

## INVESTIGATION ON MICRO CALCIFICATIONS OF BREAST CANCER FROM MAMMOGRAM IMAGE SEQUENCE

<sup>1</sup>M.Manikandan, <sup>2</sup>N.V.Andrews, <sup>3</sup>V.Kavitha

<sup>1,2</sup>Assistant Professors, <sup>3</sup>Professor,

<sup>1,2,3</sup> Department of ECE, M.Kumarasamy College of Engineering, Karur, Tamilnadu, India

**Abstract:** The breast tumor is one of the critical explanations behind death among women wherever all through the world. The honest to goodness purpose behind chest development is still dark. Thusly, an early area of the bosom tumor and its treatment is an ideal approach to maybe longer life and upgraded individual fulfillment of patients. PC supported outline systems help essentially in diagnosing chest development. Besides, systems may in like manner be used as a minute feeling by radiologists for the check of expressive results. In such CAD structures, the precision of results is of basic noteworthiness. The novel approach was introduced for the detection of the breast cancer through the microcalcification distribution level. Initially preprocessing was done for the mammogram images. Preprocessed images were appended to the next level. Watershed algorithms were applied for the depth of the calcification in a mammogram image sequence. This is the best algorithm for the distribution of calcification over a distance.

**Keywords:** Mammogram, Microcalcification, Wavelet, Watershed, Cancer Depth.

### 1. Introduction

Miniaturized scale calcifications are an early indication of bosom malignancy. Just a prior location can build the rate of survival patients. The mammography is the technique to locate these mysterious tumors. An effective conclusion regularly relies upon the perceivability of small scale calcifications. In this manner, the viability of the mammography screening could be expanded if the calcifications are distinguished naturally. Our examination over overwhelmingly focuses on straightforwardness taking care of mammogram pictures those results in the division of both unpredictable mass and calcification. Bits of knowledge show that 30–50 % of tumor has small scale calcification and anomalous mass is in like manner a sensible appearance of chest illness. Thusly, early area of such peculiar mass and little scale calcification can help radiologists in better diagnostics, achieving fitting and favorable treatment of patients.

### 2. Background Work Flow

#### 2.1 Literature survey of different tools

##### 1. Denoising Methods

Two image denoising methods have been applied to the mammographies, for reducing the possible additive random noise in the image, such as Gaussian white noise. The first one is an adaptive noise removal Wiener filter and the second one is a wavelet filter based on the wavelet coefficients shrinkage. The comparison of the results obtained for each of the filters, allow deciding if the method of automatic detection of microcalcification is effective.

##### 2. Local Thresholding

Neighborhood limit has been connected to the picture keeping in mind the end goal to choose the pixels with a dark level bigger than the picked edge, along these lines the more splendid ranges of the picture are chosen. The limit esteem determination is a sensible advance, as a too high edge can disregard the microcalcification which exhibit less differentiation, while a too low edge makes that splendid focuses which are chosen don't compare to some miniaturized scale calcification these focuses are caused by the motions in the dark levels of the foundation, because of the commotion which sullies the picture.

##### 3. Morphological operators

With the limit it is likely we have chosen a few pixels or little gatherings of pixels began by the clamor. These imperfections can be revised with the application to the picture of the opening and shutting morphological administrators. Because of 0.1 millimeter is the minimum diameter that can be detected by a radiologist, an opening with a structure element smaller than this size is applied to the image.

#### 4. Wavelet Transform

The fundamental thought behind wavelet change is to break down various frequencies of a flag utilizing distinctive scales. High frequencies are broke down utilizing low scales while low frequencies are examined in high scales. This is very more adaptable approach than the Fourier change, empowering examination of both nearby and worldwide highlights display in the picture.

#### 5. Wavelet Enhancement

Wavelet-based thresholding procedures have turned out to be viable in denoising. In past wavelet ideas the wavelet coefficients are thresholded to zero if their qualities are beneath a preset edge else kept unaltered. The opposite wavelet change is connected to staying critical coefficients which give a clamor free picture. In the proposed strategy thresholding is connected to multiscale items to figure the detail segments. Applying multiscale item technique the neighboring scale wavelet coefficients would diminish the unimportant highlights and increment huge highlights display.

#### 6. Regional growing

We apply a regional growing method based on determining the maximum of the slope function for different space directions of a wavelet smoothed version of the mammography

### 3. Result and Discussion

#### A. Proposed Method

When different sets of algorithms are available in practices for the identification of the changes of the gray level. Here we come with the best suitable algorithm.

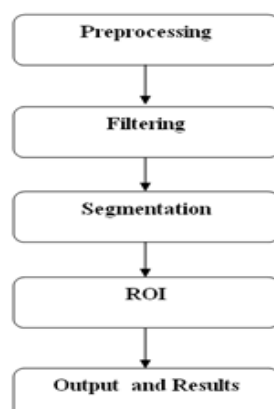


Figure 1. Proposed Method

With reference to the figure shown above is the proposed method.

#### B. Watershed Algorithm

In image processing, a watershed is a change described on a grayscale picture. The name refers metaphorically to a geological watershed, or drainage divide, which separates adjoining drainage basins. The watershed transformation treats the photo it operates upon like a topographic map, with the brightness of every point representing its peak, and unearths the lines that run alongside the tops of ridges.

