

INTISARI

Penelitian ini dilatarbelakangi oleh tingginya tingkat keterlambatan karyawan di PT Dinamika Mediakom sebesar 45%–55% setiap bulannya akibat kegagalan berulang pemindaian pada mesin *fingerprint*. Penelitian ini bertujuan untuk merancang dan membangun prototipe sistem presensi karyawan berbasis *face recognition* dan *real-time* dengan memanfaatkan kamera IP CCTV. Metode pengembangan menggunakan pendekatan *Prototyping*, sedangkan pengujian menggunakan *Blackbox Testing*, *Confusion Matrix*, dan analisis komparatif PIECES. Hasil implementasi menunjukkan bahwa program berbasis Python dengan pemanfaatan MediaPipe dan FaceNet berhasil dibangun menggunakan arsitektur *multi-threading* untuk mencegah *crash* pada tampilan antarmuka. Seluruh fungsionalitas program lolos pengujian *Blackbox* sebesar 100%. Pengujian keakuratan biometrik menggunakan *Confusion Matrix* terhadap 100 sampel acak di lapangan menghasilkan tingkat Akurasi sebesar 95,0%, Presisi 98,7%, Recall 95,0%, dan F1-Score 96,8%, membuktikan ketangguhan model dalam mengenali wajah karyawan terdaftar dan menolak wajah orang asing. Kesimpulan penelitian membuktikan bahwa transisi sistem presensi wajah berhasil memangkas durasi autentikasi menjadi 32% lebih cepat dari mesin sidik jari dan menurunkan tingkat keterlambatan karyawan akibat antrean mesin presensi menjadi 0%.

Kata kunci: Pengenalan Wajah, FaceNet, IP CCTV, Presensi Karyawan, Confusion Matrix

ABSTRACT

This research is motivated by the high rate of employee arrival delays at PT Dinamika Mediakom, averaging 45%–55% monthly, due to repeated scanning failures on the existing fingerprint machine. This study aims to design and build a contactless, real-time employee attendance system prototype based on face recognition utilizing the office's existing IP CCTV cameras. The system development follows the Prototyping approach, while the testing is evaluated using Blackbox Testing, Confusion Matrix, and comparative PIECES analysis. The implementation results show that the Python-based desktop client application, utilizing MediaPipe and FaceNet, was successfully developed with a stable multi-threaded architecture to prevent GUI interface freezing. All program functionalities passed Blackbox testing at a rate of 100%. Biometric accuracy testing using a Confusion Matrix on 100 random field samples yielded an Accuracy of 95.0%, Precision of 98.7%, Recall of 95.0%, and F1-Score of 96.8%, proving the AI model's robustness in identifying registered employees and rejecting strangers. The study concludes that transitioning to the face recognition system successfully reduced the authentication duration to 2.25 seconds per person (32% faster than the fingerprint scanner) and minimized the employee arrival-delay rate caused by attendance queue bottlenecks to 0%.

Keyword: Face Recognition, FaceNet, IP CCTV, Employee Attendance, Confusion Matrix