Novel Applications of Artificial Intelligence in the Imagistic Field of Precision Medicine [†]

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Abstract: Artificial intelligence (AI) is used to develop algorithms that attempt to mimic human cognition and teach themselves to perform tasks like lesion detection and treatment monitoring. Almost all dermatology diagnoses are based on visual pattern recognition, and automated diagnostic tools can report a probable diagnosis based on computer algorithms. The most recent advances in AI in dermatology diagnostic methods have used deep neural networks. Among them, a convolutional neural network (CNN) is the most common type used in image analysis. Machine learning algorithms can be used with skin imaging tools like dermoscopy or reflectance confocal microscopy (RCM). In the field of dermoscopy, they were found to be more accurate and appear to be superior to human experts, particularly in the diagnosis of pigmented skin lesions. AI in RCM has been primarily used to evaluate the quality of RCM mosaics, identify the dermal-epidermal junction, and analyze RCM images to aid in the diagnosis and differentiation of various skin tumors. Methods that apply CNN are used to identify lentigos, classify skin lesions and discriminate between benign and malignant melanocytic skin tumors. The majority of these deep learning technologies have already achieved clinician-level accuracy in classifying a variety of skin lesions, with machine accuracy even surpassing it in some cases. At the moment, existing algorithms cannot be used for routine skin cancer screening. More research is required to improve the applicability of automated image analysis in dermatologists' daily activities.

Keywords: artificial intelligence; dermoscopy; reflectance confocal microscopy; convolutional neural network;

Conflicts of Interest

The authors declare no conflict of interest.