

Title: Performance Assessment of Advanced CNN and Transformer Architectures in Skin Cancer Detection

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Abstract: Skin cancer has always been one of the most common types of cancer in medical history. Every year, it kills millions of people around the world. To find skin problems early, it is necessary to have a reliable automated method for recognizing them. In the past, protein sequences and different types of imaging methods were used with machine learning to find skin cancer. The problem with machine learning methods is that they need features to be designed by humans, which is hard to do and takes a lot of time. Image processing and deep learning are both used in the method for treating skin cancer that works. Our study is based on The HAM10000 dataset, which is made up of 10015 different dermatoscopic pictures of common pigmented skin lesions from different sources. The newest deep learning techniques, such as Convolutional Neural Networks (CNN), Transformers, and Hybrid models, i.e., ConvNeXt V2, SwinV2, ViT2, Cvt, DenseNet, ResNet, PVTv2, EfficientNet, EfficientFormer, VGG, MobileNet, MobileViTV2, GoogLeNet, are all compared in this study to see which one is better for automatically detecting skin cancer lesions. We found the best model for identifying skin lesions by determining its accuracy, F1-score, Inference time, and confusion matrix. Among our implemented models, the ConvNeXt V2 model has an accuracy of 93.2 % with the lowest inference time. With this research's help, new ways are being made to find skin cancer, which can lead to better patient results and better clinical decisions.

Keywords: Deep learning, Skin cancer, HAM10000, Convolutional neural network

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