

Feature Level Fusion of Face, Palm print and Fingerprint using SIFT-PCA Combination: A Multibiometric Approach

Dakshina Ranjan Kisku, Ajita Rattani, J. K. Sing, Phalguni Gupta

Summary

Multimodal biometric system combines multiple evidences derived from multiple biometric sources like face, palm print and fingerprint, multiple fingers of a user, multiple classifiers etc in order to verify the identity of an individual or identify the unknown suspicious individual. Information presented by multiple sources can be fused at different and distinct ordered levels of fusion, including sensor level, feature extraction level, match score level and decision level. The reason to combine multiple biometric sources of information or combine multiple modalities is to improve the verification or identification performance and increase the efficiency of the overall Multibiometric system. This paper reports a feature level fusion using face, palm print and finger print modalities and fusion of SIFT features are performed on reduced sets of features. Reduced feature sets are obtained by applying PCA on invariant SIFT features. In nature SIFT features are invariant to rotation, scaling, translation and partially illumination. Due to this invariant characteristics, SIFT features are successfully applied to many object recognition problems. For classification work, Radial basis function neural network has been used on reduced and concatenated SIFT features of three different modalities viz. face, palm print and finger print. The proposed system has been tested and evaluated on hybrid chimeric databases. Outcomes are very impressive and encouraging to demonstrate the state-of-the-art performance of the proposed Multibiometric system.

