BREAST CANCER DETECTION IN DIGITAL MAMMOGRAMS USING IMAGE PROCESSING TECHNIQUE

[1]Yuvaraj.J, [2]Aswini.D.R, [3]Aswini Princiya Mary.S, [4]Divya.L
[1]Assistant Professor, [2]Student, [3]Student, [4]Student
[1]Department of Electronics and Communication,
[1]Prathyusha Engineering College, Chennai, India

Abstract: Mammography using digital techniques plays a vital role in mammogram screening at former stage of breast carcinoma Even though it is very onerous to find mastery abnormality in prevalent screening by radiologists But the possibility of precise breast cancer screening is consoled to predict the mastery type of abnormality through Computer Aided Diagnosis(CAD) systems The two most important indicators of breast cancers are normal and abnormal .This study proposes two complex feature extraction methods to negotiate a complete description of quantitative characteristics. The first feature extraction module adopts GLCM features and optical density features. This is a type of complex texture feature extraction method that extracts the information of local intensity relation and discrete photometric distribution and Support Vector Machine(SVM) classifier is employed for classification with k-fold cross validation. Conclusively, the mammogram is classified as benign and malignant using SVM classifier with the enforcement matrices of accuracy, specificity and sensitivity.

Index Terms - **Breast carcinoma, grey level co-occurrence matrix, optical density co-occurrence matrix, Support vector machine (SVM)**

I.INTRODUCTION

Breast cancer is a common form of cancer disease among women with nearly 1.7 million new cases recognized in 2015 and the second prompt of cancer deaths worldwide. Early detection of breast cancer is a key factor for successful cancer treatment. In women breast cancer is most common and deadliest forms of cancer found worldwide. Early detection and removal of the primary tumor is an essential and effective method to magnify survival rate and reduce mortality. Breast cancer is the second leading cause of cancer death and its incidence continues to rise. Of all diagnostic methods currently available, mammography is the most reliable method for early detection. In an exertion to lower the cost and increase effectiveness, investigators are developing alternative techniques to improve mammography imaging. Mammogram interpretation is performed by radiologists by visual examination of the films. The shortage of radiologists and the large volume of mammograms to be analyzed make such readings labor intensive, cost ineffective, and often inaccurate. Therefore, it is useful to construct computer systems to aid early diagnosis of breast cancer with mammography.

An automated computer system could evaluate all mammograms and point out the areas which are detected as abnormal. The mammograms that are detected as abnormal by the computer would pass on to the radiologists for final diagnosis. Misinterpretations can thus be reduced and significant time, cost and valuable lives can be saved.

II.EXISTING SYSTEM

In this method, they have automatically classified the breast tumor in mammogram images to benign and malignant classes using shearlet transform. First the region of interest (ROI) of the mammogram image is subjected to shearlet transform and various texture features are extracted from different levels and orientations. The dimensionality of extracted features are reduced by Kernel principal component analysis (KPCA) method and ranked based on T-value. Ten ranked features are fed to k-nearest neighbor (KNN) classifier using minimum features. Our results show that shearlet transform coupled with KPCA is superior to shearlet transform.

DISADVANTAGES

Theoretically PCA relies on linear assumptions whereas kernel PCA (an extension to PCA) is non-linear. Relies on the orthogonal transformations of the original variables whereas kernel PCA allows the nonlinear mapping. PCA based on mean vector and covariance matrix. Some distributions may be characterized by this but not all and PCA is not scale invariant.

III.PROPOSED SYSTEM

In our proposed system we have restricted the breast tumor in mammogram images to normal and abnormal classes using GLCM and ODCM technique. First the region of interest (ROI) of the mammogram image is directed as input images and features are excerpted using GLCM method and ODCM technique is engaged to extract the features. Both GLCM and ODCM outcomes are given as input to the classification stage. Then Support Vector Machine (SVM) classifier is used to allocate the images. Enduringly, the mammogram is restricted as normal or abnormal using SVM classifier.

