

DETECTION OF BREAST CANCER USING SEGMENTATION TECHNIQUE IN MAMMOGRAM IMAGE

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ABSTRACT- *Mammography is the best method for premature detection of breast cancer. Breast cancer is the second most common cancer in the world. Breast cancer is a cancer that develops breast from breast tissue. To identify the breast cancer, four step has to be done, first step is preprocessing, in this median filter used to distinguish out –of- range isolated noise from legitimate image features such as edges and lines , Laplacian filter is used to compute the second derivatives of an image and Gaussian filter is rotationally symmetric and used to perform same in all directions ,PSNR[peak signal to noise ratio] and MSE[mean square error] has been calculated for each filter. Second step is segmentation , in this paper texture method such as texture filter is used to segment the cancer part.. Better improvement in accuracy for the expose of breast masses is texture method such as texture filter.*

Keywords- *Mammography, preprocessing, texture method, PSNR[peak signal to noise ratio] and MSE[mean square error]*

INTRODUCTION:

Breast cancer is an uncontrolled growth of breast cell. Breast cancer is a malignant tumour that has developed from cells in the breast. Nearly, 1.7 million women are affected by breast cancer. After lungs cancer, breast cancer is second most cancer in women in the united states commonly causes death. However, since 1989, no of women are died of breast cancer about 5 percentage of women have metastatic cancer then they are first diagnose with breast cancer. In mammography

image, bright region that described as cancer part. Low opposition and noisy in the mammogram image. Normal tissues and malignant tissues are present in some mammogram images. Image enhancement approaches can be classified as spatial domain method and frequency domain method. some example of image preprocessing process are contrast pre processing, edge enhancement, noise filtering, sharpening, magnifying. Remove the noise with the help of median filter, laplacian filter and Gaussian filter and we have find PSNR and MSE value for each filter. Texture segment using texture filter used to segment the cancer region.

PRE-PROCESSING:

Image preprocessing is the process of prominence certain features of interest in an image. It is one of the most interesting and visually attractive areas of image processing. The principle objectives of preprocessing is to process an image so that the results is more suitable than the original image for a specific application. This is ready by bringing out the detail that is dark known in an image. smoothing spatial filter is a type of median filter. Median filter replaces each pixel in an image by the median of grey levels in the neighbourhood. The median is defined as the percentile of a ranked set of number median filter prescription has revealed below

$$G(x,y)=\text{median}\{f(x-a,y-b),(a,b)\in W\}$$

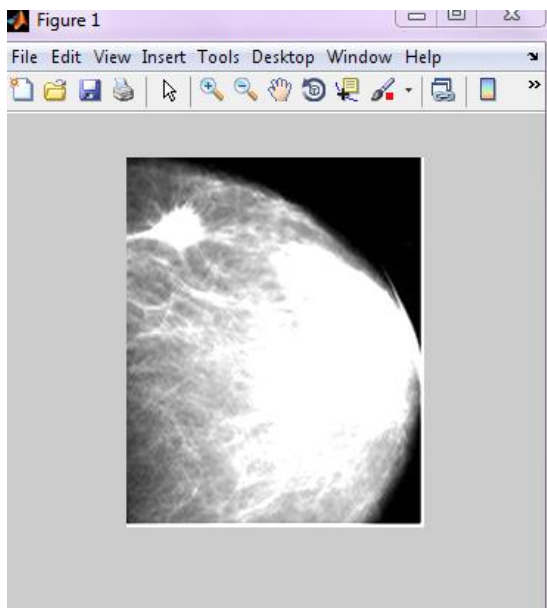


FIG 1.0 OUTPUT OF MEDIAN FILTER

Where W is a selected window

Laplacian filter is otherwise called as derivative operator, it is used to find the rapid change in the image, it is common to smooth the image. second order derivative mask is laplacian filter.

