Low-rank representation based robust face recognition by two-dimensional whitening reconstruction

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Problems & Ideas

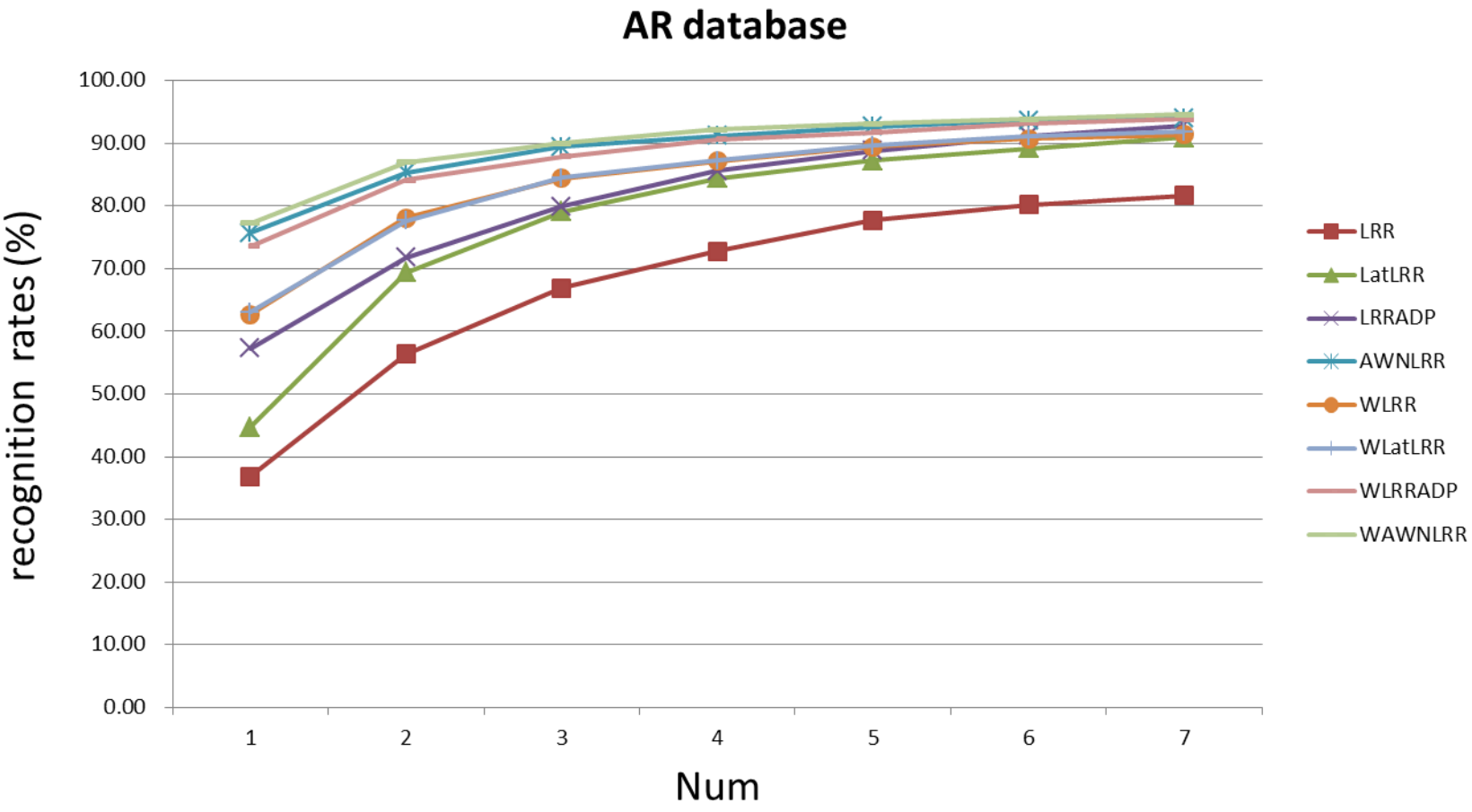
- Problems:

In practical applications of LRR-based methods, dimensionality reduction is a essential step, which could make the subsequent computer processing easier. PCA is often selected to characterize face space due to its robustness. However, one of the major disadvantages of PCA is that it is sensitive to grossly corrupted entries, such as the variations in lighting. In order to further improve the performance of LRR-based methods, we attempt to exploit the intrinsic features of the source corrupted data and make the face images more suitable for PCA.

