

Detection of Breast Cancer using ANN

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Abstract— Breast cancer has become the leading cause of cancer deaths among women. To decrease the related mortality, disease must be treated as early as possible, but it is hard to detect and diagnose tumors at an early stage. Manual attempt have proven to be time consuming and inefficient in many cases. Hence there is a need for efficient methods that diagnoses the cancerous cell without human involvement with high accuracy. This paper proposes an automated technique using artificial neural network as decision making tools in the field of breast cancer. Image Processing plays significant role in cancer detection when input data is in the form of images. Statistical parameter analysis (Feature extraction) of image is important in mammogram classification. Features are extracted by using image processing. Different feature extraction methods used for classification of normal and abnormal patterns in mammogram. This method will give maximum accuracy at a high speed. The statistical parameter include entropy, mean, energy, correlation, texture, standard deviation. This parameters will act as a inputs to ANN which will diagnose and give the result whether image is cancerous or non-cancerous.

Keywords- Artificial neural network, Image processing, Statistical parameter.

I. INTRODUCTION

Breast cancer has become the leading cause of cancer deaths among women in many countries. According to recent research about 1 in 8 women in US develop breast cancer over the course of her life [1]. Early detection of Breast cancer is needed. Breast image analysis can be performing in many ways. Digital Mammography is the most widely used method of breast cancer detection. Manual diagnosis done by Oncologist does not give result with maximum accuracy. It is time consuming. This paper give the automatic detection of Breast cancer using Image processing techniques and artificial neural network. The mammogram images have taken from MIAS (Mammography Image Analysis Society). Image processing includes various techniques to make the digital mammogram image perfect for artificial neural network.

The input image undergoes through many processes which include preprocessing, image enhancement, noise removal, mass image, targeted image, segmentation, feature extraction. The statistical parameter is important step in mammogram classification. The best extracted feature is texture parameter, by which the abnormalities can be easily indentified. Texture is a method of capturing pattern in the image. Statistical parameter includes entropy, mean, standard deviation, energy, co-relation. This parameter will be given as input to Classifier. There are different classifier used for analysis of digital image applications. Artificial neural network is the leading classifier use nowadays. ANN is used for classification between cancerous and noncancerous image. The design and implementation of the proposed algorithm is done in MATLAB using advance image processing toolbox.

II. RELATED WORK

Prof Seema singh and Sushmita H[1] has presented An Efficient neural network based system for diagnosis of breast cancer in this author has implemented an efficient neural network for diagnosis of breast cancer. They have explained the supervised and unsupervised methods tested to develop the most efficient alternative for breast cancer diagnosis. They have used Back propagation algorithm. The comparison of different types of classifiers has been added.

B.M.Gayathri, C.P.sumathi and t.santhanam [2] breast cancer diagnosis using machine Learning algorithms – a survey This paper summarizes the survey on breast cancer diagnosis using various machine learning algorithms and methods, which are used to improve the accuracy of predicting cancer. This survey can also help us to know about number of papers that are implemented to diagnose the breast cancer.

Chandra prasetyo utomo, Aan kardiana, Rika yuliwulandari [3] had published the paper, breast cancer diagnosis using artificial neural networks with extreme learning techniques in this research, author have implemented ann with extreme learning techniques for diagnosing breast cancer based on breast cancer wisconsin dataset. Results showed that extreme learning machine neural networks (ELM ANN) has better generalization classifier model than BP ANN.

Minavathi, Murali.S, M.S.Dinesh[4], presented reaserch on Classification of Mass in Breast Ultrasound Images using Image Processing Techniques. In the proposed method, ultrasound images are preprocessed using Gaussian smoothing to remove additive noise and anisotropic diffusion filters to remove multiplicative noise (speckle noise). Active contour method has been used to extract a closed contour of filtered image which is the boundary of the spiculated mass. Spiculations which make breast mass unstructured or irregular are marked by measuring the angle of curvature of each pixel at the boundary of mass.

R.Nithya, B.Santhi[6] have presented the paper on comparative study on feature extraction method for breast cancer classification. This paper presents three different feature extraction methods they are intensity histogram, GLCM (grey level co-occurrence matrix) and intensity based features for classification of normal and abnormal patterns in mammogram. This methods comes under texture measure. The results are proving that GLCM features based neural network is giving higher classification rate of 98%. a supervised classifier system based on neural network is used.

Ashmitha khaleel khan & Noufal P [9] have presented, the Wavelet based automatic lesion detection using improved active contour method. In this paper, we have proposed a method- improved active contour method that helps in the segmentation process for lesion Detection. In this method before segmentation preprocessing and Dwt of image in done. in this mean filter or average filter has

been explain to improve the image quality for human viewers, and the wiener filter is used for noise Suppression. The adaptive median filter performs also mentioned about spatial processing used to determine which pixels in an image have been affected by impulse noise.

