

Abstract

Currently, home security systems have become a crucial issue, especially in this advanced era where almost everything is connected to technology and the internet. One of these systems is the smart home security system, which aims to ensure the safety and protection of both property and individuals inside. It is important to have a good home security system that can effectively and securely secure the premises. Over the past few years, there have been many designs for smart home security systems that use facial recognition methods, but many of these designs still show subpar image processing accuracy. Therefore, in this research, the author develops a design for a smart home security system that can recognize faces in a smart home using facial recognition technology. The selection of an appropriate facial recognition algorithm is important. To address the aforementioned issues, this final project develops an enhancement for a smart home security system using facial recognition through Convolutional Neural Networks (CNN) method. The ESP32-CAM camera is integrated with the CNN model to recognize registered faces from a database. Three Convolutional Neural Networks algorithms have shown relatively high accuracy based on the analyzed literature: AlexNet CNN with an accuracy of 98.19%, SqueezeNet CNN with an accuracy of 95.83%, and FaceNet CNN with an accuracy of 99.26%. Additionally, the proposed prototype of the smart home security system also demonstrates satisfactory results. The ESP32 camera successfully detects registered faces and records the identified individuals along with the timestamp. It is hoped that this research will contribute to improving the security of smart homes.

Keywords: Security System, Smart Home, Face recognition, Convolutional Neural Networks.