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IMPLEMENTASI DEEP LEARNING DENGAN MENGGUNAKAN EFFICIENTNETB3 UNTUK MENDETEKSI KANKER KULIT PADA APLIKASI CHATBOT

SKRIPSI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Teknik Program Studi Teknik Komputer

Oleh:
Muhammad Azka Adhitama
2109981

PROGRAM STUDI S1 TEKNIK KOMPUTER
KAMPUS UPI DI CIBIRU
UNIVERSITAS PENDIDIKAN INDONESIA
2025

HALAMAN PENGESAHAN SKRIPSI

MUHAMMAD AZKA ADHITAMA

IMPLEMENTASI DEEP LEARNING DENGAN MENGGUNAKAN EFFICIENTNETB3 UNTUK MENDETEKSI KANKER KULIT PADA APLIKASI CHATBOT

Disetujui dan disahkan oleh pembimbing:

Pembimbing 1

Muhammad Taufik, S.Tr.Kom., M.T.I.

NIP. 920200819940117101

Pembimbing 2

Dr. Eng. Munawir, S.Kom., M.T.

NIP. 920200819851205101

Mengetahui

Ketua Program Studi S-1 Teknik Komputer

Dr. Eng. Munawir, S.Kom., M.T.

NIP. 920200819851205101

PERNYATAAN BEBAS PLAGIARISME

Saya yang bertanda tangan di bawah ini:

Nama	: Muhammad Azka Adhitama
NIM	: 2109981
Program Studi	: Teknik Komputer
Judul Karya	: Implementasi *Deep Learning* Dengan Menggunakan EfficientNetB3 Untuk Mendeteksi Kanker Kulit Pada Aplikasi *Chatbot*.

Dengan ini menyatakan bahwa karya tulis ini merupakan hasil kerja saya sendiri. Saya menjamin bahwa seluruh isi karya ini, baik sebagian maupun keseluruhan, bukan merupakan plagiarisme dari karya orang lain, kecuali pada bagian yang telah dinyatakan dan disebutkan sumbernya dengan jelas.

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Kabupaten Bandung, 29 April 2025

Muhammad Azka Adhitama

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IMPLEMENTASI DEEP LEARNING DENGAN MENGGUNAKAN EFFICIENTNETB3 UNTUK MENDETEKSI KANKER KULIT PADA APLIKASI CHATBOT

Muhammad Azka Adhitama

2109981

ABSTRAK

Kanker kulit merupakan ancaman kesehatan global yang semakin serius dan membutuhkan penanganan segera. Deteksi dini berperan krusial dalam menekan angka morbiditas, mortalitas, serta biaya pengobatan dengan memungkinkan intervensi yang lebih cepat dan efektif sebelum kanker berkembang ke tahap lanjut. Penelitian ini mengembangkan aplikasi *chatbot* berbasis *website* yang dibuat mendeteksi kanker kulit dengan mengintegrasikan model EfficientNetB3 dan GPT-4o. GPT-4o tidak hanya berperan dalam memahami dan merespons bahasa alami, tetapi juga digunakan untuk memvalidasi apakah gambar yang diunggah pengguna mengindikasikan kanker kulit atau tidak melalui fitur *image analysis*. Hasil pengujian menunjukkan bahwa model EfficientNetB3 memiliki performa yang sangat baik dengan *test accuracy*, *average precision*, *average recall*, dan *average f1-score* sebesar 93%. Sementara itu, *chatbot* GPT-4o yang menggunakan metode *prompt engineering* berhasil untuk membatasi ruang lingkup percakapan menjadi kanker kulit saja, lalu GPT-4o menunjukkan kinerja yang sangat baik dalam menganalisis gambar dengan akurasi pengujian sebesar 94%. Selain itu, hasil evaluasi fungsionalitas sistem *chatbot* yang menggunakan metode *black box* menunjukkan hasil yang memuaskan, di mana seluruh skenario pengujian berjalan sesuai dengan rancangan awal. Integrasi antara model EfficientNetB3 dan GPT-4o terbukti dapat meningkatkan efektivitas serta akurasi dalam deteksi kanker kulit. Penggunaan GPT-4o *Vision* sebagai *validator input* memungkinkan EfficientNetB3 hanya mendeteksi gambar yang benar-benar terindikasi sebagai kanker kulit, sehingga meningkatkan keandalan serta ketepatan hasil deteksi.

Kata Kunci: Kanker Kulit, Deteksi Dini, EfficientNetB3, GPT-4o, *Chatbot*.

IMPLEMENTATION OF DEEP LEARNING USING EFFICIENTNETB3 TO DETECT SKIN CANCER IN CHATBOT APPLICATIONS

Muhammad Azka Adhitama

2109981

ABSTRACT

Skin cancer is an increasingly serious global health threat that requires immediate attention. Early detection plays a crucial role in reducing morbidity, mortality, and treatment costs by enabling faster and more effective interventions before the cancer progresses to advanced stages. This study develops a web-based chatbot application designed to detect skin cancer by integrating the EfficientNetB3 *model and* GPT-4o. GPT-4o *not only plays a role in understanding and responding to natural language but is also used to validate whether the image uploaded by the user indicates skin cancer through an image analysis feature. Test results show that the* EfficientNetB3 *model performs exceptionally well, achieving a test accuracy, average precision, average recall, and average F1-score of 93%. Meanwhile, the* GPT-4o *chatbot, utilizing prompt engineering methods, successfully restricts the conversation scope to skin cancer only, and* GPT-4o *demonstrated excellent performance in image analysis with a test accuracy of 94%. Additionally, the functional evaluation of the chatbot system using the black box testing method yielded satisfying results, with all test scenarios running according to the initial design. The integration of* EfficientNetB3 *and* GPT-4o *has proven to enhance the effectiveness and accuracy of skin cancer detection. The use of* GPT-4o *Vision as an input validator allows* EfficientNetB3 *to detect only images that are truly indicative of skin cancer, thereby increasing the reliability and precision of the detection results.*

Keywords*: Skin Cancer, Early Detection,* EfficientNetB3, GPT-4o, *Chatbot.*

DAFTAR ISI

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DAFTAR GAMBAR

DAFTAR SINGKATAN

ABCDE	*Asymmetry, Border, Color, Diameter, Evolving*
AI	*Artificial Intelligence*
API	*Application Programming Interface*
CNN	*Convolutional Neural Network*
CSS	*Cascading Style Sheets*
CTA	*Call To Action*
D&D	*Design and Development*
DNA	*Deoxyribonucleic Acid*
FAQ	*Frequently Asked Questions*
GPT	*Generative Pre-trained Transformer*
GPU	*Graphic Processing Unit*
GRU	*Gated Recurrent Unit*
HTML	*HyperText Markup Language*
ISIC	*International Skin Imaging Collaboration*
JS	Javascript
LLM	*Large Language Model*
LSTM	*Long Short-Term Memory*
NLP	*Natural Language Processing*
NMSC	*Non Melanoma Skin Cancer*
RAG	*Retrieval-Augmented Generatio*
RNN	*Recurrent Neural Networks*
UI	*User Interface*
UML	*Unified Modeling Language*
URL	*Uniform Resource Locator*
UV	Ultraviolet
UX	*User Experience*

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