

Title : Comparative Performance Analysis of Deep Learning Models for Brain Tumor Diagnosis Using MRI Images

Author(s) : 1. Paweeakon Saisuwan

Student ID : 640510552

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Advisor(s) : 1. Lecturer Dr. Donlapark Ponnoprat
2. Assistant Professor Dr. Phimpaka Taninpong

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ABSTRACT

This study compares the performance of deep learning models in diagnosing brain tumors from MRI images, focusing on EfficientNet-B0, EfficientNet-B7, Swin Transformer, MaxViT, and ConvNeXt using the Brain Tumor MRI Dataset from Kaggle. MRI-based brain tumor diagnosis traditionally requires expert interpretation, which can be time-consuming and resource-intensive. Deep learning has emerged as a promising tool to enhance diagnostic accuracy and efficiency. The models were evaluated based on accuracy, sensitivity, specificity, F1-score, and AUC-ROC, alongside inference time and computational requirements to determine practical applicability. Results indicate varying performance across models, with EfficientNet-B7 and Swin Transformer demonstrating superior accuracy, while MaxViT and ConvNeXt offered a balance between speed and precision. Additionally, EfficientNet-B0 exhibited lower computational demands, making it suitable for resource-limited environments. These findings contribute to the development of AI-assisted diagnostic systems aimed at improving early detection, reducing the workload on medical professionals, and advancing AI applications in medical imaging.

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