**ABSTRACT**

Autism spectrum disorder (ASD) is characterized by a set of developmental disorders with a strong genetic origin. The genetic cause of ASD is difficult to track, as it includes a wide range of developmental disorders, a spectrum of symptoms and varied levels of disability. Mutations are key molecular players in the cause of ASD, and it is essential to develop effective therapeutic strategies that target these mutations. The development of computational tools to identify ASD originated by genetic mutations is vital to aid the development of disease-specific targeted therapies. This chapter employs supervised machine learning techniques to construct a model to identify syndromic ASD by classifying mutations that underlie these phenotypes, and supervised learning algorithms, namely support vector machines, decision trees and multilayer perceptron, are used to explore the results. It has been observed that the decision tree classifier performs better compared to other learning algorithms, with an accuracy of 94%. This model will provide accurate predictions in new cases with similar genetic background and enable the pathogenesis of ASD.