy of these methods using real ASD dataset. The analysis revealed that Ordinal Logistic regression approach provides the best results with very high accuracy for both training and test data. Due to the rapid increase of ASD, early diagnosis of stage of ASD with the support of classification models will undoubtedly contribute to a greater extent in decision making.

Keywords: Autism Spectrum Disorder, ASD Stage, Machine learning, Multiclass Classification