



**IMPLEMENTATION OF FACE RECOGNITION TECHNOLOGY IN AN
ATTENDANCE SYSTEM BASED ON RASPBERRY PI AND WEB
INTERFACE**

UNDERGRADUATE THESIS

Submitted as one of the requirements to obtain
Sarjana Komputer (B.sc.)

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Implementation of Face Recognition Technology in an Attendance System Based on Raspberry Pi and Web Interface



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ABSTRACT

This study discusses the design and implementation of an automatic attendance system using facial recognition technology running on the Raspberry Pi 4B platform. Manual attendance methods are often considered inefficient, prone to manipulation, and time-consuming, especially in academic and office environments. By leveraging biometric technology and low-cost edge computing devices, this study aims to provide a practical, real-time, and contactless solution for recording attendance.

The system uses a USB camera connected to the Raspberry Pi to capture facial images. Face detection is performed using OpenCV with the Haar Cascade classifier, while face recognition is carried out using the Local Binary Pattern Histogram (LBPH) algorithm due to its simplicity and efficiency on devices with limited computational power. Once the face is recognized, the system automatically records the name and attendance time in a structured .csv file. To enhance usability and accessibility, the system is also equipped with a lightweight Flask-based web interface that allows administrators to view, manage, and download attendance data via a browser.

The entire process—from face detection, recognition, recording, to web display—is run locally on the Raspberry Pi without requiring a cloud connection, demonstrating that artificial intelligence technology can be directly implemented on edge devices. Testing was conducted under various lighting conditions and facial angles to evaluate the system's accuracy and speed. Results show that the system can provide reliable recognition rates and efficient processing times for small-scale applications such as classrooms or offices.

This research contributes to the development of intelligent systems in education and organizational settings by providing an affordable, scalable, and user-friendly attendance solution. Further development could include integration with a centralized database, algorithm improvements using deep learning, and multi-device synchronization support.

Overall, the implementation of a face recognition-based attendance system on Raspberry Pi, equipped with a web interface and structured data storage, has proven to be a practical and efficient tool for attendance automation with minimal human intervention and high accessibility.

Keywords: Face Recognition, Raspberry Pi, Attendance System, OpenCV, LBPH, Web Interface, CSV, Edge Computing, Flask.

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