CHAPTER 7

CONCLUSION AND SCOPE FOR FUTURE WORK

7.1 CONCLUSION

A CAD system using data mining techniques has been developed constituting a complete framework for automated detection and diagnosis of microcalcification, mass, architectural distortion and asymmetry, such as segmentation of suspicious region, feature extraction, feature selection and classification of the abnormalities.

To segment the ROI, sIFCM is used. To demonstrate the robustness of the proposed algorithm, the sIFCM is extensively tested using MIAS and DDSM datasets. Experimental results indicate that it outperforms the most widely used techniques like FCM and IFCM. These segmentation results provide a basis for subsequent analysis.

The features based on DWT, MSRDM, Gabor filter, multifractal analysis, directional and morphological analysis are proposed to identify all the signs of abnormalities together. The proposed features are compared with the state-of-the-art researches and found that the proposed features produced better classification results (Refer Table 4.2).

Another technique proposed for improving the performance of the CAD is MABCFS. This technique selects the best predominant features for the classification of ROI and thus improves the overall effectiveness of the CAD system.
Furthermore, the SRAN classifier is used to classify the ROI which requires less learning time because it removes the samples from training, which are similar to the knowledge already stored in the model. The experimental results prove that the proposed CAD system outperforms the other existing CAD systems in terms of classification accuracy, sensitivity, specificity and classification time.

It is concluded that the results obtained by using sIFCM, integrated features, MABCFS and SRAN are very promising, which indicates that the methods presented in the current research have potential for automated detection and classification of suspicious regions.

7.2 SCOPE FOR FUTURE WORK

There is a scope for improvements to be made in the current research in future. The detection of suspicious region can further be improved with reduced FPs per image. More discriminating features should be identified to investigate further all the types of ROI and classify them into benign or malignant. A thorough study of contributions of each feature and categorization of different subsets of features characterizing different regions is required. This channelized analysis will improve the overall classification performance.

Defining a standard test data with more samples of architectural distortion and asymmetry is also quite important. Some more precise evaluations, objectives and fair comparison can determine the relative merit of competing algorithms and facilitate the development of a better and robust system. Although the developed CAD is built as an offline diagnosing system, attempts can be made to rebuild as an online diagnosing system in the near future.