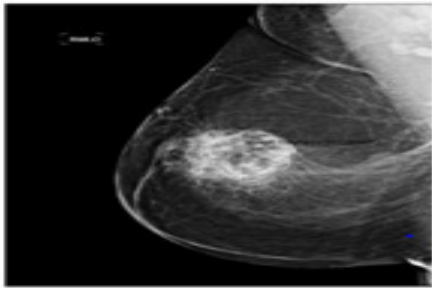
There are specific technical definitions of a watershed. In graphs, watershed traces can be defined at the nodes, on the rims, or hybrid traces on each node and edges. Watersheds may also be defined inside the non-stop domain. There also are many specific algorithms to compute watersheds. Watershed algorithm is used in photograph processing broadly speaking for segmentation functions.

Watershed set of guidelines is considered as a capable apparatus for picture division. It plays a pivotal position in device inventive and insightful, video picture division and photograph examination. The straightforward thought of the watershed set of guidelines is to see the inclination of a grayscale picture as a topographic floor, in which the rain falling at the watershed line could be gathered similarly in catchments bowls. Vincent and Soille proposed the radical approach for finding the watershed strains by utilizing the utilization of the submersion reproduction calculation. Division viability of the watershed revise is progressed broadly if frontal area items and history territories are stamped as of now.

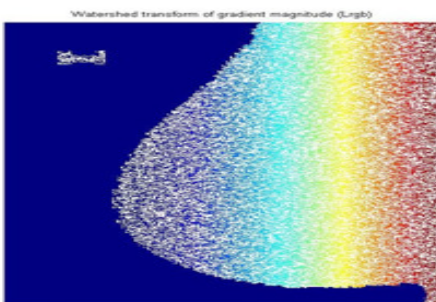
The catchment bowls owning insignificant charge aren't stamped legitimately within the sight of commotion. Therefore, before applying the watershed set of tenets, pre-preparing step is utilized to take away the clamor and another sort of non-consistency from the test photograph while in transit to stamp best the favored catchment bowls. These stamped catchment bowls deliver the altered inclination photograph. Watershed revise is then connected to changed angle photograph to yield the last watershed edge follows. The resultant picture is at long last superimposed on the one of a kind photograph to show the general division comes about.

#### C. Results

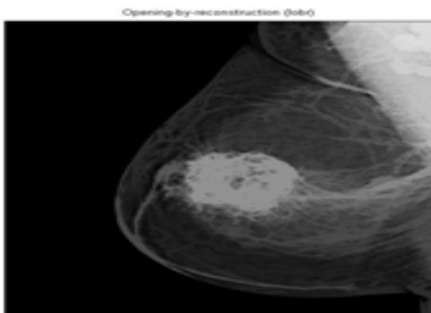
By the use of watershed algorithm of segmentation we obtain the following results.



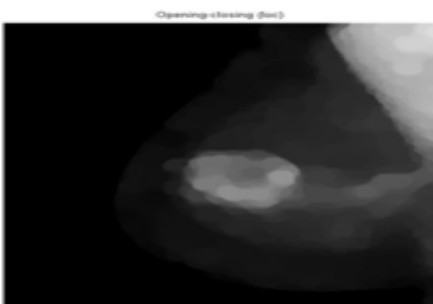
**Figure 2.** Input Breast cancer image



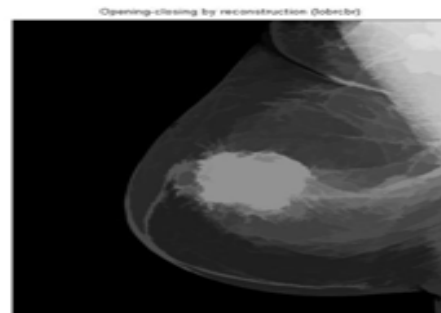
**Figure 3.** Watershed transform of gradient magnitude



**Figure 4.** Morphological Operated Image (1)



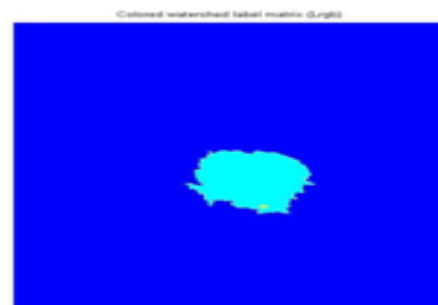
**Figure 5.** Morphological Operated Image (1)



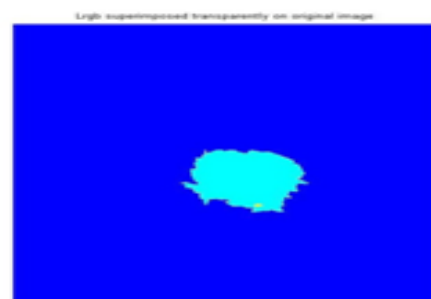
**Figure 6.** Morphological Operated Image (2)



**Figure 7.** Regional Maximum



**Figure 8.** Colored watershed label matrix



**Figure 9.** superimposed transparently on original image

#### 4. Conclusion

In existing systems there are more complex mathematical calculations are used and it is very difficult to understand for the users. There is more complexity to provide the accurate results in the specified area and also there may be chance to show many false images which is not affected with cancer cells.

We proposed two types of algorithm like watershed algorithm and level set algorithm to estimate the amount of affected cells. These algorithms are used to find the segmented regions accurately and it is very useful to find the different stages of a patients. Early stage of a person can be cured easily and if a patient is affected severely immediate action should be needed. There are different treatments are available to the different stages of affected patients between these two algorithms watershed algorithm is the best and simple way to identify the cancer cells.

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