AUTISM SPECTRUM DISORDER PREDICTION USING MACHINE LEARNING

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ABSTRACT:

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition affecting social interactions, communication, and behavior. Early and accurate diagnosis is crucial for effective intervention and improved quality of life. Traditional diagnosis methods are subjective, time-consuming, and often inaccessible. This paper proposes a machine learningbased model to detect ASD by analyzing behavioral, genetic, and cognitive patterns. Multiple classification algorithms, including Decision Trees, Random Forest, Support Vector Machines (SVM), and Neural Networks, are evaluated for their predictive performance. The study incorporates real-world datasets containing clinical and behavioral indicators, ensuring a robust evaluation of machine learning techniques. Various preprocessing methods, including feature selection, data normalization, and missing value imputation, are implemented to improve the model's efficiency. Comparative analysis of different algorithms is performed to identify the most suitable model for ASD classification, focusing on accuracy, precision, recall, and F1-score. Furthermore, this research explores the integration of deep learning techniques to enhance predictive capabilities. The findings demonstrate that machine learning can significantly enhance ASD diagnosis, providing a cost-effective, scalable, and efficient alternative to traditional methods. This study also discusses potential real-world applications, including mobilebased ASD screening tools and cloud-based diagnostic systems, to improve accessibility and early intervention for individuals at risk of ASD.

KEYWORDS: *Machine Learning, ASD Prediction, Behavioral Analysis, Genetic Disorder, Social Responsiveness Scale.*

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