

Title:

Deep Learning Approach for Prediction of Brain Tumor from Small Number of MRI Images

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Abstract:

Daily, the computer industry has been moving towards machine intelligence. Deep learning is a subfield of artificial intelligence (AI)'s machine learning (ML). It has AI features that mimic the functioning of the human brain in analyzing data and generating patterns for making decisions. Deep learning is gaining much attention nowadays because of its superior precision when trained with large data. This study uses the deep learning approach to predict brain tumors from medical images of magnetic resonance imaging (MRI). This study is conducted based on CRISP-DM methodology using three deep learning algorithms: VGG-16, Inception V3, MobileNet V2, and implemented by the Python platform. The algorithms predict a small number of MRI medical images since the dataset has only 98 image samples of benign and 155 image samples of malignant brain tumors. Subsequently, the main objective of this work is to identify the best deep learning algorithm that performs on small-sized datasets. The performance evaluation results are based on the confusion matrix criteria, accuracy, precision, and recall, among others. Generally, the classification results of the MobileNet-V2 tend to be higher than the other models since its recall value is 86.00%. For Inception-V3, it got the second highest accuracy, 84.00%, and the lowest accuracy is VGG-16 since it got 79.00%. Thus, in this work, we show that DL technology in the medical field can be more advanced and easier to predict brain tumors, even with a small dataset.