

FURIA Stacking Ensemble for ASD Classification

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Abstract

Autism Spectrum Disorder (ASD) is an illness that affects many children nowadays. It is a condition that causes parents to be concerned about detecting early autistic traits in their children because they are not visible until an expert diagnosis them using screening tools. However, screening tools consist of specific criteria domain rules such as behaviour, communication, and social emotions that comprise various questions, resulting in excessive questions and significantly lengthening the autism screening process. Instead of relying on conventional domain expert rules, one possible solution is adapting fuzzy rules by proposing the Fuzzy Unordered Rule Induction Algorithm (FURIA) and the machine learning algorithms by collaborating them into the stacking ensemble framework. The results show that the stacking ensemble of FURIA with the Logistic Regression generated ten rules and a 95.072% classification accuracy with 0.965 precision in predicting ASD traits. These findings will be an alternative option to make the screening questions much simpler yet give an alternative to the parents in predicting earlier with less time and good accuracy results.

Keywords: FURIA; Fuzzy-rule-based; ASD; Ensemble method; Stacking; Machine learning algorithms.