

Detection Of Breast Cancer Using Digital Breast Tomosynthesis

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Abstract : *In, conventional two-dimensional mammography overlapping of the tissues is very considerable problem. Developing the new system for the identification of the breast masses is the main aim of this paper. The input images are pre-processed and segmented and further are subjected to feature extraction, and finally classification. The database contains 60 images and these images are considered for feature extraction. 22 texture features are extracted and considers it for feature classification. PNN (probabilistic neural network) classifier is used for the classification.*

Index Terms - *pre-processing, Gaussian Mixture Model (GMM), EM (expectation Maximization), Kmeans clustering, feature extraction, classification.*

I. INTRODUCTION

We see that day by day diseases are increasing. In which the cancer is one of the most harmful disease. There are various types of cancer that are present in the world. In that breast cancer is one of the most hazardous form of cancer that leads to the death of a person. Breast cancer is the most common disease found in women. And it is also one of the main reason for the death in women.

Breast cancer is a malignant tumour that starts in the cells of the breast. Unlike benign tumor malignant tumour is a group of cancer cells that can grow into surrounding tissues or spread to distant areas of the body. It is the second leading mortality cause in the United States. According to the American Cancer Society, About 1 in 8 U.S. women will develop invasive breast cancer over the course of her lifetime. Nearly all 25% of breast cancer deaths occur in women diagnosed between 40 to 49 years. Early detection and treatment are currently the only means proven to reduce breast cancer related mortality rates. Early detection of breast cancer still remains as open problem in the research community.

A digital Breast Tomosynthesis is used for the detection of breast cancer. This is also called as three-dimensional mammography, it uses the low radiation x-ray system and three-dimensional images of the breast is created by computer reconstructions. Digital Breast Tomosynthesis overcome the limitations of the conventional mammogram. In conventional mammogram overlapping of the breast tissue leads to loss of the informations. But in DBT the x-ray tube moves in arc over the each breast where it gets multiple x-ray pictures and from which we can get more information and also it allows the detection of small tumors that helps in the more treatment options. DBT will detect the small breast cancer that are hidden in the conventional mammogram. DBT also avoid additional screening and also biopsy. In conventional mammogram it takes only the images from two directions that is from top to bottom and side to side and vice versa.

II. EXISTING SYSTEM

The existing systems are Breast Self-Examination (BSE), mammogram, clinical breast examination, microwave imaging and ultrasound. Breast self examination: It is a screening method which involves women herself looking at her breast and feeling each breast for possible lumps or swelling. The issue with breast self-examination is that it is not proven to save the life and it is no longer routinely recommended by health authorities.

Mammogram: It usually takes two x-ray of each breast from different angles top to bottom and side to side and vice versa. Some of the issues are the compression of breast that is required during a mammogram can be uncomfortable. The compression will cause the overlapping of breast tissues, so overlapping of the breast tissue is not visible in the mammographic images.

Clinical breast examination: It is a physical examination that is done by the healthcare provider. The issue is that it is to be performed only by the health care provider well trained in the technique.

Microwave imaging: It is a promising method for early stage detection of breast cancer. It is based on contrast of electric parameter between the tumor and normal breast tissue within the microwave spectrum. The drawback with this technique is detecting the breast cancer using only this technique will result in the poor success.

Ultrasound: It is an imaging test that sends high frequency sound waves through breast and converts that into images on viewing screen. It places a sound emitting probe on the breast to conduct the test. It is not used on its own as screening test for breast cancer, rather it is to complement other screening tests. Since the ultrasound images are of low intensity it is not suitable for early detection.

