Development of a Neural Network-Based Framework for Skin Disease Recognition

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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Abstract

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Skin diseases impact humans, animals, and plants and are typically brought on by germs or infections. These ailments include ringworm, yeast infections, brown sports, allergies, and other conditions. Early detection can help lessen the impact of diseases. But there are other risks that the skin can encounter, one of which is illness. Fungi, bacteria, allergens, enzymes, and viruses are the main causes of skin problems. Skin conditions impair not just one's physical health but also their psychological well-being, especially in those who have damaged or even scarred skin. Identifying the condition via manual feature extractions or symptom-based approaches requires time and requires comprehensive data for accurate identification. Serious health concerns are associated with skin diseases, which require an accurate and timely diagnosis for appropriate treatment. In particular, convolutional neural networks (CNNs) have shown promising results in automated skin disease identification recently. In this study, A novel CNN-based approach is presented, achieving a 95% accuracy rate in classifying seven different types of skin diseases from the HAM10000 image dataset. Dermatoscopic images from the HAM10000 dataset are preprocessed and categorized into seven classes: basal cell carcinoma, melanoma, vascular lesions, dermatofibroma, melanocytic nevi, and benign keratosis. After extensive testing and fine-tuning, it achieved an overall accuracy of 95% on the testing set. The outcomes show that the suggested CNN-based method can accurately identify a variety of skin conditions by using the HAM10000 picture dataset. Deep learning techniques can significantly help dermatologists and other healthcare professionals diagnose skin conditions accurately and automatically, enabling them to provide prompt and efficient treatments. This work adds a great deal to the growing field of

dermatological computer-aided diagnosis and offers valuable data for upcoming advancements in the identification of skin diseases.

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