

A Review of Deep Convolutional Neural Networks in Mobile Face Recognition

ABSTRACT

With the emergence of deep learning, Convolutional Neural Network (CNN) models have been proposed to advance the progress of various applications, including face recognition, object detection, pattern recognition, and number plate recognition. The utilization of CNNs in these areas has considerably improved security and surveillance capabilities by providing automated recognition solutions, such as traffic surveillance, access control devices, biometric security systems, and attendance systems. However, there is still room for improvement in this field. This paper discusses several classic CNN models, such as LeNet-5, AlexNet, VGGNet, GoogLeNet, and ResNet, as well as lightweight models for mobile-based applications, such as MobileNet, ShuffleNet, and EfficientNet. Additionally, deep CNN-based face recognition models, such as DeepFace, DeepID, FaceNet, and SphereFace, are explored, along with their architectural characteristics, advantages, disadvantages, and recognition accuracy. The results indicate that many scholars are researching lightweight face recognition, but applying it to mobile devices is impractical due to high computational costs. Furthermore, noise label learning is not robust in actual scenarios, and unlabeled face learning is expensive in manual labeling. Finally, this paper concludes with a discussion of the current problems faced by face recognition technology and its potential future directions for development.