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BREAST CANCER DETECTION IN MAMMOGRAMS BASED ON CLUSTERING TECHNIQUES

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Abstract:

Cancer is one of the most leading causes of deaths among the women in the world. Among the cancer diseases, breast cancer is especially a concern in women. Mammography is one of the methods to find tumor in the breast, which is helpful for the doctor or radiologists to detect the cancer. Doctor or radiologists can miss the abnormality due to inexperience's in the field of cancer detection. Segmentation is very valuable for doctor and radiologists to analysis the data in the mammogram. Accuracy rate of breast cancer in mammogram depends on the image segmentation. This thesis is a survey of recent clustering techniques for detection of breast cancer. These fuzzy clustering algorithms have been widely studied and applied in a variety of application areas. In order to improve the efficiency of the searching process clustering techniques recommended. In this thesis, we have presented a survey of clustering techniques.

Keywords: Cancer, Fuzzy clustering, Algorithm, Tumor.

1. INTRODUCTION

Breast tumors are uncontrolled and anomalous multiplications of cells. Some start in the breast itself, in which case they are termed essential. Others spread to this area from someplace else in the body through metastasis, and are termed as optional. Essential breast tumors don't spread to other body locales, and might be dangerous or amiable. Optional breast tumors are constantly threatening. Both sorts are possibly crippling and life debilitating. Tumors in the bosom initially begin creating from the breast tissue itself. It is significantly more basic in ladies than in men. Bosom malignancy represents 22.9% of diseases amongst ladies around the world. Its survival rates are much lower in creating countries. The motivation behind why there is center upon breast tumors is on account of numerous ladies overlook the vicinity of knots in their breasts. This irregularity later turns dangerous and has a tendency to be all the more destructive. Therapeutic Image investigation and transforming has extraordinary essentialness in the field of pharmaceutical, particularly in noninvasive medication and clinical study. Therapeutic imaging methods and examination apparatuses empower both specialists and radiologists to touch base at a particular determination. Restorative Image Processing has risen as a standout amongst the most imperative devices to distinguish and also diagnose different issue. Imaging helps the specialists to envision and examine the picture for understanding of anomalies in interior structures. Mammograms distinguish indicators emitted from typical and anomalous tissue, giving clear pictures of generally tumors. It has turned into a generally utilized strategy of fantastic medicinal imaging, utilized broadly within breast imaging, where delicate tissue contrast and non- obtrusiveness are clear focal points. In this thesis it is motivated that detecting and classifying the breast cancer accurately and comparing with the existing systems. Few methods are combined to have more accuracy in this thesis and the methods are Speckle Noise Removal, Watershed Segmentation method, EM algorithm, GLCM method and SVM classification. Since all the methods used in this thesis are benchmark approaches and they proved individually good in the early studies.

2. LITERATURE SURVEY

FCM clustering algorithm, an unsupervised clustering technique, has been successfully used for image segmentation. Compared with hard C-Means algorithm, FCM is able to preserve more information from the original image. Its advantages include a straightforward implementation, fairly robust behavior, applicability to multichannel data, and the ability to model uncertainty within the data. A major disadvantage of its use in imaging applications, however, is that FCM does not incorporate information about spatial context, causing it to be sensitive to noise and other imaging artifacts. This thesis introduces a modified segmentation algorithm for FCM clustering by incorporating spatial information and altering the membership weighting of each cluster with Fuzziness weighting exponent. The proposed algorithm greatly attenuates the effect of noise and biases the algorithm toward homogeneous clustering. Statistical features such as mean and standard deviation of a segmented mammogram are extracted. These extracted features are fed as input to the classifier Support Vector Machine. This classifies the mammogram as benign or malignant. The proposed approach which is based on SVM got a better results and classification rate .This will help the doctors to diagnose breast cancer and help to save the lives of many women's.

The method proposed in this thesis is to classify the stages of malignancy of breast cancer based on the mammogram image, through segmentation by sample K-Means clustering method The initial step is the image acquisition to get the data in the form of mammogram digital images that are required in the research. Mammography Image Analysis Society (MIAS) database used in this research. Data is in the form of image format PGM (Portable Gray Map). PGM format is used by many medical image as a PGM is a lossless type image format where at the time of data compression ,no parts are removed so that the details of the image will remain intact and not lost.

