Publications Nationales du labo Signaux et Systèmes

Résumé :

 In this paper, we present a hybrid directional classification of anisotropic textures. Our proposed method based to yield a robust attributes vector to classify the different anisotropic textures. A robust fractal analysis is put forward by hybridization of the statistical fractal with Discrete Wavelets Transform (DWT). Beside, to enhance the quality of texture, a preprocessing stage using histogram equalization is carried out. Then for a given direction from 0° to 360° by a step of 10°, we applied the DWT using Daubechies wavelets (db5) to the corresponding direction where the approximate image is inputted to Differential Box-Counting Method (DBCM) in order to yield a robust Fractal Dimension (FD) estimated in wavelets domain. We formed the vector attributes to each texture that correspond to the inputs of our Artificial Neurons Network (ANN) classifier. The originality of our work, reside in the use of the Daubechies Wavelets (db5), in particular the use of approximate image with the fractal analysis, by, estimating the directional FD and using the directional classification based on ANN classifier. To validate our algorithm, we used two classes of the Brodatz textures database. Performance classification was assessed by ROC analysis and confusion matrix. We report a successful separation of the two classes, after different training. Area under-curve (AUC) values for training, validation and testing are 1, 0.96 and 1 and classification rates are 94.1%, 85.7%, 85.7% respectively, with the classification rate for all data is 91.7% and a fail classification is 8.3%.