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Addressing the challenge of dataset acquisition for ASD diagnosis with deep learning-based neural networks
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Abstract
The abstract examines the need for prompt and accurate diagnosis of Autism Spectrum Disorder (ASD), a neurodevelopmental disorder characterized by difficulties in social communication and repetitive behaviors. Early diagnosis is crucial in facilitating appropriate intervention and support, thereby substantially improving the potential for children's social and cognitive development. The conventional diagnostic approaches for ASD are often characterized by lengthy durations, high expenses, and susceptibility to inconsistencies across evaluators. These challenges are primarily due to the complex nature of the illness, which requires a complete evaluation encompassing several aspects such as behavior, neurology, and other relevant characteristics. Given the obstacles mentioned above, applying deep learning methodologies has emerged as a potentially fruitful approach for diagnosing ASD. These techniques demonstrate exceptional proficiency in identifying significant patterns and characteristics from diverse datasets, making a valuable contribution to developing more accurate and effective diagnostic models. This comprehensive literature review examines recent studies on the diagnosis of ASD, particularly emphasizing the various types of datasets employed in deep learning-based methods. The study covers various datasets that include behavioral data, capturing intricate details of social interaction and communication patterns, neuroimaging data that provide insights into the structure and function of the brain, and datasets that incorporate genetic and clinical assessments. The paper provides a more in-depth analysis of the challenges faced while acquiring datasets, which include issues related to data reliability, the adequacy of sample sizes, and the variability present within the datasets.

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