ABSTRAK

Kanker kulit adalah masalah kesehatan global yang terus meningkat, membuat deteksi dini menjadi sangat penting. Diagnosis konvensional melalui biopsi memiliki keterbatasan, sehingga teknologi kecerdasan buatan, khususnya *deep learning*, menawarkan prospek cerah untuk solusi non-invasif. Namun, tantangan utamanya adalah ketahanan (*robustness*) model terhadap variasi kualitas gambar yang sering ditemukan di lingkungan praktis. Penelitian ini bertujuan mengatasi masalah ini dengan mengimplementasikan model *Convolutional Neural Network* (*CNN*) berbasis *MobileNetV3* yang dioptimalkan untuk deteksi dini kanker kulit pada gambar berkualitas rendah di *platform Android*.Model dikembangkan dengan pendekatan *transfer learning* dan dioptimasi *hyperparameter*-nya menggunakan *Bayesian Optimization*. Hasil evaluasi menunjukkan *performa* model yang sangat baik, mencapai akurasi 94% dan AUC 98% pada *test set*. *Robustness* model terbukti baik, dengan *AUC* yang hanya turun sedikit (dari 98.5% menjadi 98%) setelah simulasi *noise*. Saat diuji di *Android* dengan 20 citra ber-*noise*, model memberikan hasil prediksi 100% yang akurat. Secara keseluruhan, model *CNN* berbasis *MobileNetV3* berhasil dibuat dan menunjukkan *performa* yang sangat baik. Keberhasilan ini menunjukkan potensi model sebagai alat bantu deteksi dini kanker kulit yang akurat dan tangguh di lingkungan *mobile* riil. Peningkatan aksesibilitas deteksi dini ini punya potensi besar untuk mengurangi risiko angka kesakitan dan kematian akibat kanker kulit.

Kata Kunci: Kanker Kulit, Deteksi Dini, *Deep Learning*, *Convolutional Neural Network* (*CNN*), *MobileNetV3*, *Robustness*, *Android*.

ABSTRACT

Skin cancer is a growing global health issue, making early detection crucial. Conventional diagnosis through biopsy has limitations, so artificial intelligence technology, particularly deep learning, offers promising prospects for non-invasive solutions. However, the main challenge is the robustness of the model against image quality variations commonly found in practical settings. This study aims to address this issue by implementing a MobileNetV3-based Convolutional Neural Network (CNN) model optimized for early detection of skin cancer in low-quality images on the Android platform. The model was developed using a transfer learning approach, and its hyperparameters were optimized using Bayesian Optimization. Evaluation results show excellent model performance, achieving 94% accuracy and 98% AUC on the test set. The model's robustness is proven to be good, with AUC only slightly decreasing (from 98.5% to 98%) after noise simulation. When tested on Android with 20 noisy images, the model provided 100% accurate prediction results. Overall, the MobileNetV3-based CNN model was successfully developed and demonstrated excellent performance. This success highlights the model's potential as an accurate and robust tool for early skin cancer detection in real-world mobile environments. The increased accessibility of early detection has significant potential to reduce the risk of morbidity and mortality from skin cancer.

Keywords: *Skin Cancer, Early Detection, Deep Learning, Convolutional Neural Network (CNN), MobileNetV3, Robustness, Android.*