
Artificial Intelligence in Dermatology: Current Applications, Limitations, and Future Directions

Dr. Rabia Sarfraz

Kettering General Hospital, United Kingdom

Abstract:

Artificial intelligence (AI) has increasingly influenced multiple aspects of dermatology and skin care science, particularly in areas that rely on visual pattern recognition and digital data analysis. This review summarises publicly available evidence describing how computational methods are currently being explored to support dermatological practice and research. Recent work has focused on algorithm-based assessment of skin lesions, assistance with diagnostic categorisation of common inflammatory skin conditions, and prioritisation processes within teledermatology services. Reported findings suggest that, in controlled experimental environments, selected AI systems are capable of achieving diagnostic outputs that approximate specialist interpretation for narrowly defined tasks. Despite these advances, translation into routine clinical settings remains inconsistent. Key challenges identified across the literature include limited generalisability of training datasets, under-representation of diverse skin tones, variability in external validation, and uncertainty regarding long-term effects on clinician workload and patient-centred outcomes. Additional considerations relate to professional accountability, transparency of algorithmic decision-making, and the need for appropriate regulatory oversight. Current evidence indicates that AI technologies are most appropriately positioned as supportive tools that complement clinical expertise rather than autonomous diagnostic solutions. Ongoing interdisciplinary collaboration, prospective evaluation, and context-specific governance frameworks are required to ensure responsible integration of AI into dermatology. By synthesising existing knowledge, this review highlights both the potential utility and the practical limitations of AI-enabled approaches, emphasising the importance of cautious, evidence-informed implementation to bridge the gap between theoretical development and real-world dermatological practice.