CHAPTER 7

CONCLUSION AND SCOPE FOR FUTURE WORK

7.1 CONCLUSION

In this thesis, a study of various image features used for CBIR such as color, and texture have been used. The color feature is capable of representing the image when the images are well represented in color space. A majority of the real world images are texture in nature and hence the emphasis is on textured images. After studying the various texture feature extraction methods, it was found that the statistical method based on moments has a very good impact on analyzing the image content for recognizing a significant number of images. The efficiency of the method can be improved by combining it with the filter bank approach. This is evident from the various results tabulated in the previous chapters.

They also lead us to draw the following conclusions: (1). Moments results in orthogonal features; (2). The orthogonality in a feature vector improves when it is combined with the filter bank approach. (3). The Gabor wavelet is used to represent the textures in different frequency components (4). These methods are applied to work out to represent irregular textures when tuned properly (5). When these methods are extended to Image Retrieval they give a moderate response. (6) Their moderate response clearly depicts that these methods need some more tuning for improving retrieval efficiency (7). Retrieval efficiency may be improved when used along with other texture features (8). Texture feature extraction techniques are also
applied to the retrieval of nature images and to face image recognition system. 
(9) The texture features are collected from the whole image and significant portions of the image are used in the retrieval of nature images showing improved results in the second case and 10) An attempt is made to study the application of these textural features to the classification of CT skull images in the medical CBIR context.

Performance measures such as precision and recall have been suggested and obtained for several classes of retrieval algorithms. These values are compared for several features based on color and texture.

The implementations of retrieval efficiency in terms of speedup have been achieved by using NOW. By using a cluster of computer systems, the retrieval of images using the proposed set of color and texture features have been carried out successfully. Performance with respect to their response in terms of the speed has been compared with that of the single system. Thus, CBIR in a distributed form of environment is suggested for achieving better retrieval.

It is concluded that the study of various image features motivates the access of images by characterizing its content in a low dimensional form by making use of the features in a different combined form as application dictates. Also, the study has been made with standard benchmark images with a relatively large image data set.

7.2 FUTURE SCOPE

This thesis concludes by just extending the texture feature extraction techniques into the CBIR system. This area can be further explored and the techniques can be finely tuned with or without involving some pre or
post processing works for increasing retrieval performance. The fine-tuning may be done adding some shape and structure information in a well-determined form with the already existing texture and color information to suit the application. This work can be further extended to some domain-based applications such as finger print recognition, retina identification, object detection, etc for large image databases. Since texture analysis consumes a considerable amount of time for feature extraction, there is a scope for optimization also. Various soft computing techniques may also be applied to select trivial feature sets to extend this in web based applications.