Abstract

In this paper, we propose a combined approach, namely, PCA plus LDA on Wavelet Co-occurrence Histogram Features (WCHF) for texture classification. The texture features are extracted using the Wavelet Co-occurrence Histogram (WCH) from wavelet decomposed images, which capture the information about relationships between each high frequency subband and that in low frequency subband of the wavelet transformed image at the corresponding level. The correlation between the subbands at the same resolution exhibits a strong relationship, indicating that this information is significant for characterizing a texture. Thus WCH features thus extracted form a feature vector of dimension 384 for gray scale image which is very high. A combination of Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) is applied on WCH feature vector for dimensionality reduction and enhancement of the class separability respectively. The vectors obtained from the LDA are representative of each image. The classification performance is tested on a set of 32 Brodatz textures. The results are compared with the method proposed in [Hiremath and Shivashankar, 2008]. The effectiveness of proposed method is demonstrated for two different applications, i.e., CBIR and script identification (both printed and handwritten). The classification performance is analyzed using the k-NN classifier. It is evident from the experimental results that the proposed method exhibits superior performance in the reduced feature set.
References

- Jian Yang, Jing-yu Yang, 2003. "Why can LDA be performed in PCA transformed space?", Pattern Recognition, 36, 563-566.

Index Terms

Computer Science

Pattern Recognition
Keywords

Texture classification  PCA and LDA  Wavelet  CBIR  document image  script identification