Proceedings of
INTERNATIONAL CONFERENCE ON INNOVATIVE TRENDS IN ENGINEERING RESEARCH (ICITER-2016)
International Journal of Innovations in Engineering, Research and Technology,IJIERT-ICITER-16,ISSN:2394-3696
26th June,2016

EARLY BREAST CANCER DETECTION BY USING IMAGE PROCESSING

[PAPER ID: ICITER-D184]

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ABSTRACT:

In developed nations, the breast cancer rate is high. The mass segmentation methods in mammogram plays important role in Computer aided diagnosis (CAD) system. In this paper is supposed to do the breast cancer detection by using the Bidimensional Empirical Mode Decomposition (BEMD) method. Breast cancers are traditionally known to be one of the major causes of death among women. In this work, a novel segmentation approach by contour extraction was developed, based on two main phases: detection of (ROI) and region segmentation. Our approach consists of first finding regions of interests that can be suspicious masses in mammograms by using the iterative thresholding algorithm. Then the contours of the regions of interests are extracted from the first mode obtained by applying the (BEMD) Bidimensional Empirical Mode Decomposition method.

Finally, the masses are refined by the contours extracted. EMD is a method which decomposes any compound data set into a finite and often small number of components, known as intrinsic mode functions (IMF). It can be applied to non linear and non stationary data analysis. When EMD is used for image texture analysis then it is known as BEMD Mortality rates due to breast cancer have been reducing due to better diagnostic facilities and effective treatments. Introduction

INTRODUCTION:

CANCER refers to the uncontrolled multiplication of a group of cells in a particular location of the body. A group of rapidly dividing cells may form a lump, micro calcifications or architectural distortions which are usually referred to as tumors. Breast cancer is any form of malignant tumour which develops from breast cells. Breast cancers are traditionally known to be one of the major causes of death among women. Mortality rates due to breast cancer have been reducing due to better diagnostic facilities and effective treatments.

Breast cancer rates are much higher in developed nations compared to developing ones. There are several reasons for this, with possibly life-expectancy being one of the key factors - breast cancer is more common in elderly women; women in the richest countries live much longer than those in the poorest nations. The different lifestyles and eating habits of females in rich and poor countries are also contributory factors, experts believe.

Early detection of breast cancer can improve survival rates to a great extent. Inter-observer and intra-observer errors occur frequently in analysis of medical images, given the high variability between interpretations of different radiologists. Also, the sensitivity of mammographic screening varies with image quality and expertise of the radiologist. So, there is no golden standard for the screening process. To offset this variability and to standardize the diagnostic procedures, efforts are being made to develop automated techniques for diagnosis and grading of breast cancer images. The statistics show that breast cancer affects one of every eight women in the United States and one of every ten women in Europe[1].

Breast cancer is any form of malignant tumour which develops from breast cells [3]. Breast cancers are traditionally known to be one of the major causes of death among women [4].Mortality rates due to breast cancer have been reducing due to better diagnostic facilities and effective treatments [5]. One of the leading methods for diagnosing breast cancer is screening mammography. This method involves X-ray imaging of the breast. Screening mammography examinations are performed on asymptomatic women to detect early, clinically unsuspected breast cancer [2]. The need for early detection of breast cancer is highlighted by the fact that incidence rates for breast cancer is one of the highest among all cancers according to the American Cancer Society which quotes a morbidity of 230 000 and a mortality of 40 000 according to the latest figures gathered for the American population [6].

Thus, early diagnosis plays a critical role in increasing the chance of survival. Therefore, segmentation of breast

mass in the mammography computer aided diagnosis (CAD) plays an important role in the quantitative and qualitative analysis of medical images. It has a direct impact on the analysis and treatment of early breast cancer.

