Abstract

The paper presents novel content based image retrieval (CBIR) methods using orthogonal wavelet transforms generated from 7 different transforms namely Walsh, Haar, Kekre, Slant, Hartley, DST and DCT. Here the feature vector size per image is greatly reduced by taking fractional coefficients of the transformed image. The feature vectors are extracted in fifteen different ways from the transformed image. Along with the first being all the coefficients of
transformed image, fourteen reduced coefficients sets (as 50%, 25%, 12.5%, 6.25%, 3.125%, 1.5625%, 0.7813%, 0.39%, 0.195%, 0.097%, 0.048%, 0.024%, 0.012% and 0.006% of complete transformed image) are considered as feature vectors. Instead of using all coefficients of transformed images as the feature vector for image retrieval, these fourteen reduced coefficients sets are used, resulting into better performance and lower computations. The proposed CBIR techniques are implemented on a database having 1000 images spread across 11 categories. For each proposed CBIR technique 55 queries (randomly selected 5 images per category) are fired on the database and average precision and recall values are plotted to get precision-recall crossover point. The results have shown the performance improvement (higher precision-recall crossover point) with fractional coefficients compared to complete transform of image at reduced computations resulting in faster retrieval. The wavelet transform generated using Kekre transform for 0.048% reduced coefficient set gives the best performance among the proposed CBIR techniques.

Reference

- Stian Edvardsen, “Classification of Images using color, CBIR Distance of computer and Information science, June 2006.
- http://wang.ist.psu.edu/docs/related/Image.orig (Last referred on 23 Sept 2008)

**Index Terms**

Computer Science  
Image Processing

**Key words**

CBIR  
Fractional Coefficients  
Wavelet  
Transforms  
Walsh
Haar
Kekre
Slant
Hartley
Sine
Cosine