

Artificial Intelligence for Skin Psoriasis Identification: A Clinical Viewpoint for Medical Practitioners

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Abstract - Psoriasis is a chronic, immune-mediated inflammatory skin disorder affecting approximately 2–3% of the global population. Early diagnosis and appropriate treatment are essential to prevent disease progression, reduce complications such as psoriatic arthritis, and improve patients' quality of life. Although diagnosis is primarily based on clinical examination by dermatologists, distinguishing psoriasis from other inflammatory skin disorders can be challenging, particularly in atypical cases, patients with darker skin tones, or primary healthcare settings. Recent advances in Artificial Intelligence (AI), especially machine learning (ML) and deep learning (DL), have demonstrated considerable potential in supporting clinicians through automated image analysis, lesion classification, disease severity assessment, and treatment monitoring. This paper reviews the role of AI in psoriasis detection, emphasizing clinically relevant concepts, current applications, limitations, and future opportunities for AI-assisted diagnosis.

Key Words: Artificial Intelligence, Psoriasis, Deep Learning, Machine Learning, Dermatology, Clinical Decision Support, Medical Imaging.

1. INTRODUCTION

Psoriasis is a chronic inflammatory skin disease characterized by excessive keratinocyte proliferation and immune dysregulation involving T cells, dendritic cells, and cytokines such as TNF- α , IL-17, and IL-23. It commonly affects the scalp, elbows, knees, sacral region, and nails, presenting as well-defined erythematous plaques with silvery-white scales. Although experienced dermatologists can usually diagnose psoriasis clinically, atypical cases, darker skin tones, and conditions resembling eczema, fungal infections, lichen planus, or seborrheic dermatitis may complicate diagnosis, sometimes requiring biopsy.

AI supports dermatological diagnosis by analyzing digital skin images and assisting clinicians in identifying

subtle disease patterns with high accuracy. Dermatology is a logical expansion for AI-assisted diagnosis since similar AI technologies are currently being successfully applied in radiology, ophthalmology, pathology, and cancer [1].

2. OVERVIEW OF AI

AI is the ability of computer systems to carry out activities that often require human intelligence, such as pattern recognition, data-driven learning, decision-making, and image interpretation. AI can be thought of by clinicians as a skilled digital assistant that has been taught using thousands of clinical photos [2]. The AI system can evaluate a new patient's skin picture and determine the probability that the lesion is psoriasis after learning the visual traits of the condition.

3. TWO MAIN BRANCHES OF AI USED IN DERMATOLOGY:

3.1 Machine Learning (ML)

Manually chosen image attributes, such as color distribution, lesion texture, edge sharpness, and shape, are necessary for machine learning techniques. Algorithms like Random Forests and Support Vector Machines then use these features to categorize skin conditions [3].

3.2 Deep Learning (DL)

Convolutional Neural Networks (CNNs), which are used in deep learning, automatically identify key aspects of images without the need for human feature extraction. CNNs are now the recommended method for psoriasis diagnosis since they have continuously shown better diagnostic performance in medical image analysis [4, 5, 6].

4. PIPELINE OF THE WORKFLOW FOR PSORIASIS DETECTION USING AI

The pipeline contains several sequential steps to conduct AI-based psoriasis detection.

4.1 Image Acquisition

Digital cameras, dermatoscopes, and smart phones are used to take clinical photos. Diagnostic precision is increased under standardized imaging conditions.

4.2 Image Preprocessing

Images are preprocessed to enhance quality prior to examination. Typical actions consist of:

- i. Elimination of image noise
- ii. Normalization of brightness
- iii. Enhancement of contrast
- iv. Adjusting color
- v. Image scaling

These techniques lessen variations brought on by different cameras and lighting.

4.3 Lesion Identification

In order to distinguish psoriatic plaques from surrounding healthy skin, the AI system first locates the afflicted skin area. Lesion segmentation is the term for this procedure. Accurate lesion size measurement and disease monitoring during therapy are made possible by segmentation [7, 8].

4.4 Feature Learning

In contrast to conventional computer vision techniques, deep learning automatically identifies clinically significant features like:

- i. Plaque thickness
- ii. Scaling degree
- iii. Severity of erythema
- iv. Boundaries of lesions
- v. Texture of surface
- vi. Pattern of distribution

These qualities don't need to be manually defined by the doctor.