PREVIOUS ARTS:

There are various and numerous research works are carried in current scenario for breast cancer. Jai-Andaloussi, Abderrahim Sekkaki, Gwenole Quellec, Mathieu lamard, Guy Cazuguel, Christian Roux have mention that to identified breast mass segmentation in mammography images by using Bi dimension empirical mode decomposition(BEMD) method[1]. This method is use to decompose images into a set of functions named as Bidimensional intrinsic mode function(BIMF) and residue. In this work, a segmentation approach by contour extraction was developed, based on two main phases are detection of region of interest (ROI) and region segmentation. Our approach consist of first finding regions of interest that can be suspicious masses in mammograms by using the iterative thresholding algorithm. Then the contours of the region of interest are extracted from the first mode obtained by applying the Bidimensional Empirical Mode Decomposition (BEMD) method.

Sonia Narang, Harsh K Verma, Uday Sachdev was introduced to develop more cost effective and easy to use system, procedures and methods[2]. In this paper presents a review on classification of breast cancer using ART, Adaptive Resonance Neural Networks(ARNN) and Feed Forward Artificial Neural Networks. Breast cancer is one of the major causes of death among women. Women can have highest chance of survival if we are able to detect the cancer at its early stages.

Karthikeyan Ganesan, U Rajendra Acharya, Chua Kuang Chua, Lim Choo Min, K Thomas Abraham and Kwan Hoong states that have documented the general trends of computer aided diagnosis(CAD) of breast cancer, making a study of several techniques[3]. It has been provided to show that the accuracy of cancer detection has indeed improved with introduction of CAD based diagnostic procedures.

Vikas Chaurasia, Saurabh Pal has to investigate the performance of different classification techniques[4].To developing accurate prediction models for breast cancer by using data mining technique. In data mining and machine learning areas is to build precise and computationally efficient classifiers for medical application.

Yao Yao sates that one of the leading methods for diagnosing breast cancer is screening mammography and early diagnosis[5]. In this paper they have mention that contrast enhanced magnetic resonance of the breast is most alternative for mammography. They present a research on this two techniques and image processing techniques is used for the cancerous tumour mass segmentation. In image processing method used for tumour mass detection in mammograms and some enhancement tools such as filter, fractal analysis and segmentation algorithm.

PROPOSED WORK:

In the System flow based on (BEMD), illustrated in fig.1(a).

A. INPUT IMAGE:

Input image is taken from database of 50 images. This database includes images of cancerous image as well as normal image. These images are taken from standard database. Hence we can rely on this database for further proceedings. The database images are colored images.

B. PRE PROCESSING:

Pre-processing of an image includes resizing of an image. The basic condition for any image processing algorithm is that images must be of same size for processing purpose. Hence in order to process out any image with respective algorithm we resize the image.

