

FARO: FAcE Recognition Against Occlusions and Expression Variations

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Abstract—Face recognition is widely considered as one of the most promising biometric techniques, allowing high recognition rates without being too intrusive. Many approaches have been presented to solve this special pattern recognition problem, also addressing the challenging cases of face changes, mainly occurring in expression, illumination, or pose. On the other hand, less work can be found in literature that deals with partial occlusions (i.e., sunglasses and scarves). This paper presents FAcE Recognition against Occlusions and Expression Variations (FARO) as a new method based on partitioned iterated function systems (PIFSs), which is quite robust with respect to expression changes and partial occlusions. In general, algorithms based on PIFSs compute a map of self-similarities inside the whole input image, searching for correspondences among small square regions. However, traditional algorithms of this kind suffer from local distortions such as occlusions. To overcome such limitation, information extracted by PIFS is made local by working independently on each face component (eyes, nose, and mouth). Distortions introduced by likely occlusions or expression changes are further reduced by means of an *ad hoc* distance measure. In order to experimentally confirm the robustness of the proposed method to both lighting and expression variations, as well as to occlusions, FARO has been tested using AR-Faces database, one of the main benchmarks for the scientific community in this context. A further validation of FARO performances is provided by the experimental results produced on Face Recognition Grand Challenge database.