ABSTRACT

One of the recent advancements in the medical field is to detect the early stage of the disease which could tackle the patient from the critical situation. Nowadays, the breast cancer increases in high level. Indian council for Medical Research (ICMR) estimated in 2016 more than 1.5 lakh women affected by breast cancer. There are several research processes are used to detect the breast cancer with the help of mammogram image.

Generally, a breast cancer digital form is detected through x-ray images and referred as a mammogram image. The mammogram image is used to detect the early stage of breast cancer. The radiologist detects the breast cancer through the mammogram image. Screening of the mammogram image is very difficult because lot of images have to be detected in a certain amount of time. Due to this, the radiologist’s workload is increased and the efficiency of the detection process is reduced. To overcome this problem, the radiologist uses Computer Aided Diagnosis (CAD) techniques for the early detection of breast cancer. The CBIR is the part of CAD which is useful to retrieve the most relevant images with respect to the query images. This research work is the combination of CBIR system and classification system. In CBIR, the relevant images are to be retrieved and then classify the retrieved mammogram images into normal or abnormal image with the respect to the query image.

The aim of the proposed system is to detect the breast cancer in an early stage by increasing the performance of the Content Based Mammogram Image Retrieval system (CBMIR). The performance of the CBIR is evaluated by using accuracy, precision and recall. According to Breast Imaging Reporting and Data systems, the mammogram images are characterized by shape, margin and density features. For mammogram analysis various sets of
features like texture, wavelet and shape based features are used. The performance of retrieval process and classification in CBMIR is low in existing method due to the use of such large set of features.

In order to increase the performance of the retrieval process various techniques are developed with the least number of features. In this thesis a hybrid classifier approach is proposed which is an Artificial Neural Network with Multilayer Feed Forward Back Propagation (MLFFBP-ANN) classifier. The proposed approach gives better results compared to existing methods. The retrieval process of this approach consists of training and testing phase where the features of the mammogram dataset images and mammogram query images are extracted and formed into a feature vector. The proposed optimization technique of Particle Swarm Optimization (PSO) algorithm selects the best feature compared to other existing methods. So accuracy, precision and recall are to be increased in this hybrid approach. By this approach achieved the accuracy is 87.85%, Precision is 82.12% and Recall is 82.34%

Also the fuzzy based retrieval of mammogram is proposed with the least number of features such as Local Binary Pattern (LBP) feature, texture features and Gabor feature and optimization method of Modified Fisher’s Linear Discriminant Analysis (MFLDA) is used. This system will give better performance of content based mammogram image retrieval than the proposed hybrid approach. By this approach achieved the accuracy is 96.23%, Precision is 90.01% and Recall is 91.12%. The proposed research work is developed by MATLAB R2012 software and data set of Mammogram Image Analysis Society (MIAS) database is used for analysis and retrieval of mammogram image.
The proposed research work is applied for early detection of the mammogram image for several numbers of images through the retrieval process. This will increase the efficiency of the early detection process in a medical imaging system.