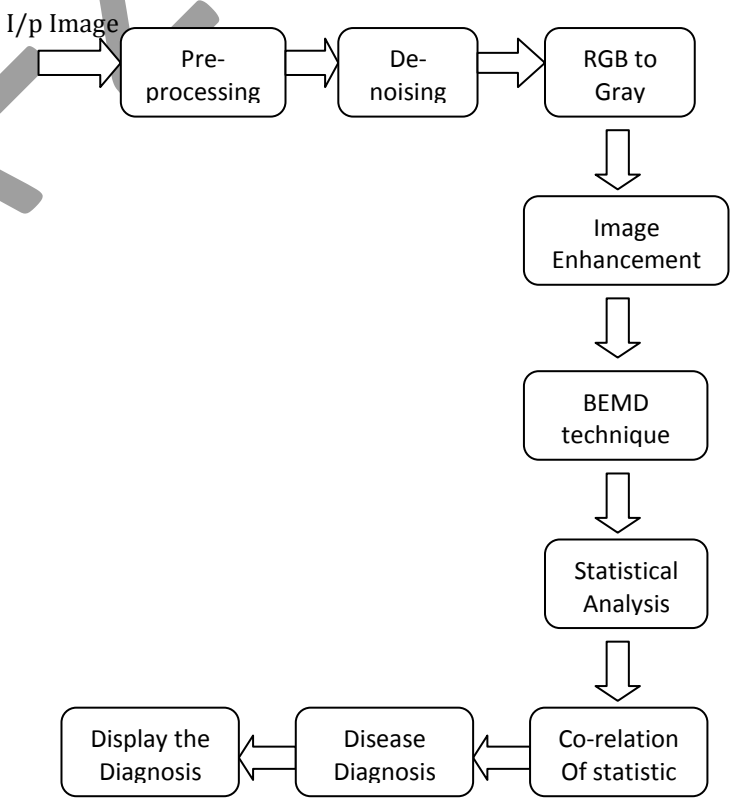

Fig.1(a) System Flow

C. DE-NOISING OF AN IMAGE:

It's necessary to have quality images without any noise to get accurate result. Noisy image may lead your algorithm towards in accurate result. Hence it becomes necessary to de-noise the image. Image de noising is an

important image processing task, both as a process itself, and as a component in other processes. Very many ways to de noise an image or a set of data exists. The main properties of a good image de noising model are that it will remove noise while preserving edges. Traditionally, linear models have been used. to de-noise the image we can use median filter. Median filter does the work of smoothening of image.

D. RGB TO GRAY CONVERSION:

The input signal which we get that is RGB image. But for our algorithm we require gray images. Hence using rgb to gray conversion in MATLAB we convert RGB images in to gray images.

E. IMAGE ENHANCEMENT:

To get accurate result in biomedical image processing it is always necessary that biomedical image must be of very good quality. But practically this is not that much easy. Due to different reasons we get low or medium quality images. Hence it becomes necessary to improve there quality. To improve the quality of image we are using image enhancement algorithm. This algorithm enhances the image by focusing on parameters like contrast, brightness adjustment.

F. BEMD TECHNIQUE:

A Bidimensional Empirical Mode Decomposition (BEMD)method is introduced for the mass segmentation in mammography images. EMD is a method that which decomposes any compound data set into a finite and often small number of components, as known as intrinsic mode functions (IMF). This can be applied to non linear and non stationary data analysis. When EMD is used for image texture analysis then it is known as BEMD. The starting point of the Empirical Mode Decomposition (EMD) is to consider oscillations in signals at a very local level. In fact, if we look at the evolution of a signal x(t) between two consecutive extrema (say, two minima occurring at times t− and t+), we can heuristically define a (local) high-frequency part {d(t), t− ≤ t ≤ t+}, or local detail, which corresponds to the oscillation terminating at the two minima and passing through the maximum which necessarily exists in between them. For the picture to be complete, one still has to identify the corresponding (local) low-frequency part m(t), or local trend, so that we have

$$x(t) = m(t) + d(t) \text{ for } t- \le t \le t+.$$

Assuming that this is done in some proper way for all the oscillations composing the entire signal, the procedure can then be applied on the residual consisting of all local trends, and constitutive components of a signal can therefore be iteratively extracted. Given a signal x(t).

G. STATSTICAL ANALYSIS:

Data analysis is process of inspecting, cleaning, transforming, and modeling data with the goal of discovering useful information, suggesting conclusions, and supporting decision-making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains.

Data analysis technique that is data mining is a particular that focuses on modeling and knowledge discovery for predictive rather than purely descriptive purposes

Data integration is a precursor to data analysis, and data analysis is closely linked to data visualization and data dissemination. The term data analysis is sometimes used as a synonym for data modeling.

The goal of statistical analysis is to identify trends. A retail business, for example, might use statistical analysis to find patterns in unstructured and semi-structured customer data that can be used to create a more positive customer experience and increase sales. Statistical analysis of rubber sheet model is supposed to give different statistics such as:

- Entropy
- Standard deviation
- Texture factor
- correlation factor

Depending on these parameter first we find out there range. To find out range of these parameters we use standard database.

H. CORRELATION OF STATISTICS AND DIAGNOSIS:

If the standard range found it is stored in standard template. This template can be correlated with the range of image to be diagnosis or checked. If this range gets matched then it can diagnosis that respective person is of breast cancer patient, and at the end we can message this report to patient or store it.

