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Robust Face Recognition Using CNN-Based Feature Extraction and Exponential Discriminant Analysis

Communication Info

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- (1) Convolutional Neural Networks
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Abstract

Despite recent advancements, face recognition (FR) technology still faces significant challenges, particularly in adverse conditions such as varying lighting, facial expressions, poses, and aging effects. This necessitates the development of more robust and accurate recognition models. This study presents a hybrid methodology for face recognition that utilizes multiple deep learning architectures, specifically convolutional neural networks (CNNs) [1], combined with exponential discriminant analysis (EDA) [2]. The main objective of this research is to enhance facial representation to minimize recognition errors. To achieve this, we modified the EDA algorithm to reduce the dimensionality of the feature maps obtained from three pre-trained CNN architectures (ResNet50 [3], InceptionV3 [4], MobileNetV2[5]). Subsequently, we evaluated the effectiveness of these features using two machine learning classifiers, 1NN and SVM. Advanced experiments conducted on well-known face databases (GT, AR, LFW) demonstrated high efficiency in FR rates.

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