

ABSTRAK

SMART CLASSROOM DENGAN FACE RECOGNITION UNTUK KONTROL AKSES DAN OTOMATISASI RUANGAN

XIV + 80 halaman, 10 tabel, 36 gambar, 30 lampiran

Karya Tulis Ilmiah berupa Tugas Akhir, Agustus 2025

Syarif Husin. Dibimbing oleh Iskandar Lutfi dan Masayu Anisah

Implementasi *smart classroom* menjadi wujud transformasi pendidikan berbasis TIK. Penelitian ini menyajikan solusi inovatif: sistem *smart classroom* berbasis *face recognition* untuk kontrol akses dan otomatisasi ruangan terintegrasi. Dengan komponen utama kamera, Raspberry Pi 5, Arduino, dan relay, sistem mengendalikan lampu dan *magnetic lock*. Metode HOG (*Histogram of Oriented Gradients*) yang diimplementasikan via pustaka Python *face_recognition* dan OpenCV memungkinkan pengenalan wajah terdaftar secara *real-time* serta otomatisasi akses dan pencahayaan. Pengujian menunjukkan akurasi tinggi dan kinerja optimal dalam variasi kondisi pencahayaan. Sistem ini secara signifikan meningkatkan keamanan, efisiensi operasional, dan kenyamanan proses belajar, menjadi kontribusi penting bagi digitalisasi lingkungan pendidikan yang aman, cerdas, dan adaptif.

Kata Kunci: *Smart Classroom, Face Recognition, Histogram of Oriented Gradients (HOG), Otomatisasi*

ABSTRACT

SMART CLASSROOM WITH FACE RECOGNITION FOR ACCESS CONTROL AND ROOM AUTOMATION

XIV + 80 pages, 10 tables, 36 figures, 30 attachment

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Syarif Husin. Supervised by Iskandar Lutfi and Masayu Anisah

The implementation of smart classrooms represents the transformation of education based on information and communication technology (ICT). This study presents an innovative solution: a smart classroom system based on face recognition for integrated access control and room automation. With main components including a camera, Raspberry Pi 5, Arduino, and relay, the system controls lights and magnetic locks. The HOG (Histogram of Oriented Gradients) method, implemented via the Python face_recognition library and OpenCV, enables real-time recognition of registered faces as well as automated access and lighting. Testing demonstrated high accuracy and optimal performance under varying lighting conditions. This system significantly enhances security, operational efficiency, and the comfort of the learning process, making it a crucial contribution to the digitalisation of a safe, smart, and adaptive educational environment.

Keywords: Smart Classroom, Face Recognition, Histogram of Oriented Gradients (HOG), Automation