



Clinical-Medical Image

Dermatological Knowledge and Image Analysis Capabilities of Large Language Models Evaluated Through Dermatology Specialty Certificate Examinations

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Case Study

Large Language Models (LLMs) have demonstrated remarkable advancements in various fields, including medicine, with applications ranging from clinical decision-making to image interpretation. In dermatology, their potential to assist with diagnostic accuracy and knowledge dissemination has garnered attention. Evaluating the dermatological knowledge and image analysis capabilities of LLMs through the lens of the Dermatology Specialty Certificate Examination offers insights into their performance and limitations. These examinations, designed to test the knowledge and diagnostic skills of dermatology professionals, encompass a broad spectrum of topics, including rare and complex conditions. When applied to LLMs, the evaluation highlights their ability to recall detailed medical information and interpret dermatological cases based on textual inputs. However, the integration of image-based analysis poses additional challenges, requiring precise pattern recognition and contextual understanding that go beyond textual data processing [1].

Initial findings suggest that LLMs excel in theoretical dermatological knowledge, often providing accurate and evidence-based responses to exam-style questions. Their performance in image analysis, however, varies depending on the complexity of visual data and the availability of high-quality training datasets. While LLMs can identify common dermatological conditions with moderate accuracy, their limitations become apparent in distinguishing nuanced or overlapping features, particularly in rare diseases or atypical presentations [2].

This evaluation underscores the need for further refinement of LLMs to bridge the gap between theoretical knowledge and practical diagnostic applications. Incorporating multimodal training that integrates both text and high-resolution dermatological images could enhance their performance in clinical settings. Ultimately, while LLMs show promise as supplementary tools in dermatology, their current capabilities emphasize the importance of clinician oversight to ensure accurate diagnosis and patient care.

Keywords: Diagnostic accuracy; Clinical decision-making; Multimodal training

Acknowledgement

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Conflict of Interest

None.

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