EXPERIMENTAL RESULTS AND DISCUSSION:

In this section it represent the result of the experimental performed that it mammographic database. For executing our approach we are used some information taken by the mammographic database, such as

- class of abnormality;
- image-coordinates of centre of abnormality;
- radius (in pixels) of a circle enclosing the abnormality.

The overlapped area is the ratio of the area between the auto segmented region and the criteria region segmented by the radiologist manually In this mammograms database, the criterion region is the circle formed by the coordinates of centre and radius. We give below the principle of our evaluation method.

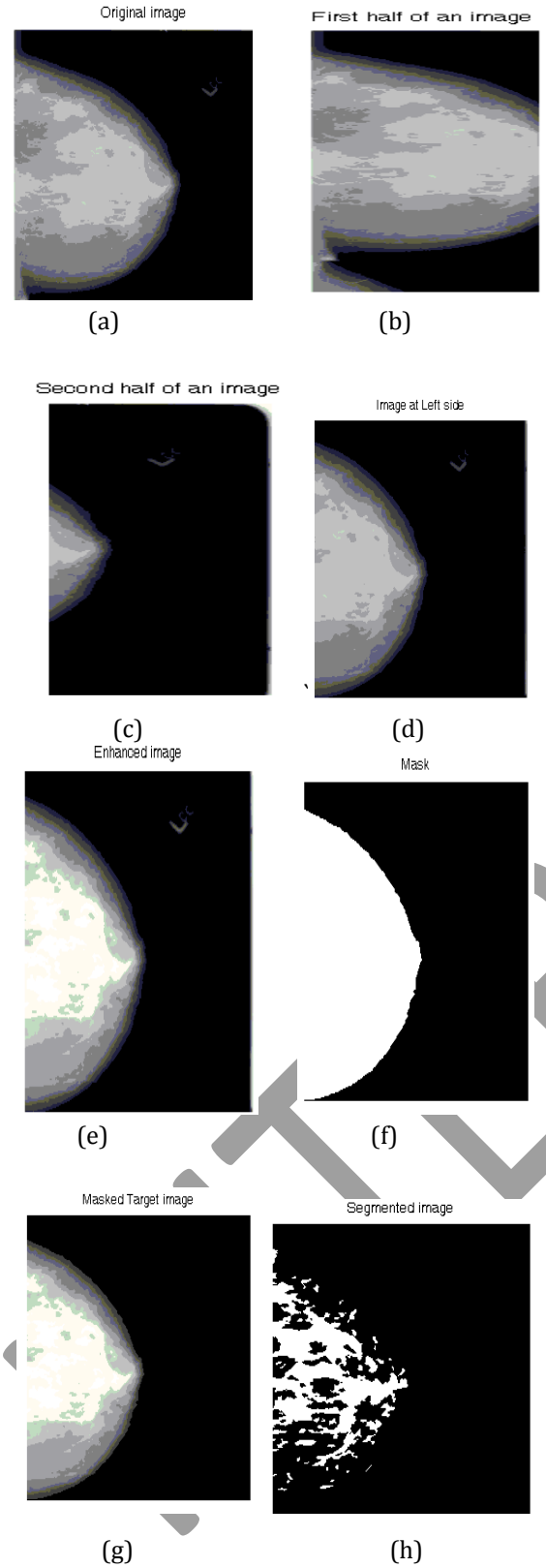

fig 2. (a) original image (b) First image on half (c) Second half an image (d) image at left side (e) enhanced image (f) mask (g) masked target image (h) segmented image

In above fig 2 it has shown the output of the mass segmentation in mammography and in fig 3 shown the whatever input has taken that as in output.