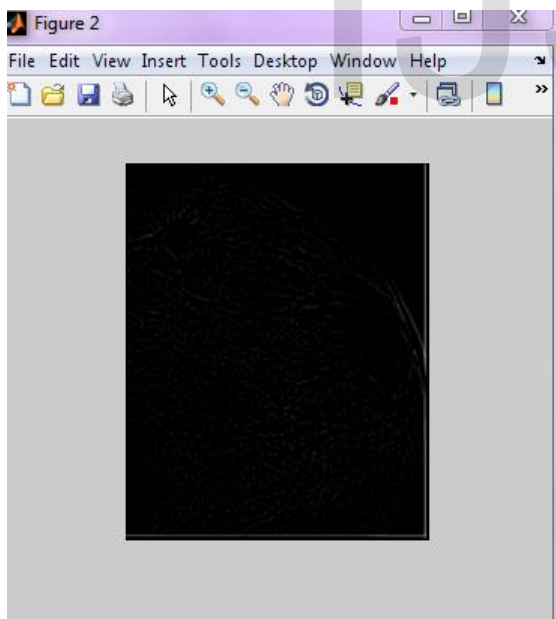


FIG 2.0 OUTPUT OF LAPLACIAN FILTER

The laplacian equation has shown below,

$$L = \Delta^2 u / 4 = 1/4 [d^2u/dx^2 + d^2u/dy^2]$$

$$L = \Delta^2 u / 2 = 1/2N [d^2u/dx^2 + d^2u/dy^2 + d^2u/dz^2 + \dots]$$

Gaussian filter is a filter whose impulse response is a Gaussian function. It has the properties of having no overshoot to a step function input while minimizing the rise and fall time, equation of Gaussian filter is $f(x) = \exp(-0.5(x-c)^2) / \sigma^2$

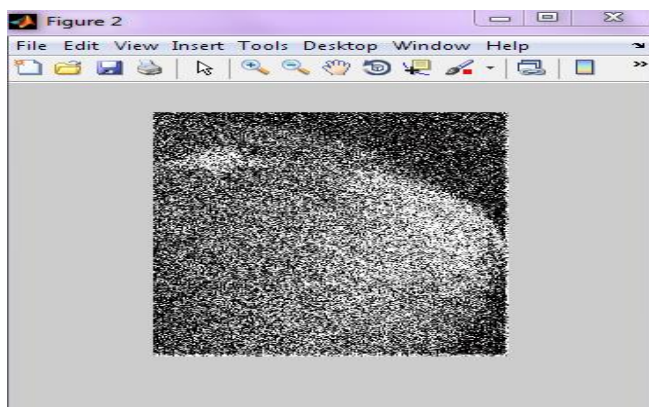


FIG 3.0 GAUSSIAN FILTER

Gaussian filter image has shown above and we have calculated PSNR and MSE values for individual image for several filter that has shown below

MEDIAN FILTER

Image	PSNR	MSE
Img1	60.4723	0.0588
Img2	57.3398	0.1209
Img3	57.9627	0.1048
Img4	61.5223	0.0462
Img5	60.1750	0.029
Img6	62.2325	0.0392
Img7	62.5538	0.0364
Img8	57.1802	0.1254
Img9	54.1916	0.2496
Img10	54.8774	0.2132
Img11	59.5131	0.0733

TABLE 1.0 COMPARISON OF PSNR AND MSE IN DIFFERENT IMAGES

Laplacian filter

Image	PSNR	MSE
Img1	26.7551	138.3455
Img2	26.5729	144.2760
Img3	26.6588	141.4480
Img4	27.4054	119.1064
Img5	27.2700	122.8793
Img6	28.6281	89.8818
Img7	26.1381	159.4659
Img8	25.2758	194.4890
Img9	24.9093	211.6170
Img10	24.8431	214.8652
Img11	24.1230	253.6208

Table 2.0 COMPARISSION OF PSNR AND MSE IN DIFFERENT IMAGES

Gausssian filter

Image	PSNR	MSE
Img1	29.3959	75.3172
Img2	29.70	70.13
Img3	29.8295	68.1606
Img4	30.5156	58.2002
Img5	30.3388	60.6184
Img6	31.6496	99.8253
Img7	29.0241	82.0484
Img8	28.3853	95.0498
Img9	28.2330	98.4425
Img10	28.1126	101.2089
Img11	27.4085	119.0234

