Assiut university
Staff Researches

A 3D-based Pose Invariant Face Recognition at a Distance Framework

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Abstract:

Face recognition in the wild can be defined as recognizing individuals unabated by pose, illumination, expression, and uncertainties from the image acquisition. In this paper, we propose a framework recognizing human faces under such uncertainties by focusing on the pose problem while considering the other factors together. The proposed work introduces an automatic front-end stereo-based system, which starts with image acquisition and ends by face recognition. Once an individual is detected by one of the stereo cameras, its facial features are identified using a facial features extraction model. These features are used to steer the second camera to see the same subject. Then, a stereo pair is captured and 3D face is reconstructed. The proposed stereo matching approach carefully handles illumination variance, occlusion, and disparity discontinuity. The reconstructed 3D shape is used to synthesize virtual 2D views in novel poses. All these steps are done off-line in an Enrollment stage. To recognize a face from a 2D image, which is captured under unknown environmental conditions, another fast on-line stage starts by facial features detection. Then, a facial signature is extracted from patches around these facial features. Finally, this probe image is matched against the closest synthesized images. Experiments are conducted on different public databases from where we investigate the effect of each component of the proposed framework on the recognition performance. The results confirm that without training and with automatic features extraction, our proposed face recognition at a distance approach outperforms most of the state-of-the-art approaches.

Keywords:

face recognition feature extraction

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