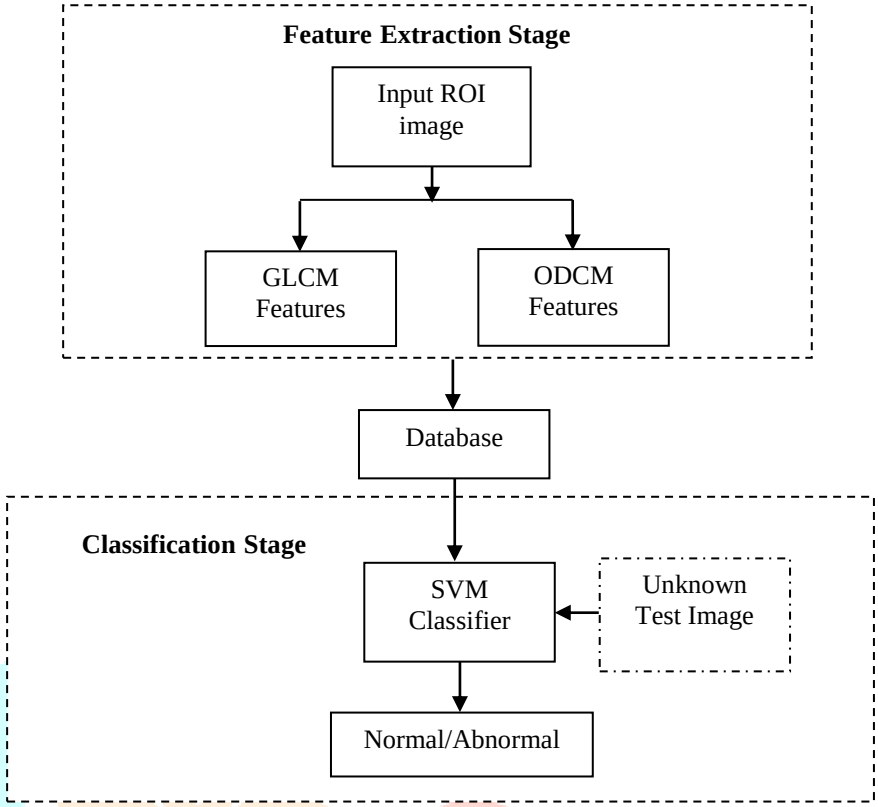

Fig 3.1 Block diagram of proposed system

A. Pre-processing

In pre-processing task there are two works to be done. First noise can be detached using the median filter. Then the mammogram image is enhanced using the Gaussian filter. Noise refers to the unwanted area of the mammogram image. The pre-processing has been splitted into two phases.

Fig 3.2 Thresholding image of the input mammogram

B. Noise reduction

The noise reduction in mammogram is done by using median filter to remove the salt and pepper noise present in the input mammogram.

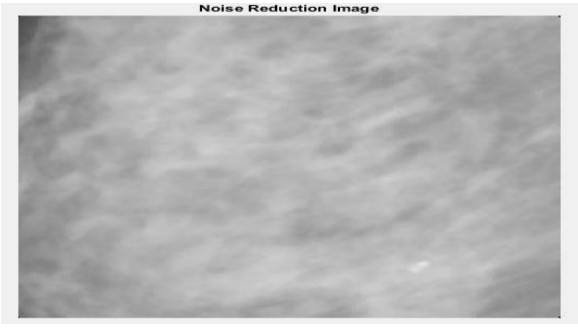

Fig 3.3 Noise reduction image of the input mammogram

C. Contrast Enhancement

The contrast enhancement is done to increase the brightness of the image. The adaptive histogram equalization technique is applied to increase the adverse of the mammogram image. The pre-processing method reduces noises, removes the pectoral muscle, separates the breast image from the background and increases the contrast of the mammogram input image.

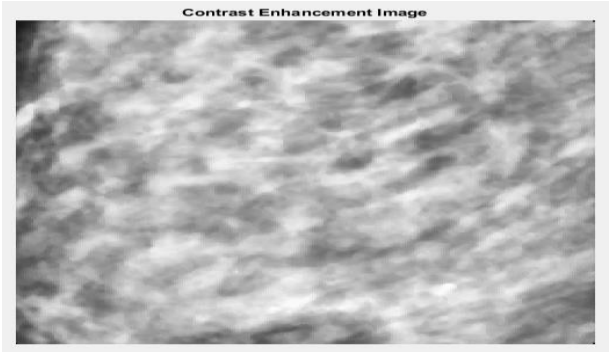

Fig 3.4 Contrast Enhancement image of the input mammogram

D. Feature Extraction

Features of the input mammogram images are extracted adopting two different modules grey level co-occurrence features and optical density features. The optical density features are extracted to characterize the photometric textures.

E. Classification

Diverse classification algorithms have been developed in recent years. The SVM classifier which is resilient and veridical is adopted here since it will fetch us the finer classification results.

IV. EXPERIMENTAL RESULTS

The input to the feature extraction algorithm is the ROI mammogram image. GLCM and ODCM features extracted from the images is given as input to the SVM classifier. Finally the mammogram is classified as normal and abnormal using SVM classifier with the enforcement matrices of accuracy, specificity and sensitivity.

V.CONCLUSION AND FUTURE SCOPE

Mammography has played a vital role in the early diagnosis of breast cancer. The existing system using KPCA failed to meet the desired performance since it is nonlinear and scale invariant. In this system we proposed a computer-aided diagnosis (CAD) system which focuses on analyzing normal and abnormal mammograms. Features are extracted using GLCM and ODCM and then classified as benign and malignant using SVM classifier. The proposed approach achieved an accuracy of about 95% which is very assuring and analogously the overall reckoning time is also less which is an added advantage of the system.

Future exertion will be consecrated to elevate revival precision. Also classifying range when protracted further can help us to scent the stages of cancer from stage 0 to stage 4 including the type of abnormalities, thereby reducing the need for the precocious mammographic test. Further, in future this method of SVM classifier using GLCM and ODCM features can be contraption in hardware which will perform better results.

VI. REFERENCES

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