4.5 Classification of Diseases

Lastly, the AI algorithm forecasts if the lesion indicates:

- i. Psoriasis
- ii. Eczema
- iii. Seborrheic dermatitis
- iv. Fungal infection

- v. Typical skin
- vi. inflammation causing skin conditions

A confidence score, which shows the likelihood of each diagnosis, is another feature that many systems offer.

5. AI MODELS USED IN DERMATOLOGY

In dermatology, a number of CNN architectures have been effectively used. ResNet, DenseNet, EfficientNet, and MobileNetV3 are widely used deep learning models for psoriasis detection. ResNet enables very deep networks, DenseNet promotes feature reuse, EfficientNet balances accuracy and computational efficiency, while MobileNetV3 is optimized for mobile and tele-dermatology applications. Because psoriasis-specific datasets are limited, transfer learning is commonly employed, allowing pre-trained models to be fine-tuned on dermatological images, thereby improving diagnostic accuracy while reducing training time.

6. CLINICAL USES OF AI

6.1 Early Identification

AI speeds up diagnosis by helping primary care doctors identify psoriasis before referring patients to dermatologists.

6.2 Differential Diagnosis

AI separates psoriasis from conditions that share similar clinical characteristics, such as:

- i. Atopic dermatitis
- ii. Dermatitis caused by contact
- iii. Seborrheic dermatitis
- iv. Lichen planus
- v. Tinea corporis
- vi. Lupus erythematosus discoid

This increases diagnostic confidence, especially in environments with limited resources.

6.3 Severity Assessment

AI can automatically estimate the severity of the disease using established clinical scoring systems such as:

- i. Psoriasis Area and Severity Index (PASI), [9]
- ii. Body Surface Area (BSA)
- iii. Physician Global Assessment (PGA)

During follow-up visits, objective measurements improve consistency and lessen inter-observer variability.

6.4 Tele-dermatology

For remote assessment, patients can send pictures from their smartphones. AI facilitates early screening and minimizes needless clinic visits by conducting preliminary analysis prior to dermatological assessment.

6.5 Monitoring Treatment

When necessary, serial image analysis supports treatment modification by allowing objective evaluation of lesion improvement or deterioration throughout therapy.

7. ADVANTAGES FOR MEDICAL PROFESSIONALS

AI offers several advantages in dermatology by enabling rapid image analysis, reducing observer variability, and improving the consistency of diagnosis. It supports automated lesion measurement for monitoring treatment response and extends dermatology services to underserved and remote areas. AI also serves as an educational tool by highlighting image features that influence diagnosis. Importantly, AI is designed to assist and enhance the clinical expertise of dermatologists rather than replace their professional judgment.

8. PRESENT CHALLENGES

Despite promising results, AI-based psoriasis diagnosis faces important challenges. Limited psoriasis datasets, variations in skin tone, image quality, lighting, and camera settings can reduce model accuracy and generalizability. Deep learning models often lack transparency, making their decisions difficult to interpret. Explainable AI methods, such as Grad-CAM, improve understanding by highlighting diagnostic image regions. Further clinical validation, regulatory approval, and integration into healthcare systems are required before widespread clinical adoption.

9. PROSPECTS FOR THE FUTURE

Future AI systems will incorporate many patient data sources, such as:

- i. Photos from clinical procedures
- ii. Dermoscopic pictures
- iii. Histopathological results
- iv. Research conducted in laboratories
- v. Electronic Medical Records
- vi. Biomarker and genetic information

Multimodal AI models could provide individualized therapy suggestions while increasing diagnostic accuracy. Federated learning may solve privacy issues

and promote medical cooperation by enabling organizations to build AI models without exchanging patient data. In addition to image analysis, large language models (LLMs) can help doctors by summarizing patient histories, producing clinical reports, and offering evidence-based therapy recommendations.

10. CONCLUSION

Artificial intelligence is emerging as a valuable tool in the diagnosis and management of psoriasis. By integrating computer vision, deep learning, and clinical decision-support systems, AI can assist healthcare professionals in detecting psoriasis, differentiating it from similar skin disorders, assessing disease severity, and monitoring treatment response. Studies have shown that AI models trained on diverse, high-quality datasets can achieve high diagnostic accuracy. However, AI is designed to support, not replace, the clinical expertise of dermatologists. Continued collaboration among clinicians, computer scientists, and healthcare organizations is essential to develop accurate, transparent, ethical, and clinically reliable AI systems for routine dermatological practice.

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**ES (Optional not mandatory)**

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