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Local uncorrelated local discriminant embedding for face recognition

Key words: Feature extraction, Local discriminant embedding, Local uncorrelated criterion, Face recognition

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Motivation

- Local discriminant embedding (LDE) is one of the most commonly used feature extraction algorithms in face recognition.

- Although the feature extraction algorithm plays an important role in face recognition. However, the extracted features have overlapping discriminant information. A property of the statistical uncorrelated criterion is that it eliminates the redundancy among the extracted discriminant features, while many algorithms generally ignore this property.

- Therefore, a novel feature extraction method called local uncorrelated local discriminant embedding (LULDE) has been proposed.

Method

- The proposed approach can be seen as an extension of a local discriminant embedding (LDE) framework in three ways. First, a new local statistical uncorrelated criterion is proposed, which effectively captures the local information of interclass and intraclass.

- Second, we reconstruct the affinity matrices of an intrinsic graph and a penalty graph, which are mentioned in LDE to enhance the discriminant property.

- Finally, it overcomes the small-sample-size problem without using principal component analysis to preprocess the original data, which avoids losing some discriminant information.

Conclusions

- A new feature extraction algorithm named local uncorrelated local discriminant embedding (LULDE) is proposed.

- Experimental results on Yale, ORL, Extended Yale B, and FERET databases demonstrate that LULDE outperforms LDE and other representative uncorrelated feature extraction methods.