

ABSTRACT

Security is a crucial aspect in creating a safe and comfortable dormitory environment for its residents. Manual logging systems such as logbooks are often inefficient and prone to errors. To address this issue, a Smart Dorm Lock system was developed by utilizing Internet of Things (IoT) technology and facial recognition as an automatic access control system for dormitory doors. This system is designed to enhance security, facilitate real-time monitoring, and optimize dormitory management efficiency. The implemented solution uses the Convolutional Neural Network (CNN) algorithm as the primary method for facial recognition. The main controller of the system is Raspberry Pi 5, integrated with supporting components such as a camera, PIR sensor, solenoid door lock, relay, LCD display, and a mobile application connected to Firebase. The system automatically recognizes dorm residents' faces, matches them with the stored database, grants access if verified, and records access activity into the system. Based on the test results, this system is able to provide a level of facial recognition accuracy of up to 100% under normal conditions, an accuracy level using accessories of 91.8%, testing with varying light intensity gets an accuracy of 97% and the optimal detection distance based on testing is 40cm - 280cm, and shows a fast response with real-time data integration through the application. With these capabilities, Smart Dorm Lock is able to be a solution in improving security and access management systems in the dormitory environment.

Keywords: CNN, facial recognition, Internet of Things, Raspberry Pi, smart lock