

Enhancement Process for Detection of Infected Region

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Abstract: Medical images are contaminated with noise and blur which are some of the major sources of image quality degradation during acquisition or transmission. In this we propose an improved technique to reduce blur and noise in medical images (MRI and CT) images by using Gabor wavelet filter finding the infected region with enhance image. Experimental results shows that our method gives comparatively higher Entropy and standard deviation.

Keywords: MRI, CT, infected region.

I. INTRODUCTION

Medical image enhancement technique is very important in the diagnosis process. Enhanced medical images are used by a doctor to help diagnosis and interpretation because medical image qualities are often deteriorated by artifacts which are present in the image. In recent, Medical imaging is the best techniques for detect the diagnosis process. Many diseases are diagnosed by doctors using medical imaging methods. In this proposed method enhance the medical image and find the infected region in the image. Image enhancement is the process for enhance the image by using the filter. In this proposed work used the Gabor filter wavelet for enhance the image.

The comparison between the input image and the enhance image is shows the values of enhance image with infected region are higher than the input image. Comparing to the existing method, proposed method have high entropy and standard deviation. Medical image enhancement solve problem of noisy medical image. In the medical field to detect body parts different techniques can be used. Some commonly used scanning techniques are computerized tomography (CT) and magnetic resonance imaging (MRI). Medical images of various body parts taken by using the diagnosis are having their advantages and disadvantages. The CT scan can show the images of the hard tissues like bone. If the images of both the CT scan and MRI scan are combined then the final image will have the advantages of both CT and MRI images. This paper will describe an image enhancement technique to show the infected region in the enhance image.

TABLE 1: COMPARATIVE ANALYSIS OF VARIOUS METHODS.

Sr. No.	Author	Method	Advantage	Disadvantage
1.	Tamalika Chaira	Type II fuzzy set	When the value of fuzzy membership function increases then quality of image also increases.	Enhance image is less than original image.
2.	Amir Yavariabadi Chafik Samir Adrien Bartoli	Enhancement based on Discrete Wavelet transform	high frequency sub-band images obtained	Used only for low resolution images
3.	Bibo Lu Hui Wang Chunli Miao	local geometrical feature	preserves fine details of medical images	Pixel image fusion is the combination rules for high frequency coefficients, which contain an abundance of image.
4.	Dr. Muna F. Al-Samaraie Dr. Nedhal Abdul Majied Al Saiyd	wavelet transforms and Haar transform	Decompose high frequency image	Uses two levels of transformation
5.	Shirkant Burje Dr.Saurabh Rungta, Dr.Anupam Shukla	Hybrid approach based on GA	robust easy to operate, non-invasive and inexpensive.	necessitates fresh training each time whenever there is a Change in image database.
6.	Faisal G. Mohammed Huda M. Rada	Sobel filter	Apply on low luminance medical x-ray images	Not apply on high luminance medical images
7.	Yashu Rajput Vishwashvar Singh Rajput	Wavelet & Histogram Equalization	enhance the contrast level	Binary decomposition with different time frequency with different time frequency

II. LITERATURE REVIEW

To studied the concept of the medical image enhancement I have survey some papers. Various enhancements method are present to enhance the image.

Some enhancement methods are listed below in tabular format.

III. PROPOSE WORK

- **Input Image:** first take input image. The image which takes somewhat blur, noisy.
- **Extract ROI:** Select region of interest for detection of infected region. The image is split in important section which is used in the detection for infected region.

