Content-based Image Retrieval using color models and linear discriminant analysis

ABSTRACT

The past few years have seen a major development in Content-based Image Retrieval (CBIR) due to the needs by various fields in accessing visual data, particularly images. As a result, several techniques have been developed to allow image databases to be queried by their image content. Color Models is one of the promising color descriptors used to extract and index image features effectively. However, the conventional Color Models and its advancements are not able to accurately capture the global color information and derive high-level semantic concepts from low-level image features for better image understanding. A new method for CBIR has been introduced by integrating the Color Models with Linear Discriminant Analysis (LDA) where the proposed method not only able to provide better representation for low-level feature but also allow optimal linear transformation to be found which projects the color coefficients into a low-dimensional space. The Hue-Saturation-Value (HSV) is first extracted from an image followed by the implementation of the Co-occurrence Matrix on the extracted color pixels. LDA is then performed to classify the generated low-dimensional color features of an image and its respective semantic labelling according to classes. Retrieval experiments conducted on 1000 SIMPLIcity image database has demonstrated that the proposed method has achieved a significant improvement in effectiveness compared to the benchmark method.

Keyword: Color models; Content-based Image Retrieval; Linear discriminant analysis