

Brain Tumor Detection and Classification Using Pre-Trained Deep Learning Models

Authors : Aditya Karade, Sharada Falane, Dhananjay Deshmukh, Vijaykumar Mantri

Abstract : Brain tumors pose a significant challenge in healthcare due to their complex nature and impact on patient outcomes. The application of deep learning (DL) algorithms in medical imaging have shown promise in accurate and efficient brain tumour detection. This paper explores the performance of various pre-trained DL models ResNet50, Xception, InceptionV3, EfficientNetB0, DenseNet121, NASNetMobile, VGG19, VGG16, and MobileNet on a brain tumour dataset sourced from Figshare. The dataset consists of MRI scans categorizing different types of brain tumours, including meningioma, pituitary, glioma, and no tumour. The study involves a comprehensive evaluation of these models' accuracy and effectiveness in classifying brain tumour images. Data preprocessing, augmentation, and finetuning techniques are employed to optimize model performance. Among the evaluated deep learning models for brain tumour detection, ResNet50 emerges as the top performer with an accuracy of 98.86%. Following closely is Xception, exhibiting a strong accuracy of 97.33%. These models showcase robust capabilities in accurately classifying brain tumour images. On the other end of the spectrum, VGG16 trails with the lowest accuracy at 89.02%.

Keywords : brain tumour, MRI image, detecting and classifying tumour, pre-trained models, transfer learning, image segmentation, data augmentation

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