Table 2.0 COMPARISSION OF PSNR AND MSE IN DIFFERENT IMAGES

SEGMENTATION:

Image segmentation is used to find out the place line and curves in the images. In this paper we are proposing texture method such as texture filter , Sub dividing an image into its constituent region is image segmentation. The segmentation methods are of two types they are

- 1.Discontinuity
- 2.Similarity

There are two types of texture filtering they are magnification filtering and minification filtering. Texture method is used to resolve the texture colour for a texture mapped pixels of the texture. Texture is that innate property of all surfaces that describes virtual patterns, each having properties of homogeneity.it contains important information about the structural arrangement of the surface, such as clouds, leaves, bricks, fabric, etc. It also describes the relationship of the surface to the surrounding environment. In short, it is a feature that describes the distinctive physical composition of the surface.

Texture properties include :

- 1.coarseness
- 2.contrast
- 3.directionality
- 4.line-likeness
- 5.regularity
- 6.roughness

Texture is one of the most important defining feature of an image.it is characterized by the spatial distribution of gray levels in the neighbourhood. Texture method such as texture filter has five steps to segment the cancer image they are read image, create texture image, create rough mask to segment the top texture and finally display segmentation results. The output of the segmentation will be shown below

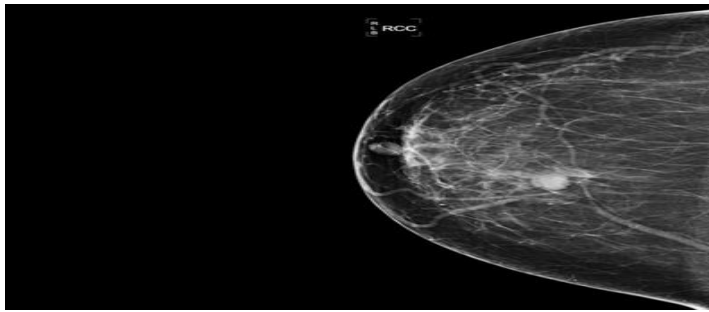


FIG 4.0 ORIGINAL IMAGE (BENIGN)

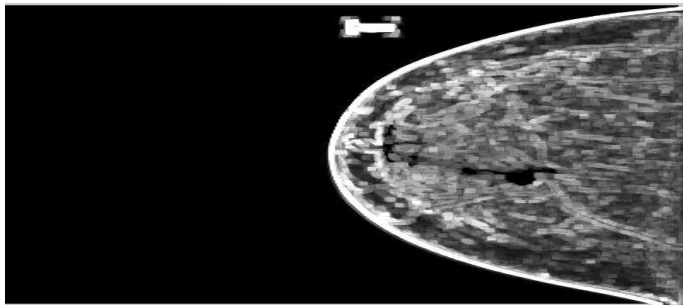


FIG 5.0 SEGMENTED IMAGE(BENIGN)

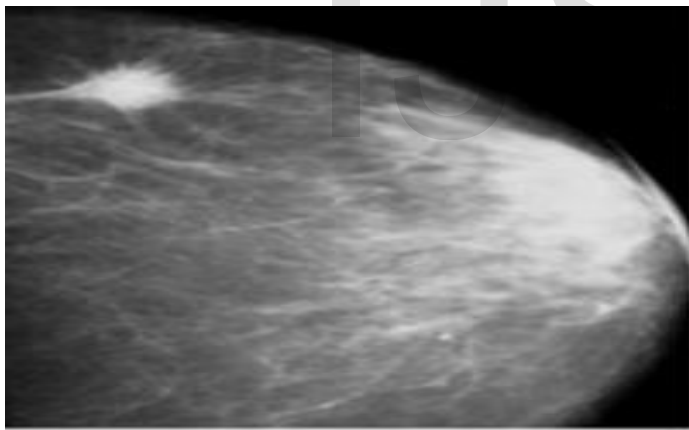


FIG 6.0 ORIGINAL IMAGE(MALIGNANT)



FIG 7.0 SEGMENTED IMAGE (MALIGNANT)

This above images are segmented in malignant image and benign image.

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