ABSTRACT

The high prevalence of brain tumors and the importance of early detection drive the development of automated diagnostic systems based on artificial intelligence. Manual early detection of brain tumors remains prone to human error and requires a considerable amount of time. These limitations demand more efficient and accurate solutions. One such solution involves the use of deep learning models with a transfer learning approach in brain tumor diagnosis. Transfer learning enables the reuse of pre-trained deep learning models for new classification tasks. This study aims to compare the performance of two deep learning models, VGG16 and ResNet50, in classifying four types of brain tumor MRI images: glioma, meningioma, pituitary, and no-tumor. The comparison takes place in two scenarios: before and after applying fine-tuning techniques. Fine-tuning refers to the process of retraining certain parameters of a deep learning model to better fit the characteristics of a new dataset. This research follows the Knowledge Discovery in Database (KDD) process, which includes data collection, preprocessing, model training, and evaluation. The results show that ResNet50 achieves an accuracy of 94.80% before fine-tuning and improves to 97.54% after fine-tuning, while VGG16 achieves an accuracy of 91.39% before fine-tuning and increases to 98.68% after fine-tuning. Overall, VGG16 outperforms ResNet50 in terms of accuracy. These findings suggest that deep learning models hold strong potential for improving the accuracy and efficiency of brain tumor diagnosis and treatment.

Keywords: fine-tuning, transfer learning, VGG16, ResNet50.