<u>Abstract</u>

Teledermatology and Artificial Intelligence: Piction Health

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Abstract

Background: Skin diseases affect 2.3 billion people globally. Due to the scarcity of dermatologists, 2 in 3 cases are seen by primary care physicians (PCPs), who have lower diagnostic accuracy. Published studies have shown that the diagnostic accuracy of a PCP or general practitioner is close to 50%.

Objective: The aim of this study was to build artificial intelligence (AI) classifiers across 26 and 54 common and urgent adult rashes that present in a primary care setting.

Methods: We trained our AI models with approximately 50,000 total photos. The number of images within each disease or class ranged from 76 to 5505. Additionally, we further tested narrowing the differential diagnosis by adding body part information to identify how this impacts top-5 accuracy for one condition.

Results: Overall, we trained an AI model to identify 26 classes on par with the accuracy level of a dermatologist, who is, on average, 75% top-3 accurate across 26 conditions. Additionally, we trained the AI model across 54 conditions and achieved 74.3% top-5 accuracy across common conditions and 79.2% top-5 accuracy across urgent conditions. In evaluating if body part information may increase top-5 accuracy, we saw top-5 accuracy for one condition increase from 67% to 97%.

Conclusions: Overall, we concluded that including body part information to down-select possible disease matches substantially increased the overall differential diagnosis accuracy for body region–specific conditions. We also concluded that AI may assist PCPs to identify the most likely skin conditions quickly in a clinical encounter, improve overall diagnostic accuracy, and inform the most appropriate next step for the patient. These promising findings highlight the need and potential of AI and clinical decision support to augment the ability of PCPs to accurately and confidently evaluate patients with skin conditions.

Conflicts of Interest: SC is the cofounder and chief executive officer of Piction Health, a company focused on using AI to help augment frontline providers' clinical decision making to save time and improve outcomes for patients with skin diseases. SC also holds shares in Piction Health.

Multimedia Appendix 1

Top-3 diagnostic accuracy of health care providers across 26 skin conditions, in comparison to Piction Health.
[PNG File , 25 KB-Multimedia Appendix 1]

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