Abstract

The development of a Content-Based Image Retrieval System (CBIRS) is presented. The second-order statistics were adopted as image features by the system as a means of distinguishing between images. The numbers of co-occurrences of pairs of gray values in an image are recorded in the Gray Level Co-occurrence Matrix (GLCM). Five of the second-order statistics which usually have values greater than 1 were selected; Contrast, Dissimilarity, Entropy, Mean (μ), and Standard Deviation (σ). Thus, fifteen features were recorded for each image from the Horizontal GLCM, Vertical GLCM, and Diagonal GLCM. During Database querying, features of the Query Image are computed and compared with those of the Database images, and Euclidean distance is computed as a similarity measure. The system displays the Query Image, the Retrieved Image (if any), the Best Match Image, and Eight Close Images with their Euclidean distances from the Query Image. Columbia Object Image Library image collection of 7,200 images was selected as the test Database. The developed CBIRS system accurately detects and retrieves Exact Match Images to Query Images with Euclidean distance of the Best Match Image being zero. The system also accurately identifies Query Images which
are not in the Database with Euclidean distance of the Best Match Image being greater than zero. The system recorded 100% Recall ratio and 100% Precision ratio.

References


Index Terms

Computer Science
Image Processing
Keywords

Image retrieval, Second-order statistics, Gray Level Co-occurrence Matrix, Euclidean distance, Recall ratio, Precision ratio.