**ABSTRACT**

Autism Spectrum Disorder (ASD) is the fastest-growing complex disorder and the genetic ground of this comprehensive developmental disability is very difficult to research. Autism diagnosis for an average child is not done till the age of four, though it can be given at the age of 18 months to two years. Hence a computational model that enables the early diagnosis and personalized treatment is the need of the hour. In this research work, a deep learning based approach is proposed for Autism Spectrum Disorder (ASD) gene prediction. There are various contributors for Autism including genes, mutations, chromosomal settings influence of the environment, prenatal influences, family factors and problems during birth. Recurrent Neural Network (RNN) based Gated Recurrent Units (GRU) are implemented to develop a model that predicts ASD genes, mutations and gene susceptibility. GRUs with their internal memory capability are valuable to store and filter information using the update and reset gates. Also GRU offers a powerful tool to handle sequence data. The model is trained using three simulated datasets with features representing genes, mutations and gene susceptibility to ASD. Besides, the proposed approach is compared to original RNN and Long Short Term Memory Units (LSTM) for ASD prediction. The experimental results confirm that the proposed approach is promising with 82.5% accuracy and hence GRU RNN is found to be effective for ASD gene prediction