CHAPTER 5

CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

This thesis examined the content based image retrieval system of mammogram image. In this work the performance of the content based mammogram image retrieval is increased with less features of the proposed method and compared with existing methods having more features. The various machine learning techniques are designed to increase the performance of classification and retrieval process. The machine learning techniques such as hybrid classifier and FNN classifier are used.

The hybrid classifier approach is comprised of feature extraction, feature selection, similarity measure and classifier. The shape & margin, texture and density features are extracted from the mammogram and feature database is formed. The feature selection is the key to success for CBIR system and perfect features are selected by using Particle Swarm Optimization (PSO) optimization algorithm. The selected features are compared with the feature database similarity measure of Manhattan distance and relevant images are retrieved. Finally retrieved images are classified with query image by using a hybrid classifier of MLFFB-ANN. The performance of the hybrid classifier compared with the existing method of SVM and Bayesian network.

The Accuracy obtained by hybrid classifier, SVM and Bayesian network are 87.85%, 82.25% and 72% respectively. The Accuracy obtained by hybrid classifier is 5.6% higher than SVM classifier and 15.85 % higher than Bayesian network. The Precision obtained by hybrid classifier, SVM and Bayesian network are 82.12%, 74.45% and 67.73% respectively. The Precision
obtained by hybrid classifier is 7.67% higher than SVM classifier and 14.39% higher than Bayesian network. The Recall obtained by hybrid classifier, SVM and Bayesian network is 82.34%, 79.82% and 70% respectively. The Recall obtained by hybrid classifier is 2.52% higher than SVM classifier and 12.34% higher than Bayesian network. Hence the performance of the proposed hybrid classifier obtained better results than existing methods with less execution time.

The fuzzy based approach of mammogram retrieval is implemented with FNN classifier is used to improve the performance and results. This method is developed with preprocessing, segmentation, feature extraction, feature selection, similarity measure and classifier. The Wiener filter is used to remove the artifacts present in the mammogram image and segmented using a watershed algorithm. In this approach, texture features, Gabor features and LBP features are extracted from the segmented Mammogram image. The extracted features are selected based on MFLDA algorithm and the Mahalanobis distance is used for similarity measure between the query image and the database images and relevant images are retrieved. The retrieved images are classified as benign or malignant by using Fuzzy Neural Network classifier. The performance of the FNN classifier is obtained and compared with a proposed hybrid classifier. The Accuracy, precision and recall of the FNN classifier are 96.23%, 90.01% and 91.12%. The Accuracy obtained by FNN classifier is 8.38% higher than a proposed hybrid classifier. The precision obtained by FNN classifier is 7.89% higher than a proposed hybrid classifier. The recall obtained by FNN classifier is 8.78% higher than a proposed hybrid classifier. The precision, recall and accuracy of FNN classifier yield a higher percentage than proposed hybrid classifier with less execution time.

Thus the overall performance of the proposed system of FNN classifier gives good performance compared to the proposed hybrid classifier and existing classifier of SVM and Bayesian network with less execution time.
5.2 FUTURE SCOPE

The future research can be carried out with the following focus

Now a days CBIR-based CAD systems are growing one to diagnose the early detection of breast cancer. In future, Adaptive Binary Tree Based Support Vector Machine (ABTSVM) for efficient and fast classification of mammogram images is to be used to increase the accuracy, precision and recall compared to proposed method. Short-Term Based Relevance Feedback (RF) mechanism is also adopted to reduce the semantic gap.

CBIR-based CAD methods are detecting masses of uncommon size, mass boundary problem and the lack of scalability limits the performance of the retrieval process as well as the diagnostic accuracy. To overcome this problem, a scalable CBIR system with Scale-Invariant Feature Transform (SIFT) features and search method of vocabulary tree is used to increase performance of the retrieval process.