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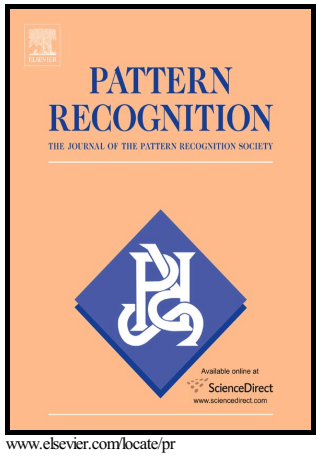

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An Application of Chain Code-Based Local Descriptor and Its Extension to Face Recognition

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Abstract – Local descriptors are widely used technique of feature extraction to obtain information about both local and global properties of an object. Here, we discuss an application of the Chain Code-Based Local Descriptor to face recognition by focusing on various datasets and considering different variants of this description method. We augment the generic form of the descriptor by adding a possibility of grouping pixels into blocks, i.e., effectively describing larger neighborhoods. The results of experiments show the efficiency of the approach. We demonstrate that the obtained results are comparable or even better than those delivered by other important algorithms in the class of methods based on the Bag-of-Visual-Words paradigm.

Keywords: face recognition; local descriptor; chain code; chain code-based local descriptor.

1. Introduction

Face recognition has been one of the most important problems of biometrics in the recent decades fully recognized by wide community of researchers. Its vast plethora of applications covers, among others, forensic sciences, driver's licenses and passport verification, missing identification, surveillance systems, social networks, etc. A relative easiness of usage (non-invasiveness), and low technological costs imply the immense development of various facial recognition approaches. However, many of them still suffer from some of typical problems occurring in image recognition such as lighting conditions, quality of old images, aging, pose of the subject, face occlusion, computing overhead, etc. There are many trends in face recognition. The most significant and comprehensively examined are the approaches originated from geometrical methods [1], principal component analysis (eigenfaces [2]), linear discriminant analysis (Fisherfaces [3]), EBGM (elastic bunch graph matching [4]), SVMs (support vector machines [5]), Gabor wavelets [6,7], information aggregation and fusion [8], neural networks [9], sparse representation [10], deep learning [11,12], Granular Computing and linguistic descriptors [13,14], and local descriptors [15,16]. For instance, the

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