

Comparing the Detection of Autism Spectrum Disorder within Males and Females Using Machine Learning Techniques

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Abstract : Autism Spectrum Disorders (ASD) are a spectrum of social disorders characterized by deficits in social communication, verbal ability, and interaction that can vary in severity. In recent years, researchers have used magnetic resonance imaging (MRI) to help detect how neural patterns in individuals with ASD differ from those of neurotypical (NT) controls for classification purposes. This study analyzed the classification of ASD within males and females using functional MRI data. Functional connectivity (FC) correlations among brain regions were used as feature inputs for machine learning algorithms. Analysis was performed on 558 cases from the Autism Brain Imaging Data Exchange (ABIDE) I dataset. When trained specifically on females, the algorithm underperformed in classifying the ASD subset of our testing population. Although the subject size was relatively smaller in the female group, the manual matching of both male and female training groups helps explain the algorithm's bias, indicating the altered sex abnormalities in functional brain networks compared to typically developing peers. These results highlight the importance of taking sex into account when considering how generalizations of findings on males with ASD apply to females.

Keywords : autism spectrum disorder, machine learning, neuroimaging, sex differences

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