

Abstract

Skin cancer is one of the most commonly diagnosed forms of cancer worldwide, and its early detection is vital to effective treatment and improved patient outcomes. In this project, we propose a novel deep learning-based web application designed to detect and classify seven types of skin cancer using dermatoscopic images. Our application integrates four state-of-the-art convolutional neural network (CNN) models—EfficientNetV2S, EfficientNetV2M, InceptionResNetV2, and XceptionNet—for feature extraction and classification. The models are trained on the HAM10000 dataset, a rich and diverse collection of skin lesion images. Through ensemble learning and advanced image preprocessing, the application delivers high accuracy and reliability. Users interact with the model through a simple Gradio web interface where they can upload images and receive instant diagnostic predictions. This system serves as an intelligent aid for both medical professionals and the general public, helping democratize access to dermatological insights through AI. It also lays the foundation for scalable, cloud-based health diagnostic solutions. The project aims to bridge the gap between medical expertise and technological accessibility.

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List of Abbreviations

- AI: Artificial Intelligence – The simulation of human intelligence in machines.
- ML: Machine Learning – A subset of AI that learns patterns from data.
- DL: Deep Learning – A type of ML involving neural networks with many layers.
- CNN: Convolutional Neural Network – A DL architecture used for image data.
- GUI: Graphical User Interface – User-friendly interface for interaction.
- API: Application Programming Interface – Used for software communication.
- ROI: Region of Interest – The area of focus in an image for analysis.
- BCC: Basal Cell Carcinoma – A common form of skin cancer.
- MEL: Melanoma – The most dangerous form of skin cancer.
- HAM10000: A public dataset with 10,000 dermatoscopic images of skin lesions.