Exploring tree-based machine learning methods to predict autism spectrum disorder

(Book Chapter)

- Omar, K.S.,
- Islam, M.N.,
- Khan, N.S.
- View Correspondence (jump link)
- [a]Department of Computer Science and Engineering, Uttara University, Dhaka, Bangladesh
- [b]Department of Computer Science and Engineering, Military Institute of Science and Technology (MIST), Dhaka, Bangladesh
- [c]Department of Computer Science, University of Central Florida, Orlando, FL, United States

Abstract

In present-day, autism spectrum disorder (ASD) is gaining its momentum faster than ever. According to Worth Health Organization, 1 in every 160 children has ASD. Diagnosis of autism requires a considerable amount of time and cost. Also, the complex etiology of autism presents a challenge in diagnosis, as different autistic subgroups have a divergent set of behavioral characteristics. The evolution of artificial intelligence and machine learning (ML) presents the opportunity to develop prediction models that can be used to predict autism at quite an early stage. Though several researches were conducted in this field, a predictive tool for diagnosing autism for all age groups is yet to be seen. The objective of this chapter is to explore the existing tree-based ML techniques and propose a new tree-based ML method to predict autism traits of an individual at any age. In order to attain the research objective, different tree-based ML methods were used to develop predictive models of autism and were evaluated using two different datasets. Finally, a new tree-based approach was proposed that combines Iterative Dichotomiser 3 and Classification and Regression Trees in a merged random forest classifier. The evaluation results illustrated that merged random classifier outperforms the existing tree-based ML approaches.

Author keywords

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