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Decision Pyramid Classifier For Face Recognition Under Complex Variations Using Single Sample Per Person

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Abstract

The single sample per person (SSPP) problem is a great challenge for real-world face recognition systems. In an SSPP scenario, there is always a large gap between a normal sample enrolled in the gallery set and the non-ideal probe sample. In this paper, we propose a new face recognition method, called decision pyramid classifier (DPC), to solve SSPP problems with large appearance variations (e.g., illumination, expression and partly occlusions). Unlike the conventional image partitioning methods, the proposed DPC is a nonparametric method which does not require a training process. In the data preprocessing phase of DPC, we divide each training image into multiple non-overlapping local blocks and respectively extract features from each block to generate the training feature set. For an unseen image, DPC requires obtaining its features using the exactly same preprocessing. By constructing a decision pyramid, we predict the final category of the unseen face image. Experimental results show that DPC possesses higher recognition rate than other related face recognition methods.

Keywords: single sample per person; face recognition; decision pyramid classifier; image partitioning; feature extraction