3. METHODOLOGY

Introduction Cancer detection using mammography mainly concentrates on features of tiny micro calcifications, together with the number, size and spatial arrangement of micro calcification clusters and morphological features of individual micro calcifications.

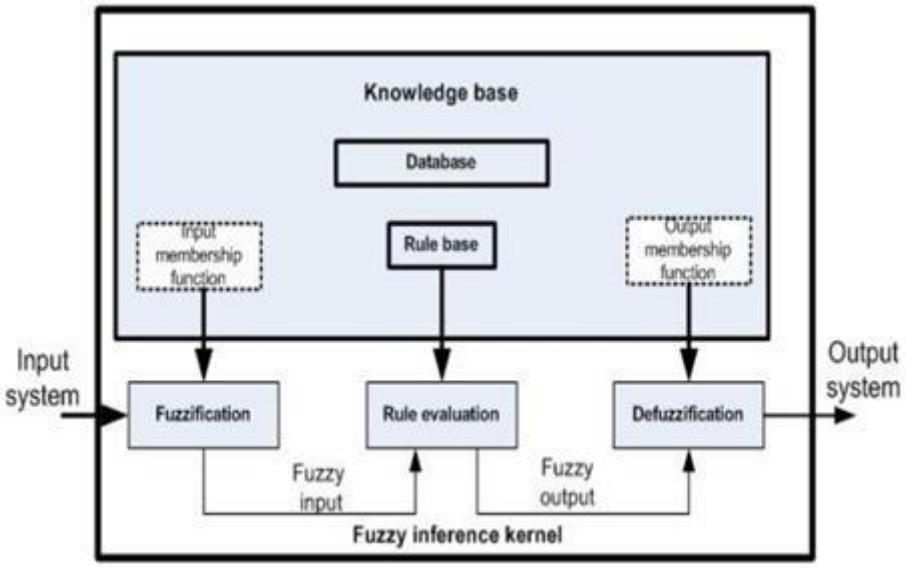

Fig.1.Principle of Fuzzy system

Since the mammogram images are very noisy, low-contrast, blur and fuzzy, it is necessary to enhance the mammogram images for accurate identification and early diagnosis of breast cancer. The enhancement can be defined as transformation of the image quality to a standard and more understandable level to carry out the diagnosis. The main aim of the present research is to propose suitable techniques for mammogram image enhancement and segmentation in order to accurately identify the breast cancer regions. The main goal of an image denoising algorithm is to reduce 66 the noise level, while preserving the image features (such as edges, textures, etc.) The proposed method uses Dual Tree Discrete Wavelet Transform for image denoising. Certainly, due to sensor imperfections, transmission channels defects, as well as physical constraints, noise weakens the quality of almost every acquired image. There are three types of noise exist in mammogram images namely impulse noise, additive noise, and multiplicative noise. The main goal of an image denoising algorithm is then to reduce the noise level, while process or protect the image features. The multiresolution analysis performed by the wavelet transform has been shown to be a powerful tool to achieve these goals.

4. RESULT ANALYSIS

This section details the results of the automatic detection of breast cancer mass in mammograms using morphological operators and Fuzzy Logic. In this analysis, the first procedure is determining the seed regions. When dealing with mammograms, it is known that pixels of tumor regions tend to have maximum allowable digital value. Based on this information, morphological operators are used to detect the possible clusters which contain masses. Image features are then extracted to remove those clusters that belong to background or normal tissue as a first cut. Features used here include cluster area and eccentricity. The Fuzzy logic is used as a segmentation strategy to function as better classifier & aims to class data into separate groups according to their characteristics Fuzzy logic is helpful in early stage of clustering in medical diagnosis. The cancerous mode is separated from the fatty breast regions using Fuzzy Logic. As the number of clusters increases, more and more information is obtained about the tissue which cannot be identified by pathologists.

