



DERMOSCOPY AND SKIN IMAGING

DEVELOPMENT OF ARTIFICIAL INTELLIGENCE BASED MOBILE APPLICATION FOR TEN COMMON DERMATOLOGICAL DISEASES

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Background: The appearance in various skin diseases is different in shape, size, colour, surface and distribution. The more one sees, the better they get at the craft.

Many people consult general practitioners due to non-availability of trained dermatologists. Artificial intelligence (AI) has been found to be better than dermatologists in diagnosing skin cancers. We propose to develop an AI and data sciences-driven diagnostic mobile phone application for ten common dermatological diseases.

Objective: To develop and experimentally evaluate an AI-based mobile application for the diagnosis of ten common dermatological diseases.

Material and Methods: Around 5000 images were collected for ten diseases namely, Acne Vulgaris, Tinea corporis and cruris, Impetigo, Viral Warts, Psoriasis, Lichen Planus, Eczema, Urticaria, Melasma, Vitiligo. The images were annotated to the respective disease class on an AI learning tool. These images are then pre-processed via several image augmentation algorithms like random crops, rotations, horizontal and vertical flips. The resulting augmented images were then fed through the neural network model for training. Once the model is trained, we used similar scheme for inference also. Each test image is replicated several times and fixed augmentations schemes were applied on each of those copies which are then fed through the model and the predictions of all those copies are averaged to get the final prediction. We modulate the final prediction in the form of probability scores for each individual disease.

Results: Upon testing the application for validation on images that were not included for training, the sensitivity was as follows: Psoriasis- 59%,; Lichen Planus-80%; Vitiligo-99%; Eczema-86%; Melasma-93%; Warts-82%; Tinea-89%; Impetigo-78%; Urticaria-75%; Acne-96%. Overall sensitivity was found to be 87%. Specificity was in the range of 50-60%.

Conclusion: AI-based mobile application is a promising tool to augment the clinical diagnosis.

