ABSTRACT

Case studies of house break-ins in Indonesia, especially in residential areas, highlight the need for improved home security systems. Conventional manual key-based security systems have weaknesses in preventing criminal actions. This research aims to design and implement a home door security system based on facial recognition integrated with the Internet of Things (IoT) to enhance security effectively. This study uses the Research & Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). Facial recognition technology is implemented using the Convolutional Neural Network (CNN) method with the Multi-task Cascaded Convolutional Neural Network (MTCNN) architecture. The system is implemented using Raspberry Pi 3 Model B+ devices, connected to a solenoid door lock for automatic locking, a Telegram bot for real-time notifications, and a web-based interface for system management. The results show that the system achieves the best detection accuracy and facial recognition at an optimal distance of 55 cm with the best detection time of 0.01 seconds under light intensity conditions (50-90 lux), allowing the door to open. Under low light intensity (less than 50 lux), the system only achieves detection accuracy and fails to recognize faces at distances less than 75 cm, with a detection time of 0.71 seconds when the face is unrecognized.

Keyword : Artificial Intelligence, Convolutional Neural Network, Home Security, Internet of Things, Raspberry Pi.