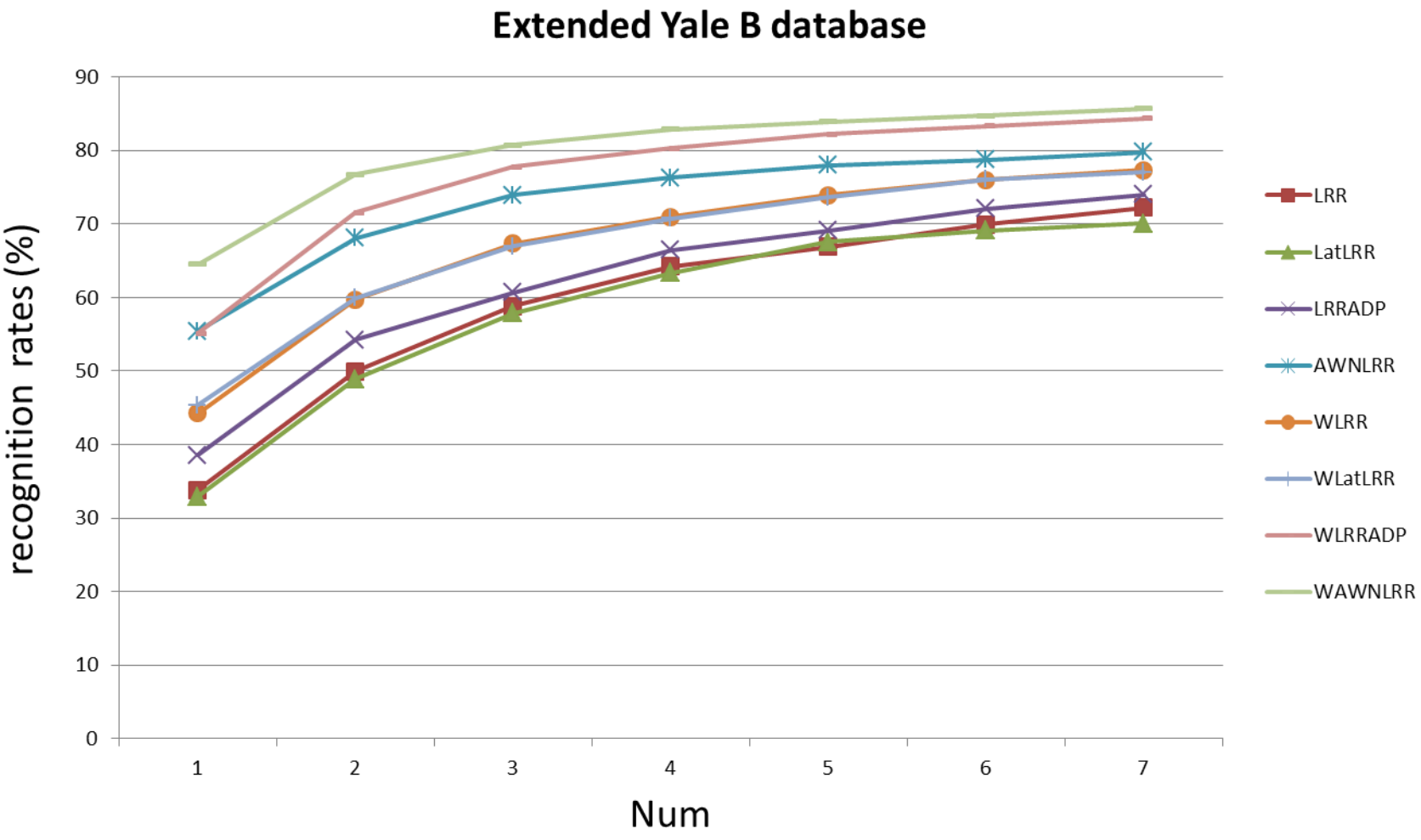
- Ideas:

- We integrate two-dimensional whitening reconstruction into the data preprocessing to reduce the influence of gross errors before dimensionality reduction. Extracting important intrinsic features for LRR-based classification
- We apply LRR or its variants to obtain the low rank representation matrix and construct the weight graph.
- With the weight graph obtained by LRR based methods, we can predict the labels of unlabeled samples by using the semi-supervised classification method GFHF

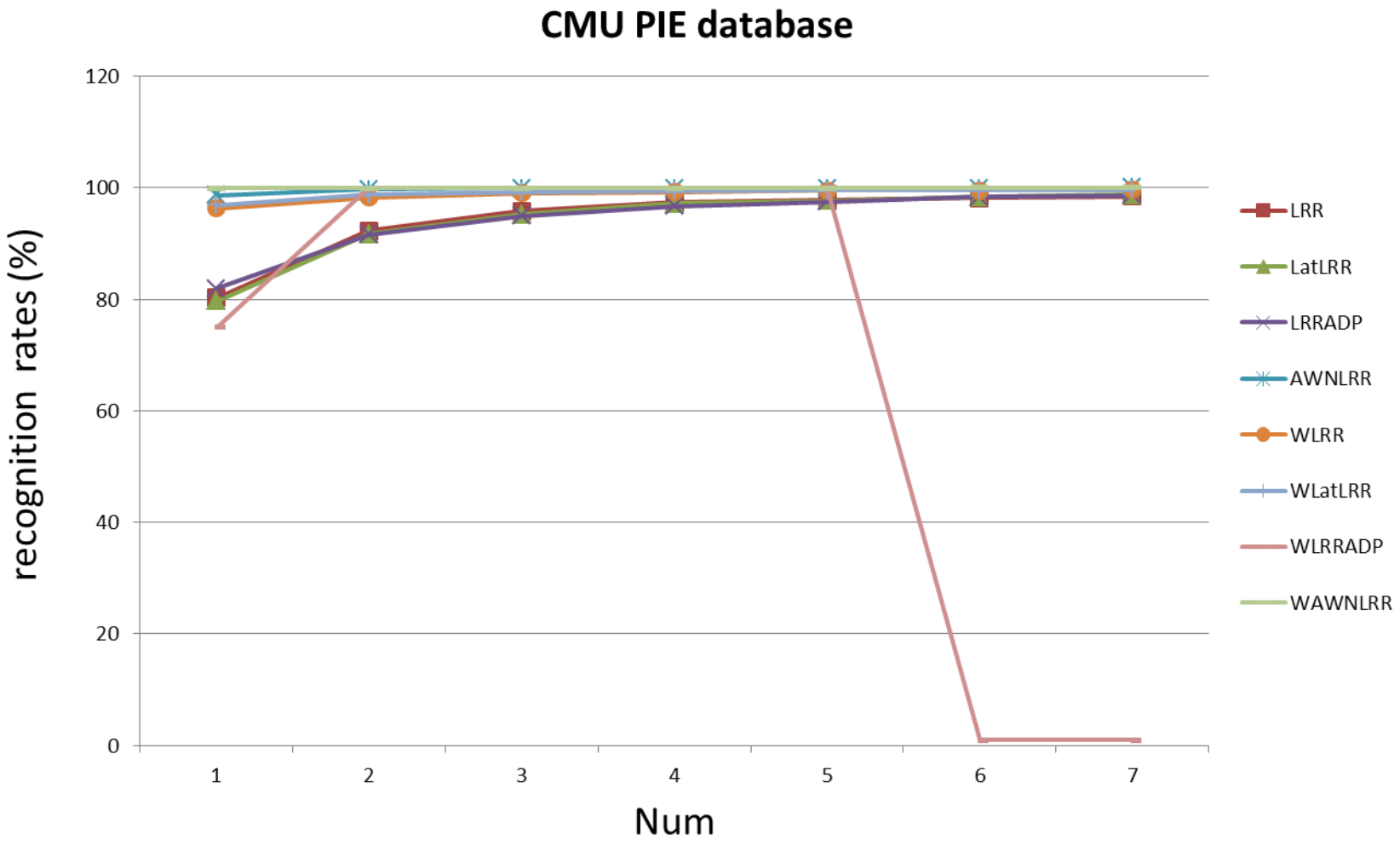
Main Contributions



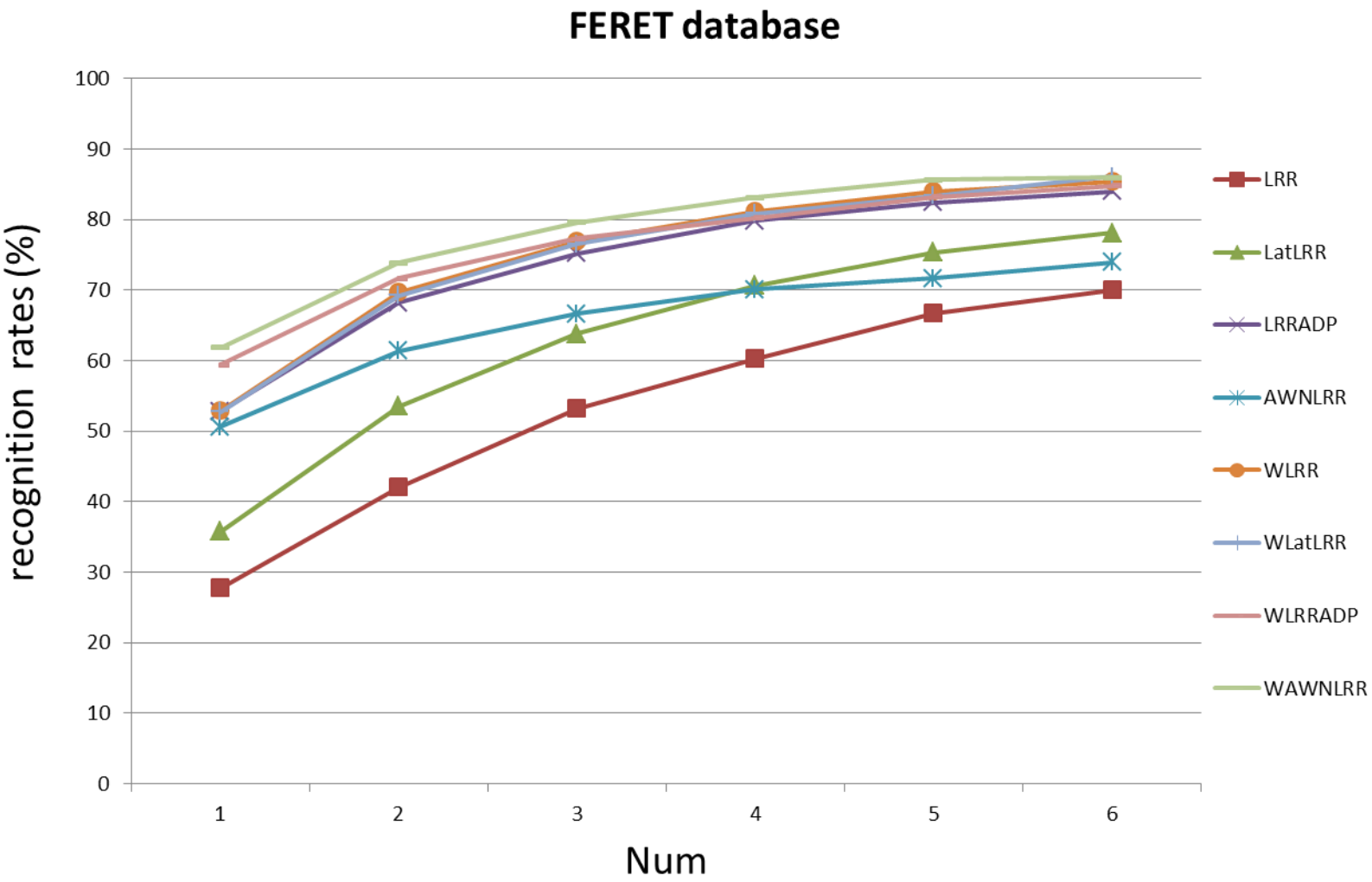
The recognition rates (%) with different number of training samples on AR database.



The recognition rates (%) with different number of training samples on Extended Yale B database.



The recognition rates (%) with different number of training samples on CMU PIE database.



The recognition rates (%) with different number of training samples on FERET database.