Chethan k, Dr. Krishna A N[10] presented Detection of breast masses in digital mammograms using multiple concentric layers. In this paper the implementation of multiple concentric layers (mcl) is applied to mammogram Segmentation; this technique has the automatic Detection of masses in digital mammograms. Perform the image to array converter then the image will be scale down . After this binary mask image are typically obtained by thresholding from the grayscale image. Image granulation step determines that group of pixels that are strongly connected in terms of spatial location and Intensity range.

In the above discussion on related work by many researchers ,methods of detection of breast cancer has been explained with different method, techniques and they have given the result with good accuracy ,but the processing is getting complicated as the concepts they have used is difficult. so to overcome this issue our paper has included the new concept of statistical parameter analysis where parameters are extracted for classification purpose .This parameters are sufficient to get maximum accuracy .It is also using artificial neural network classifier for diagnosis purpose. This paper gives the automatic method of detection of breast cancer.

III. PROPOSED SYSTEM

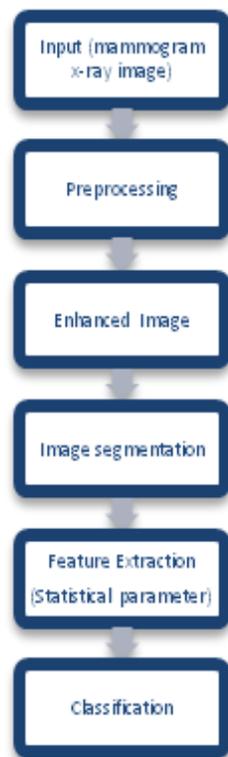


Fig 1:Flow Diagram of the Proposed System

A. Input Dataset:

The proposed system have used the Digital Mammogram X-ray Images Dataset of MIAS (Mammography Image Analysis Society).The dataset has many images from which some are cancerous and some non cancerous images.

B. Preprocessing:

Biomedical images are normally affected by various types of noises. Removal of these various noises without destroying the desired information is often a significant challenge. Pre-

processing images commonly involves removing low frequency from background noise; this normalizing the intensity of the individual particle images. Digital Image preprocessing is the techniques of enhancing data images prior to computational processing. The output is said to been preprocessed from the input data. Preprocessing methods use a small neighborhood of a pixel to get a new brightness value in output image. Such preprocessing operation is called Filtration. The input image may be color image so first the image is converted to gray image. This gray image taken as input to proposed system, then noise will be removing. This image converted into enhanced image, which will be more accurate image to analyze in next step.

C. Enhanced Image :

The pre-processed image have many undesirable white spots/pixels in the non-targeted area so it has to be removed, and that part of image is mask .The mask creation of image is perform. This image is the enhanced image.

D. Segmented Image:

Segmentation refers to the process of partitioning a digital image into multiple segments that is set of pixel also refer as super pixel.The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze[5].The suspected objects are separated from background (lines and curves)objects and boundaries in image.It has been observed that after the segmentation process, the white shaded portions i.e. the abnormalities present in the breast region will appear.

E. Feature extraction :

When the input data to an algorithm is too large to be processed and it is suspected to be notoriously redundant the input data will be transformed into a reduced representation set of features .Transforming the input data into the set of features is called features extraction.

Feature extraction is a method of capturing visual content of an image. The objective of feature extraction process is to represent raw image in its reduced form to facilitate decision making process such as pattern classification[7]. A variety of technique used for texture feature extraction such as intensity histogram, co occurrence matrix and intensity based features. Texture features are extracted from the mammograms. Feature extraction step is important step to get high classification rate. A set of features are extracted in order to allow a classifier to distinguish between normal and abnormal pattern. The abnormality can be identified on the basis of textural appearance. Extracted features are used in neural classifier to train it for the recognition of particular class either normal or abnormal. The ability of the classifier to assign the unknown object to the correct class is dependent on the extracted features.

Statistical parameter analysis is the advance method of detection of cancer. This will give maximum accurate result. The best feature extracted is Texture feature.

D. Classification

The project used a three layer artificial neural network. The schematic representation of neural network with 'n' inputs 'm' hidden units and one output unit .The extracted features are considered as input to the neural classifier. A neural network is a set of connected input/output units in which each connection has a weight associated with it. The neural network trained by adjusting the weights so as to be able to predict the correct class. The desired output was specified as 1 for normal and 0 for

abnormal. The classification process is divided into the training phase and the testing phase. In the training phase known data are given. In the testing phase, unknown data are given and the classification is performed using the classifier after training. The accuracy of the classification depends on the efficiency of the training.

IV. CONCLUSION

Breast cancer detection at early stage will reduce the mortality rate among women in many developed countries. I have use the artificial neural network method for the diagnosis of cancer with the help of advance image processing techniques whih will give the best accurate result.

V. REFERENCES

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