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Abstract

# Deep Learning Skin Disease Classifiers: Current Status and Future Prospects

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## Abstract

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**Background:** Most studies on deep learning skin disease classifiers are done with binary classifications (ie, classifying lesions into malignant and benign). However, dermatology practice involves a large number of inflammatory and infective conditions that are not easily diagnosed by nondermatologist physicians.

**Objective:** The aim of this study is to develop a machine learning–based smartphone app for multiclass skin disease classification and evaluate its performance in different levels of dermatology practice. We will also explore similar studies in the literature.

**Methods:** We developed an artificial intelligence–driven smartphone app for 40 common skin diseases and tested it in primary care, tertiary care, and private practice settings.

**Results:** In the clinical study, the overall top-1 accuracy was 75.07% (95% CI 73.75%-76.36%), top-3 accuracy was 89.62% (95% CI 88.67%-90.52%), and the mean area under the curve was 0.90 (SD 0.07). Multimedia Appendix 1 shows the top-1 positive predictive values and negative predictive values from a clinical study of 35 diseases using the developed mobile health app on patients. In the literature, there are very few studies on image-based deep learning multiclass classification of common skin diseases and none of them included evaluations in actual clinical settings.

**Conclusions:** An artificial intelligence–driven smartphone app has the potential to improve the diagnosis and management of skin diseases in patients with skin of color. Nondermatologist, primary care physicians are likely to benefit from having access to such an app.

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**Conflicts of Interest:** None declared.

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## KEYWORDS

artificial intelligence; deep learning; skin disease classifier; skin of color; mHealth; machine learning

## Multimedia Appendix 1

Top-1 positive and negative predictive values from a clinical study of 35 diseases using a mobile health app on patients.

[\[DOCX File, 17 KB-Multimedia Appendix 1\]](#)

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