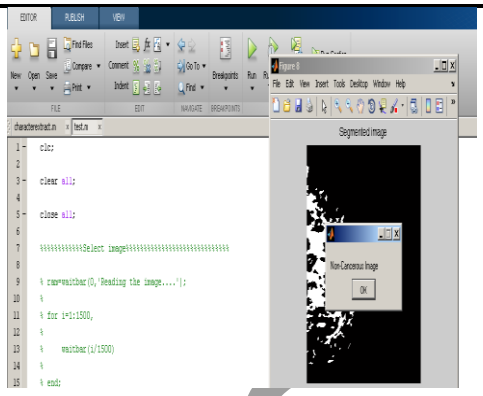

Fig 3. Output result

CONCLUSION:

In data analysis and data research though various research papers and E media. Project came to conclusion that using Statstical analysis with correlation algorithm we can diagnose the breast cancer patient. The features of mammograms images have been extracted using BEMD method. BEMD plays important role in improving the quality of the computer-aided diagnosis.

REFERENCES:

i. Said Jai-Andaloussi, Abderrahim Sekkaki, Gw´enol´e Quellec, Mathieu Lamard, Guy Cazuguel, Christian Roux, "*MASS SEGMENTATION IN MAMMOGRAMS BY USING BIDIMENSIONAL EMPERICAL MODE DECOMPOSITION BEMD*" ,35th Annual International Conference of the IEEE EMBS Osaka, Japan, 3 - 7 July, 2013

ii. Karthikeyan Ganesan, U. Rajendra Acharya, Chua Kuang Chua, Lim Choo Min, K Thomas Abraham, and Kwan-Hoong Ng, "*COMPUTER-AIDED BREAST CANCER DETECTION USING MAMMOGRp'AMS: A REVIEW*", IEEE REVIEWS IN BIOMEDICAL ENGINEERING, VOL. 6, 2013

iii. Vikas Chaurasia, Saurabh Pal, "*A NOVEL APPROACH FOR BREAST Journal CANCER DETECTION USING DATA MINING TECHNIQUES",* International of Innovative Research.

iv. *Computer and Communication Engineering* Vol. 2, Issue 1, January 2014

v. Sonia Narang, Harsh K Verma, Uday Sachdev, "*A REVIEW OF BREAST CANCER DETECTION USING ART MODEL OF NEURAL NETWORKS*", International Journal of Advanced Research in Computer Science and Software Engineering Volume 2, Issue 10, October 2012

vi. Yao Yao, "*SEGMENTATION OF BREAST CANCER MASS IN MAMMOGRAMS AND DETECTION USING MAGNETIC RESONANCE IMAGING."*

vii. Anupam Shukla, Ritu Tiwari and Prabhdeep Kaur, "*Knowledge Based Approach for Diagnosis of Breast*

Cancer" IEEE International Advance Computing Conference, Patiala, India, March 2009, pp. 6-12

viii. T. Matsubara, T. Ichikawa, T. Hara, H. Fujita, S. Kasai,T. Endo, T. Iwase,*"Automated detection methods for architectural distortions around skinline and within mammary gland on mammograms*", International Congress Series Vol.1256, pp. 950–955, 2003.

ix. Fauci, F., Bagnasco: *"Mammogram Segmentation by Contour Searching and 16-*

x. *Massive Lesion Classification with Neural Network*" NSSCR, Rome, Italy, October 22, vol. 5, pp. 2695-2699 (2004).

xi. Zou, F., Zheng, Y., Zhou, Z., Agyepong, K.: *"Gradient Vector Flow Field and MassRegion Extraction in Digital Mammograms"* In: CMBS 2008, Jyvaskyla, June 17-19, pp. 41-43 (2008).

xii. *Diagnosis Schemes"* ISBI 2007, April 12-15, pp. 516-519 (2007)

xiii. Zheng, B., Mello-Thoms, C., Wang, X.H., Gur, D.: *" Improvement of Visual Similarity of Similar Breast Masses Selected by Computer- Aided* Pappas, T.N.: *"An Adaptive Clustering Algorithm for Image Segmentation*".IEEE Transactions on Signal Processing 40(4), 901-914 (1992)