

ABSTRACT

The increasing crime rate in residential areas encourages the development of modern technology-based security systems. Face recognition is an effective alternative by eliminating the need for physical keys and enhancing protection. This study aims to design a home door security system based on face recognition using the ESP32-CAM module, and to evaluate the implementation of the Haar Cascade method and the Viola-Jones algorithm. The system was developed using ESP32-CAM, applying the Haar Cascade method for facial feature extraction and the Viola-Jones algorithm for detection acceleration. Testing was conducted on angle, distance, lighting intensity, and indoor and outdoor conditions. Results showed the system performs optimally at 90° angles and 10–70 cm distance. It also functions adequately under tilted angles, mid-range distances, and low lighting, though with slightly reduced accuracy. In all intrusion tests, the system successfully denied access with 100% accuracy.

Keywords: *face recognition, ESP32-CAM, Haar Cascade, Viola-Jones, home door security.*