ICECAA

Springer

Proceedings

of the

3rd International Conference on Edge Computing and Applications ICECAA 2025

Organised by

Gnanamani College of Technology

Gateway to Great Life !

Accredited by NAAC 'A' Grade & NBA

AUTONOMOUS

Gnanamani College of Technology
Namakkal, Tamilnadu, India

3-4, December 2025

Table of Contents

DENSENET AND EFFICIENTNET-B HYBRID DEEP TRANSFER LEARNING FOR GROWTH IN SKIN DISEASE PREDICTION

Dr. A. Kalaivani[1], A. Shanmugapriya[2], Dr. A. Sangeetha Devi[3], Dr. P. Jayapriya[4]

[1] Assistant Professor, Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi, Coimbatore, Tamil Nadu, India
[2] Assistant Professor, Department of ECE, Sri Eshwar College of Engineering, Coimbatore. Tamil Nadu, India
[3] Professor, Department of Mathematics, Nehru Institute of Engineering and Technology Coimbatore, Tamil Nadu, India
[4] Department of Computer Science, Nallamuthu Gounder Mahalingam College, Pollachi, Coimbatore, Tamil Nadu, India

kalaivanimathsca@gmail.com
shanmugapriya301991@gmail.com
sangeethadevi.a@gmail.com
topriyadamu@gmail.com

Abstract. Background: Skin disorders are among the most prevalent medical problems in the world, and in order to prevent consequences, a prompt and precise diagnosis is typically required. However, some of the main obstacles to automated classification techniques are the lack of annotated clinical images, overlapping symptoms, and the visual similarity of lesions.

Objective: By combining the relative benefits of DenseNet121 and EfficientNetB0, the suggested study suggests a Dual-Backbone Transfer Learning Network (DBTLN) designed to improve the diagnostic performance of skin disease classification.

Methods: The DBTLN structure makes use of EfficientNet's depth scaling for computational efficiency and DenseNet's dense connectivity of features for preserving fine-grained lesion features. 19,171 dermoscopic photos of 19 distinct skin diseases were used to train and test the model. Presentation was assessed using exactness, accuracy, memory, and F1-score, and comparisons were made with the traditional CNN models, VGG19, MobileNetV2, AlexNet, DenseNet121, and EfficientNetB0.

Findings: The DBTLN outperformed all baselines with validation accuracy of 97.57%, correctness of 0.95, remembrance of 0.96, and F1-score of 0.95. These results demonstrate enhanced generalization across a broad range of skin lesion types, particularly under constrained and irregular clinical settings. Thus, this model substantially enhances skin disease prediction by leveraging deep feature fusion and adaptive learning mechanisms. It also achieves reliability by minimizing prediction error and enhancing generalizability.

In conclusion, the suggested dual-backbone architecture offers a robust,