Abstract

Information fusion is a key step in multimodal biometric systems. Fusion of information can occur at different levels of a recognition system, i.e., at the feature level, matching-score level, or decision level. However, feature level fusion is believed to be more effective owing to the fact that a feature set contains richer information about the input biometric data than the matching score or the output decision of a classifier. The goal of feature fusion for recognition is to combine relevant information from two or more feature vectors into a single one with more discriminative power than any of the input feature vectors. In pattern recognition problems, we are also interested in separating the classes. In this paper, we present Discriminant Correlation Analysis (DCA), a feature level fusion technique that incorporates the class associations into the correlation analysis of the feature sets. DCA performs an effective feature fusion by maximizing the pairwise correlations across the two feature sets, and at the same time, eliminating the between-class correlations and restricting the correlations to be within the classes. Our proposed method can be used in pattern recognition applications for fusing features extracted
from multiple modalities or combining different feature vectors extracted from a single modality. It is noteworthy that DCA is the first technique that considers class structure in feature fusion. Moreover, it has a very low computational complexity and it can be employed in real-time applications. Multiple sets of experiments performed on Palm print and Hand vein datasets, and using different feature extraction techniques.

References


Index Terms

Computer Science

Information Sciences

Keywords

multimodal biometrics, feature level fusion, class structure, discriminant correlation analysis.