III. PROPOSED SYSTEM

This section discuss on the proposed work to detect the breast cancer using the digital breast tomosynthesis. The detection of breast cancer is done by using the image processing steps that is shown in figure below:

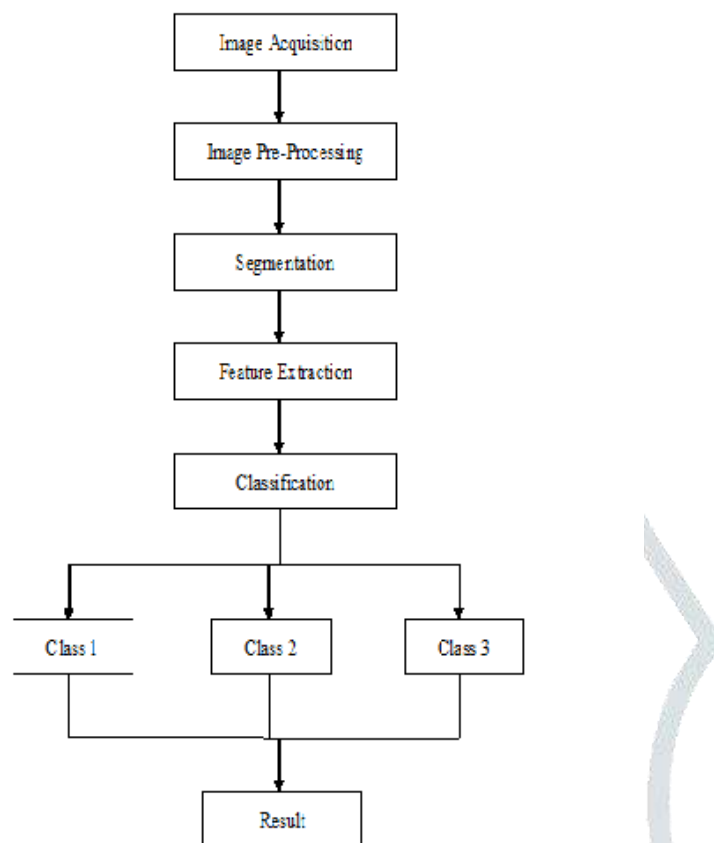
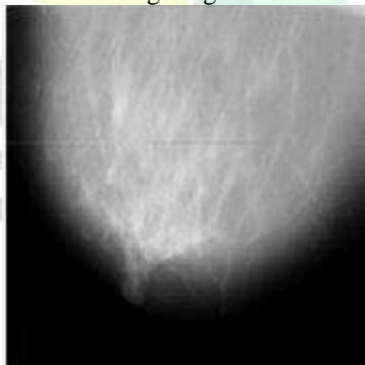


Fig:Flow of the system

Image Acquisition:

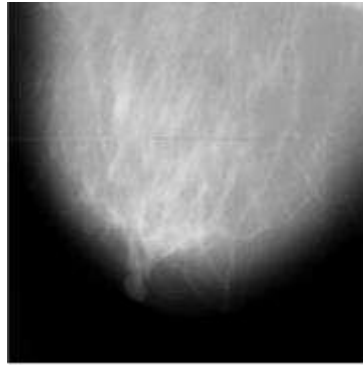
It is the first step in the system where input image is read. This image is given to the next stage that is the preprocessing for further process.



Preprocessing

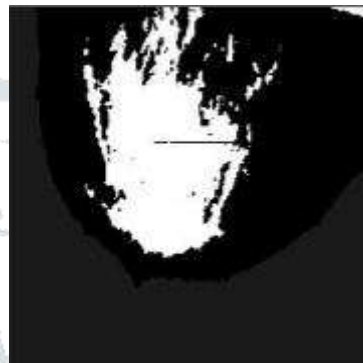
In this step the noise removal is done. If there is noise present in the image that is read then by applying the filtering technique the image will be noise free. Here we are using Adaptive Median Filtering technique. This is an advanced median filtering technique used for the noise removal. In this filtering method it suppress the noise very effectively and also it will go to preserve the edges and fine details in the image.

