Super-Low Resolution Face Recognition using Integrated Efficient Sub-Pixel Convolutional Neural Network (ESPCN) and Convolutional Neural Network (CNN)

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Abstract:
Several deep image-based models which depend on deep learning have shown great success in the recorded computational and reconstruction efficiencies, especially for single high-resolution images. In the past, the use of superresolution was commonly characterized by interference, and hence, the need for a model with higher performance. This study proposed a method for low to super-resolution face recognition, called efficient sub-pixel convolution neural network. This is a convolutional neural network which is usually employed at the time of image pre-processing to increase the chances of recognizing images with low resolution. The proposed Efficient Sub-Pixel Convolutional Neural Network is used for the conversion of low-resolution images into a high-resolution format for onward recognition. This conversion is based on the features extracted from the image. Using several evaluation tools, the proposed Efficient Sub-Pixel Convolutional Neural Network recorded a higher performance in terms of image resolution when compared to the performance of the benchmarked traditional methods. The evaluations were carried out on a Yale face database and ORL dataset faces. For Yale and ORL datasets, the obtained accuracy of the proposed method was 95.3% and 93.5%, respectively, which were higher than those of the other related methods.

Keywords : Super-Resolution (SR); Face Recognition; Low Resolution (LR); Deep Learning

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