ABSTRAK

IMPLEMENTASI SISTEM KEAMANAN BRANKAS BERBASIS *FACE RECOGNITION* MENGGUNAKAN ALGORITMA YOLO DENGAN VERIFIKASI *FINGERPRINT*

(2025 : xv + 62 Halaman + 39 Gambar + 10 Tabel + 10 Lampiran)

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Abstrak - Seiring dengan perkembangan teknologi, sistem keamanan menjadi aspek krusial dalam menjaga aset berharga dan dokumen penting. Namun, sistem keamanan brankas konvensional yang hanya mengandalkan kunci manual, masih memiliki kelemahan, seperti risiko pencurianb atau penggandaan, sehingga masih rentan terhadap pembobolan. Untuk mengatasi permasalahan tersebut, penelitian ini mengembangkan sistem keamanan brankas berbasis biometrik yang menggabungkan pengenalan wajah menggunakan metode *You Only Look Once* (YOLO) dan verifikasi *fingerprint*. Hasil pengujian menunjukkan bahwa sistem mampu mengenali wajah dengan tingkat akurasi sebesar 83,33% dan berhasil melakukan verifikasi sidik jari dengan rata-rata waktu respons sebesar 1,41 detik. Sistem juga memberikan respons keamanan melalui pengendalian aktivasi buzzer apabila proses verifikasi *fingerprint* gagal sebanyak tiga kali percobaan. Berdasarkan hasil yang diperoleh, sistem terbukti dapat bekerja secara efektif dan terintegrasi dengan baik untuk meningkatkan keamanan akses terhadap brankas.

Kata Kunci: Sistem Keamanan, Brankas*, Face Recognition*, *Fingerprint*, ESP32-CAM, YOLO

ABSTRACT

IMPLEMENTATION OF SAFE SECURITY SYSTEM BASED ON FACE RECOGNITION USING YOLO ALGORITHM WITH FINGERPRINT VERIFICATION

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Abstract – With the advancement of technology, security systems have become a crucial aspect in protecting valuable assets and important documents. However, conventional safe security systems that rely solely on manual keys still have weaknesses, such as the risk of theft or duplication, making them vulnerable to breaches. To address this issue, this study developed a biometric-based safe security system that combines face recognition using the You Only Look Once (YOLO) method and fingerprint verification. Test results showed that the system was able to recognize faces with an accuracy rate of 83.33% and successfully verify fingerprints with an average response time of 1.41 seconds. The system also provides a security response by activating a buzzer if fingerprint verification fails after three consecutive attempts. Based on the results, the system is proven to operate effectively and is well-integrated to enhance access security to the safe.

Keywords: Security System, Safe, Face Recognition, Fingerprint, ESP32-CAM, YOLO