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Segmentation

The noise free image is given as the input to the segmentation step. Image segmentation is done by Gaussian Mixture Model(GMM).GMM is a category of the clustering algorithm .GMM uses Expectation Maximization.This Expectation Maximization will produce a valid parameter for the mixture model.Kmeans clustering algorithm is used which will partition the matrix into k clusters and also these kmeans will consider the hidden pattern.



Feature Extraction

The features are the information that is obtained from an image which will go to give the detailed perspective of that image.The features are extracted by using the method called as (GLCM)Gray-level co-occurrence Matrix.GLCM will have the information about the different combinations of gray-level that occurs in the image. It contains the matrix of $N \times N$ where N will be the different gray level number in the image.The feature are entropy,autocorrelation,energy,dissimilarity,sum of average ,sum of variance,sum of squares, sum of average

Classification

Classification of the image as benign, malignant and normal include two step mainly training and testing.In training it identifies the features that are useful for the the testing phase.In testing phase for each particular class the features are assigned based on the training.all these trained and tested features are passed to the classifier.Here we use PNN classifier to do classification.The PNN(Probabilistic Neural Network)is a feed forward neural network it uses Bayesian network.It is organized into four layers.Input layer:It represents the predictor variable in the network.These variable will store the value to the hidden layer.Hidden layer:The layer contains one variable for each case in the training dataset.Pattern layer:For PNN network there is one pattern for each category of target variables.Output layer:It compares the weighted votes for each category accumulated in the pattern layer and uses the largest vote to predict target category

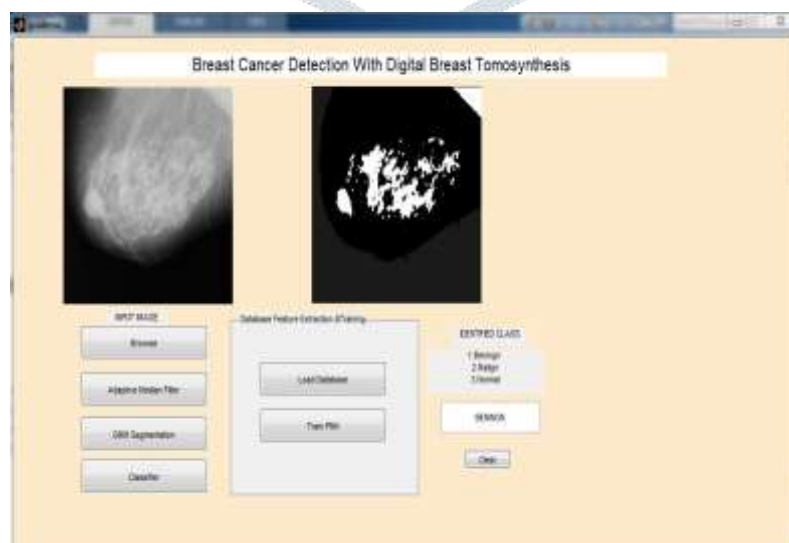


Fig:classified image

Table: Table 1.1 Testcases

Testcase ID	Input	Expected Output	Actual Output	RESULT
TID_1	Benign tomo image	Belongs to class 1 Breast cancer type	Belongs to class 1 Breast cancer type	Passed
TID_2	Malignant breast tomo image	Belongs to class 2 Breast cancer type	Belongs to class 2 Breast cancer type	Passed
TID_3	Normal breast tomo image	Belongs to class 3 Breast cancer type	Belongs to class 3 Breast cancer type	Passed

REFERENCES

- [1] Early Stage Detection of Breast Cancer Using Novel R. Image Processing Techniques, Matlab and Labview Implementation[2013]
- [2]. A Novel Approach for Breast Cancer Detection and studies Segmentation in Mammogram[2015]
- [3]. A Novel automatic tumor detection for breast cancer using ultrasound images[2011]
- [4]. Computer aided breast cancer detection using mammogram[2013]
- [5]. Detection of breast cancer with Hybrid image segmentation and Ostu's thresholding[2015]