

**INTEGRATED ATTENDANCE APPLICATION BASED ON FACE
RECOGNITION AND ARTIFICIAL INTELLIGENCE WITH ACADEMIC
SYSTEM**

THESIS

Submitted to fulfill part of the requirements to obtain a Bachelor's degree in the
field of Electrical Engineering



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A thesis submitted to fulfill one of the requirements for obtaining a Bachelor's
degree in Electrical Engineering in the Electrical Engineering Undergraduate
Study Program

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Universitas Pendidikan Indonesia

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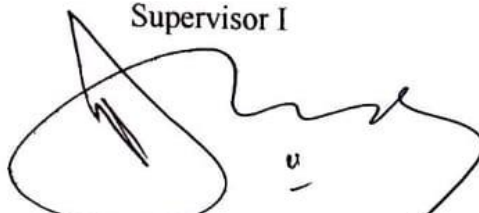
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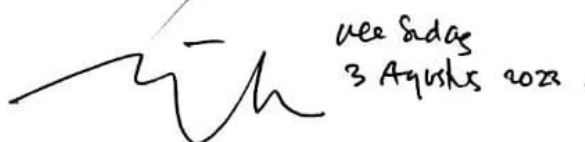
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STATEMENT OF AUTHORIZATION

I, Afdal Rezki, as the researcher responsible for the thesis titled "**INTEGRATED ATTENDANCE APPLICATION BASED ON FACE RECOGNITION AND ARTIFICIAL INTELLIGENCE WITH ACADEMIC SYSTEM**" hereby affirm that I am the sole author of this thesis and all its contents. I assure that I have not engaged in any form of plagiarism or improper citation that deviates from the scientific ethics upheld by the linguistic community. I acknowledge that in the event of any violation of scientific ethics or if any claims are raised regarding the authenticity of my work by other parties, I am willing to accept the associated risks and potential sanctions.

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ABSTRACT

The facial recognition attendance system plays a crucial role in enhancing security through its biometric capabilities. Particularly, in the context of a pandemic or an endemic situation, the adoption of facial recognition technology offers a contactless solution to minimize the risk of transmission. This research aims to develop a mobile-based facial attendance system using artificial intelligence. Numerous previous studies have demonstrated high accuracy levels of mobile-based facial recognition systems supported by artificial intelligence. By integrating this technology with Flutter programming and applying Machine Learning and Neural Network methods, a fast and accurate facial recognition system is created. Flutter provides user interface widgets developed by Google with high-quality coding standards. With this system, developers can easily customize without the need to write code from scratch. Within Flutter, various technologies are highly supportive of Artificial Intelligence-based project development. Libraries are available to facilitate application creation, streamlining the coding process. This mobile-based application enables usage anytime and anywhere. The Iterative Waterfall Model is employed as the development methodology. The implemented facial attendance application achieves a system accuracy rate of 92%, with a dataset loading time of around 653 milliseconds. This application demonstrates efficient facial recognition under adequate lighting conditions, even when faces are obstructed by glasses. Overall, this research presents a well-functioning facial attendance system by harnessing artificial intelligence to enhance security and contactless interactions that can be applied to the academic system.

Keywords: Face recognition; Artificial intelligence; Machine learning; Mobile application

ABSTRAK

Sistem aplikasi kehadiran wajah memiliki peran penting dalam meningkatkan keamanan melalui kemampuan biometriknya. Terutama, dalam konteks pandemi atau endemi, adopsi teknologi pengenalan wajah menawarkan solusi tanpa kontak untuk meminimalkan risiko penularan. Penelitian ini bertujuan untuk mengembangkan sistem kehadiran wajah berbasis mobile menggunakan kecerdasan buatan. Banyaknya penelitian terdahulu telah menunjukkan tingkat akurasi yang tinggi dari sistem pengenalan wajah berbasis mobile yang didukung oleh kecerdasan buatan. Dengan mengintegrasikan teknologi ini dengan pemrograman Flutter dan menerapkan metode Machine Learning dan Neural Network, sistem pengenalan wajah yang cepat dan akurat tercipta. Flutter menyediakan user interface widgets yang dikembangkan oleh Google dengan kualitas coding yang tinggi. Dengan sistem ini developer dapat melakukan kustomisasi dengan mudah, tanpa perlu menulis coding dari nol. Di dalam flutter memiliki berbagai teknologi yang sangat mendukung untuk pengembangan sebuah projek berbasis Artificial Intelligence. Library untuk memudahkan pembuatan aplikasi juga sudah tersedia sehingga memudahkan proses coding. Aplikasi berbasis mobile ini memungkinkan penggunaan kapanpun dan dimanapun. Metode Iterative Waterfall Model digunakan sebagai metodologi pengembangan. Aplikasi kehadiran wajah yang diimplementasikan mencapai tingkat akurasi sistem sebesar 92%, dengan waktu pemuatan dataset sekitar 653 milidetik. Aplikasi ini menunjukkan pengenalan wajah yang efisien dalam kondisi pencahayaan yang memadai, walaupun wajah terhalang oleh kaca. Secara keseluruhan, penelitian ini menyajikan sistem kehadiran wajah yang baik dengan memanfaatkan kecerdasan buatan untuk meningkatkan keamanan dan interaksi tanpa kontak yang dapat diterapkan pada sistem akademik.

Kata Kunci: Pengenalan wajah; Kecerdasan buatan; Machine learning; Aplikasi mobile

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