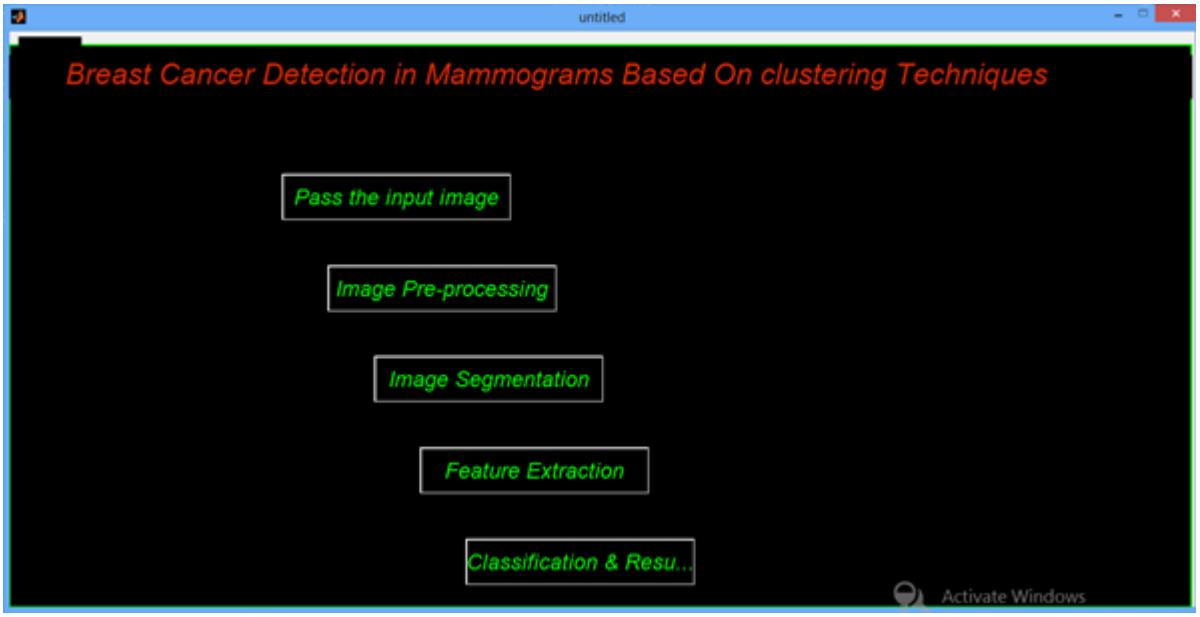

Fig.2.System structure

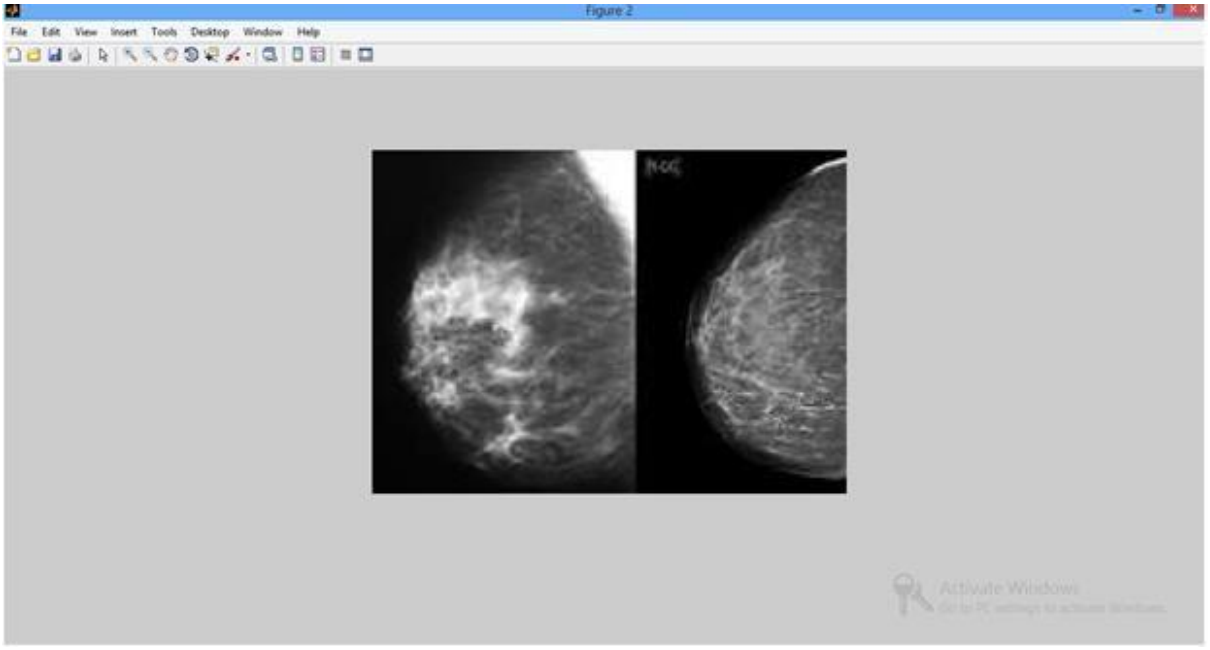

Fig.3. Output structure

Mammogram Image segmentation is a challenging task and there is a need and huge scope for future research to improve the accuracy, precision and speed of segmentation methods. Thus there is no single method which can be considered good for neither all type of images, nor all methods equally good for a particular type of image. Due to all above factors, image segmentation remains a challenging problem in image processing and computer vision and is still a pending problem in the world. Further works may be conducted to develop efficient segmentation method.

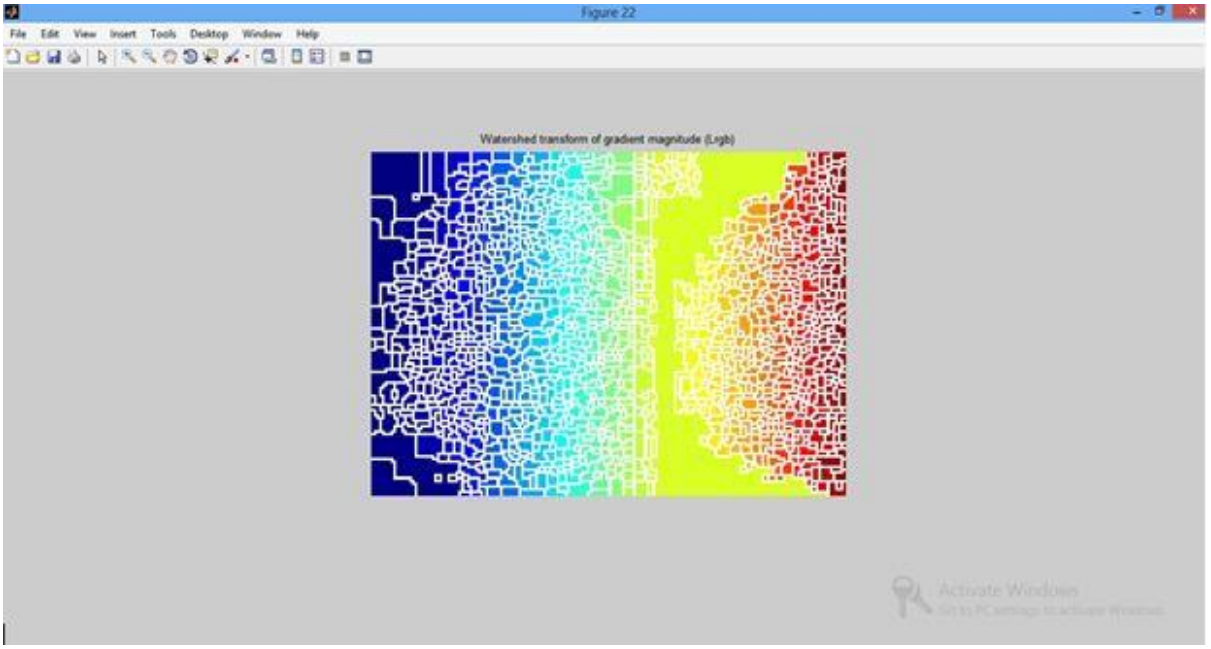

Fig.4. Output

CONCLUSION

Image segmentation is one of the most challenging and active research areas in the field of medical image processing. Mammogram Image segmentation is a challenging task and there is a need and huge scope for future research to improve the accuracy, precision and speed of segmentation

methods. Thus there is no single method which can be considered good for neither all type of images, nor all methods equally good for a particular type of image. Due to all above factors, image segmentation remains a challenging problem in image processing and computer vision and is still a pending problem in the world. Further works may be conducted to develop efficient segmentation method

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