

ABSTRACT

The most common cause of dementia is Alzheimer's disease, and as the number of senior people increases, so does the number of instances. Since there is no known treatment and prompt intervention is required to prevent the progression of the disease, early detection is essential. This study generates categorization outputs into demented and non-demented categories using brain MRI scans as input. There are still drawbacks to traditional techniques like medical imaging and cognitive testing, such as their high expense, delayed diagnosis, and dependence on subjective interpretation. CNN and other deep learning algorithms are capable of extracting simple patterns, but they are less successful at capturing intricate spatial correlations. The External Attention Transformer (EAT) is the primary model used in this study to solve this problem, with CNN acting as a baseline comparison. CNN training with three depth variations, image preprocessing, EAT development with hyperparameter adjustment, and the simplification of the Alzheimer MRI 4 Classes dataset into two categories came next. Accuracy, precision, recall, f1-score, confusion matrix, and learning curve were used in the evaluation process. According to the results, EAT balanced precision, recall, and f1-score to achieve 97% accuracy on training data and 89% accuracy on test data, while the top CNN only managed 75% accuracy on test data. Consequently, it has been demonstrated that EAT is more successful and efficient than CNN in the early identification of Alzheimer's disease using MRI images.

Keywords: *Alzheimer's, MRI, Convolutional Neural Network, External Attention Transformer, deep learning, early detection.*