CHAPTER 7

CONCLUSION

7.1 CONCLUSION

The CBIR has been implemented using color, texture, shape and pattern features. This method provides an interactive mechanism to bridge the gap between the visual features and the human perception. Also this work has enhanced the image retrieval process using CBIR. This retrieval process is analyzed in all the four chapters. Initially the work is concentrated on removal of additive noise through the process of wavelet based fuzzy filter enhanced the quality of the image for web applications. The performance of the wavelet based fuzzy filter is better than other filters like median, wiener and linear smoothing filters in terms of PSNR and MSE values.

The color feature is an important feature for image retrieval. The color of each pixel of an image is characterized by three components R, G, B. Hence it is not accurate in the measurement of small color difference; the four different color spaces such as RGB, HSV, YIQ and XYZ have been used for investigation which is more suitable for CBIR. These different color spaces are quantized over each pixel as N_b=5^3 bin descriptor on an overlapping squared fixed size neighborhood, centered on the pixel is classified under IAKFCM clustering. These color spaces are combined based on the histogram computed on a squared fixed size neighborhood, centered on the pixel to undergo IAKFCM clustering process. The performance of combined color space is better than the individual color space in terms of PSNR and MSE.
The shape feature is obtained based on the segmentation of the combined color and texture features. Color features are extracted from lab color space. Texture feature is determined by the extraction of local texture information from each pixel. These combined features are segmented using IAKFCM. Then EMD eliminates the misclassified pixels. Performance results have been proved in terms of RMSE. This metric compares the segmented results with human labeled images.

Finally an efficient RF mechanism is adopted for CBIR. The image retrieval is performed based on the retrieval of color, texture, shape and pattern features. Color features such as mean, variance and skewness are extracted from the three different color spaces i.e. HSV, YC_bC_r and Lab. HSV color space is a good compatibility of chromatic and achromatic components and possibility of preferring one component to other (Chih-Chin Lai, 2011). Lab color space has perceptual relevance. YC_bC_r color space is simplicity and explicit separation of luminance and chrominance components (Kerstin Bunte, 2011). Texture features are determined by the extraction of local texture information from each pixel. The shape feature is obtained from the segmented image using canny edge detection algorithm. Then, pattern feature is extracted from the input image and the dimensions of all features are combined to form feature vector.

Statistical similarity matching between the feature vectors of query and feature vectors of the images in the database using Euclidean distance measure is performed better than the other distance measure. Also RF technique is incorporated to improve the performance of image retrieval. Our experimental results demonstrated that the proposed method has higher average precision performance compared with other image retrieval models. Retrieval performance of image based on color, texture, shape and pattern feature generation is significantly higher than that of retrieval of image based
on color alone or texture alone. This proposed CBIR using RF technique is very effective and shows improvement in retrieval results within few iterations.

The General database, Medical database, Berkeley database, COREL database and COIL database were used to evaluate the performance of the proposed method. The performance evaluation is carried out using precision, recall and accuracy measures and the results are compared with OPT-RF, RBF and Machine learning based pre-filtering technique. The results show that the proposed approach produces better results when compared to that of existing methods.

7.2 FUTURE WORK

The future work regarding object recognition can be concentrated towards optimization in searching of the image retrieval process. Future work can also be concentrated on the size of the database, where the data structure of the feature vector is alone stored for image retrieval.