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Paper Title:	Improving AI-Based Skin Disease Classification with StyleGAN3 for Minority Skin Tone Generation
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Abstract

Skin diseases are prevalent in Thailand due to the hot temperatures, humid climate, and increasing diversity of skin tones, which complicates diagnosis. Artificial intelligence (AI) has improved skin disease detection through deep learning models, aiding faster diagnoses and reducing the workload on dermatologists. However, AI models often struggle with underrepresentation of darker skin tones in training datasets, affecting performance. To address this imbalance, data augmentation techniques like generative models are recommended. This research enhances skin disease classification using StyleGAN3 for data augmentation to balance minority skin tone classes. The Fitzpatrick17k dataset focusing on Acne, Psoriasis, and Vitiligo is used. The Fitzpatrick Skin Type Scale is reduced from six to three levels due to image availability. VGG16 is applied to classify skin tone classes. Two additional datasets, the original and traditionally augmented datasets, are used for comparison against the StyleGAN3-augmented dataset. Results show that the StyleGAN3-augmented dataset achieves the best performance with F1-scores of 0.7193, 0.7446, and 0.7543 and accuracy scores of 0.7200, 0.7368, and 0.7419 for Acne, Psoriasis, and Vitiligo respectively. These findings demonstrate that StyleGAN3 improves model performance for minority skin tone classes in skin disease classification.
