A Novel Approach to Texture Classification using NSCT and LDBP

Abstract

Texture is an important image feature and is defined as something consisting of mutually related elements. Texture based classification is an important approach for effective object recognition in digital images. This paper presents an efficient approach for texture classification based on local directional binary patterns (LDBP) and nonsubsampled contourlet transform (NSCT). The NSCT has translation invariability and LDBP has rotational invariability. The main focus in this study is to recognize certain directional binary patterns which are fundamental properties of local image texture. The proposed approach is robust in terms of gray scale variations, since the operator is invariant against any monotonic transformation of gray scale.
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The feature set is obtained by extracting statistical mean, co-occurrence parameters for three level NSCT subbands and applying LDBP for small neighborhood. Principal component analysis (PCA) is applied to avoid the curse of dimensionality. Linear discriminant analysis (LDA) ensures the class separability. The features obtained from LDA are representatives of the feature set. The evaluation of the proposed method is performed on the sixteen Brodatz textures. The k-NN classifier has been used for classification. The experimental results show a marked improvement in terms of classification accuracy.

References

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Index Terms

Computer Science
Image Processing
Keywords
Texture Analysis  Brodatz  Classification  Ldbp  Nsct  Binary Pattern