International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169
Volume: 4 Issue: 4 446 - 448

Mammogram Cancer Detection and Classification Using Clustering and Neural Network

Soniya D Wawhal[#1], Sarang D. Patil[#2]

Assistant Professor. Department of E&Tc, Gangamai College of Engineering, Nagaon.[#1]

Assistant Professor. Department of E&Tc, Gangamai College of Engineering, Nagaon.[#2]

chandrakironji@gmail.com[#1]

saarangpatil@gmail.com[#2]

Abstract: Breast cancer is second largest cancer in the world and cause of death among women. Cancer is abnormal growth of body cell which never die. The most effective way to reduce cancer is its earlier detection.

The detection of breast cancer is challenging problem, due to structure of cancer cell . Mammography is the most effective way for early detection of breast cancer. Here segmentation method, wavelet based threshold method for segmenting the mammographic images can be used. The threshold will be determined by bi-clustering an image into rows and columns. The probabilistic neural networks are used to classify the stage of image that is normal or abnormal. The manual analysis of these samples are time consuming, inaccurate and requires intensive trained persons to avoid diagnostic errors .The segmentation results will be used as base for computer aided diagnosis system for early detection of cancer from mammographic images. Discrete wavelet transform can be used for extracting shape and statistical features and it decomposes the image into four levels for getting the edge details in horizontal and vertical directions. Probabilistic neural network gives fast and accurate classification than other neural networks and is promising tool for classification of cancer.

*****

I. INTRODUCTION

Cancer refers to uncontrolled multiplication of group of cells in a particular location of body. A group of rapidly dividing cells may form lump, micro-calcifications or architectural distortions which are usually referred as tumours. Approximately 39520 women died from breast cancer in 2011, despite the fact that passing rates have been diminishing as a result of early recognition of malignancy. Screening mammography is a standout amongst the best systems in early discovery of bosom tumor.

A radiologist ordinarily look at a mammogram to check for indications of growth. Computer Aided detection (CAD) framework prompts the radiologist to reevaluate the movies. At the point when utilizing a CAD framework with mammography a radiologist still peruses the mammogram yet a PC program likewise assesses the mammogram and highlights suspicious districts for the radiologist to audit.

It has been demonstrated that twofold perusing of therapeutic pictures could prompt better disease discovery yet the expense suggested in twofold perusing is high, thats why great programming to help people in restorative foundations is of extraordinary intrigue these days. At the point when two radiologists make distinctive conclusion of a mammogram, the CAD framework can give and target machine assessment to them to rethink.

Along these lines CAD framework have been produced to help radiologist and expansion the exactness of analysis. The variations from the norm in mammogram can be generally partitioned into two sorts:

Characterization or masses[6]. Arrangement are minor mineral stores inside the bosom tissue. They look like little white spots on a mammogram. The order might be of various sorts and may contrast in dispersion.

A Mass is generally something somewhat more significant and clearer than a sore. Particularly a mass has volume and possesses space. On a mammogram, it has a tendency to be denser in the center than towards the edge. A mass can't be sprinkled with fat cell to the same degree as non-influenced tissue. Masses may likewise have diverse shapes and edges may vary in size, area and introduction and may have distinctive foundation. In the event that the mass seems more like a lobule than a simply round or oval shape then it is to some degree more suspicious for bosom disease. Masses with unpredictable shapes are exceedingly suspicious for bosom malignancy. Bosom masses are more hard to distinguish on account of the plenteous appearance and vague edges contrasted with characterization in this manner mass identification keep on challenging both radiologist and CAD framework.

The Automated recognition of bosom attractive reverberation pictures by utilizing some earlier information like pixel force and some anatomical component is proposed. Right now there are no techniques broadly acknowledged in this manner programmed and solid strategies for growth identification are of extraordinary need and intrigue. The use of Probabilistic neural system (PNN) in the order of information for mammogram pictures is prototyped here for taking care of the issue of incorrect discovery and grouping of bosom malignancy from the mammographic pictures.

Essential Image Classification

There are three sorts of pictures utilized as a part of advanced picture handling:

1) Binary Image.

2) Gray Scale Image.

3) Colour picture.

Parallel Image: The two hues utilized for twofold picture are high contrast however any two hues can be utilized. The Color utilized for the object(s) in the picture is the frontal area shading while rest of picture is the foundation shading. Paired Images are likewise called bi-level or two level pictures. This implies every pixel is put away as a solitary bit(0 or 1).This name high contrast monochrome or monochromatic are regularly utilized for this idea however may likewise assigned any pictures that have one and only example for each pixel, for example, dim scale pictures. Twofold pictures regularly emerge in advanced picture preparing as cover or as the aftereffect of specific operations, for example, divisions, thresholding and dithering.

Gray Scale Image: A gray scale image is digital image, is a image in which the value of each pixel is single sample. That is carries only intensity information. Images of this sort, are also known as black and white, are composed exclusively of shades of gray(0-255), varying from black(0) at the weakest intensity to white(255) at the strongest. Gray images are distinct from one bit black and white images, which in the context of computer imaging are images with only the two colours, black and white(also called bi-level or binary images). Gray scale images have many shades of gray in between. Gray scale images are also called monochromatic, denoting the absence of any chromatic variation.

