

TriNetDerm:An Ensemble Deep Learning Framework for Robust Skin Cancer Classification

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Abstract:

Skin cancer is one of the most prevalent and severe diseases worldwide, making early and accurate detection critical. Here, we present a deep learning-based approach for classifying skin cancer images with improved accuracy. We experimented with several well-known architectures, including ResNet50, EfficientNetB0, and InceptionV3, both individually and in various ensemble configurations. Our final model combines ResNet50, EfficientNetB0, and a custom Convolutional Neural Network (CNN) into a hybrid ensemble, leveraging pre-trained networks alongside task-specific features. Key metrics such as accuracy, precision, recall, and F1-score were used to evaluate the system. Findings indicate that the hybrid ensemble outperformed individual models and other ensemble combinations, achieving 92% accuracy while maintaining balanced performance across all metrics. These results demonstrate that ensemble deep learning can enhance diagnostic reliability and support automated systems that aid dermatologists in early skin cancer detection and treatment decisions.

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