Colour Image: A digital colour image is a digital image that includes colour information for each pixel. Each pixel has a particular value which determines its appearing colour. This value is qualified by three numbers giving the decomposition of the colour in the three primary colours red, green and blue. Any colour visible to human eye can be represented this way. The decomposition of a colour in the three primary colours is quantified by a number between 0 and 255. For example, white will be coded as R=255, G=255, B=255. Black will be known as (RGB=0,0,0) and say, bright pink will be (RGB=255,0,255).

II. LITERATURE SURVEY

a) Automatic system for stage classification of breast Cancer

In this system, methods for cancer detection based on many methods which are described below are proposed. All these methods play a key role in the detection process. Here apart from classical clustering methods bi-clustering is been preferred to analyse biological datasets due to its ability to group both genes across conditions simultaneously also probabilistic neural network used for training and classification as it's a dependable and accurate method. Here a system is proposed for mammogram image classification for can diagnosis based on

1) Cancer detection using Bi-clustering method.
2) Wavelet transforms.
3) Probabilistic neural network for image classification.

There are many methodologies used in the system which plays a key role in diagnosis of cancer as well as stage classification of the same. They are :

1) Image segmentation for cancer detection.
2) Discrete wavelet transform.
3) Graylevel Co-occurrence matrix feature.
4) PNN training and Classification.

b) Computer Aided diagnostic system based on wavelet analysis for micro-calcification detection in digital mammogram

\ Cluster of micro-calcification in mammograms are an important early sign of breast cancer in women. In this paper an approach is proposed to develop a computer aided diagnosis. CAD system that can be very helpful for radiologist in diagnosing micro-calcification pattern in digitized mammogram earlier and faster than typical screening program. The proposed method has been implemented in three stages

1) ROI(Region of interest). Selection of 32x32 pixel size which identifies cluster of micro-calcification.
2) The feature extraction stage is based on the wavelet decomposition of locally proposed image (ROI). To compute the important feature of each cluster.
3) The classification stage which classify between normal and micro-calcification patterns and then classify between benign and malignant micro-calcification. In classification stage four methods were used the voting k-nearest neighbour classifier (K-NN), Support vector machine SVM classifier, Neuralnetwork (NN) classifier and fuzzy classifier. The proposed method was evaluated using the mammographic image analysis society(MIAS) mammographic databases. The proposed system was shown to have the large potential for micro-calcification detection in digital mammogram.

Integrated wavelets for enhancement of micro-calcification in digital mammography. The paper presents a new algorithm for enhancement of micro-calcification in mammograms. The main novelty is the application of techniques we have developed for construction of filter banks derived from the continuous wavelet transform. This discrete wavelet decomposition, called integrated wavelets are optimally designed for enhancement of multi-scale structure in image. Furthermore we use a model based approach to refine existing method for general enhancement of mammograms resulting in a more specific enhancement of micro-calcification.

c) Computerized detection of malignant tumors on digital mammograms

This paper presents a tumor detection system for fully digital mammography. The processing scheme adopted in the proposed system focuses on the solution of two problems:

One is how to detect tumor as suspicious region with a very weak contrast to their background and another is how to extract features which characterize malignant tumor. First

problem a unique adaptive filter called the iris filter is proposed. Clues for differentiation between malignant tumors and other tumors are believed to be mostly in their border areas. This paper proposes typical parameters which reflect boundary characteristics to confirm the system performance for unknown samples, large scale experiments using 1212 CR images were performed.

REFRENCES

[1] C.J.VybornyM.L.Giger, and R.M. Nishikawa, "Computer Aided detection and diagnosis of breast cancer ," Radiologic clinics N. Amer, vol 38. no.4, pp.725-740 ,jul 1, 2000, 10.1016/S00338389(05)70197-4, 0033-8389.

[2] J. Scharcanski and C. R. Jung, "Denoising and enhancing digital mammographic Images for visual screening, "Computerized Medical Image graphics, vol.30, no.4, pp 243-254, Jun 2006, 10.1016/j. Comp med image,2006.05.002, 0895-6111.

[3] N. Karssemeijer, "Adaptive noise equalization and recognition of microcalcification clusters in mammogram, "Int.J. Pattern recognition artificial Intell, vol.7. pp. 1375-1376, 1993.

[4] M. L. Giger,"Computer Aided diagnosis in radiology," Acad.radiol. Vol 9, pp.1-3, 2002.

[5] K. J. McLoughlin, P.J. Bones, and N. Karssemeijer, "Noise equalization for detection of microcalcification clusters in direct digital mammogram images," IEEE trans. Med image .vol.23, no.3.pp.313-320, mar 2004, 10.1109/TMI.2004.824240.

[6] J. Grim, P.Somol, M.Haindl, and J. Danes,"Computer Aided evaluation of screening mammograms based on local texture models,"Trans.Ima.Proc.,ol.18, pp.765-773, Apr 2009.

.