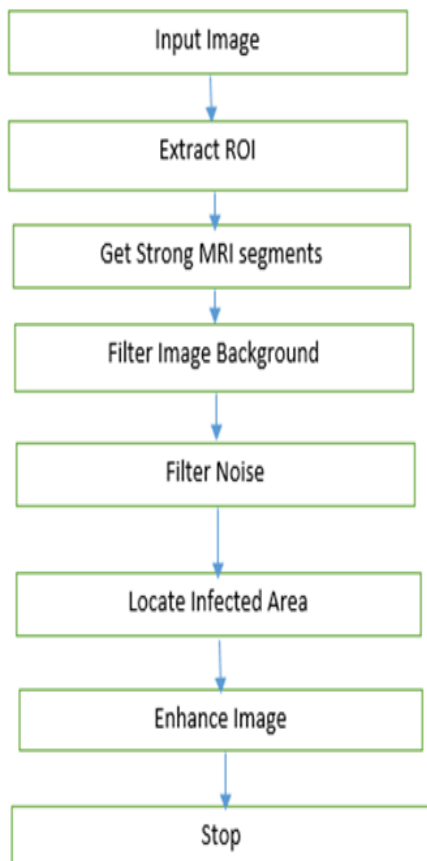


Fig 1: Flowchart of Proposed system

- **Get Strong MRI segments:** Image can be divided into several parts to detect the infected region. In this step take those part of image which represents the whole image
- **Filter Image Background:** Read continue 30 pixels of the image when the value of that pixel >30 convert into the green color to remove unwanted region
- **Filter Noise:** Takes the R, G, B values of pixels and maintain each pixel in average range (0 to 255).To remove the black and white spot in that image.
- **Locate Infected Area:** Read each pixel of the image values which are near to range of 245 to 255 then convert that pixel into 255(white) to show the infected region.
- **Enhance Image:** In this step for enhancing the image use Gabor wavelet. Wavelet use enhance factor for set the values of pixels. The enhance image is the final image with the infected region.

Algorithm for upgrading the pixels value.
These are the following steps to upgrade the pixels value.

1. Start
2. Input image.
3. Read R,G,B
 - for i=1 to I H*W
 - R= I(R)
 - G= I(G)
 - B= I(B)
 - R'=R+R*.E.F.
 - G'=G+G*.E.F.

$$B' = B + B * E.F$$

$$P_i' = R' || G' || B'$$

Set the P_i to EnI

4. Stop

IV. ARCITECTURE OF PROPOSED SYSTEM

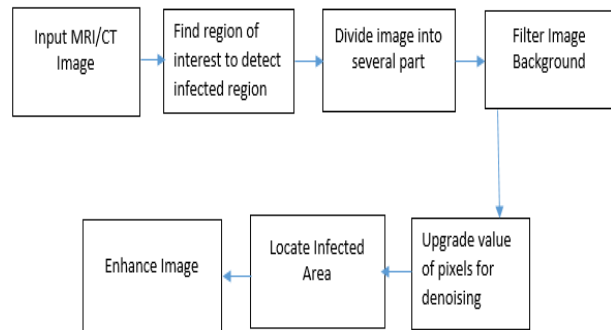


Fig 2: System Architecture

A. Select MRI/CT Image.

In multimodal medical image first take input as a bone fracture image. The image which takes somewhat blur, noisy and colourless image. MRI images are being used from a long time to image the internal structure of human body. It is one of the most widely used diagnostic tools in the field of medicine. MRI medical imaging technique used in radiology to visualize detailed internal structures.



Fig3: Extract Region of Interest.

For finding the infected region in medical images firstly detect the region of interest of that image. Find those area of that image which represents the whole image. In this section splitting of image is done for proper detection of infected region.

B. Segmentation

Segmentation is a method of calculations. The results partitioning a image into several segments. The method show that the algorithm is purpose of segmentation.

Segmentation make the image simpler or change not only efficient in enhancing the image but also demonstration of an image. This section select the part of image detection and add into database.

C. Filter Image Background.

To detect the infected region select the strong part of that image then remove the unwanted region of the image. For filtering background upgrade the pixels values of the image. In this process unwanted region turns into green color.

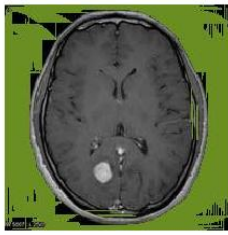


Fig 4: Background Remove Image

D. Denoising.

For enhancing the image remove the noise which are present in the image. Denoising is used to enhance the image.

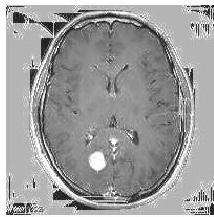


Fig 5: Noise Filter Image

E. Locate Infected Area.

After pixels up gradation the RGB values of the pixels are not equals. So the whiter section of the image which are lie in between 245 to 255 are denote as the infected area.

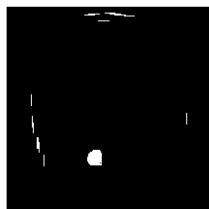


Fig 6: Infected Region

F. Enhance Image

In final process obtain the enhance image with infected region which is compare to the input image and show which region of the image is infected.



Fig 7: Enhance Image with Infected Region

V. RESULT AND DISCUSSION

This chapter focuses on the results of the implemented work on enhancement images with infected region. In this project work various forms of images are specially taken as input. On these images various operations are applied. This system used Gabor wavelet for enhancing the image and show the reflected region.

The test images have been enhanced using proposed algorithm, Gabor wavelet filter. Enhancement techniques produced following results in figure3 to figure 7.

Step 1-takes the input image for processing as shown in figure 3.

Step 2-this step represents the filter image background, remove unwanted region which are not use for detection of infected region as shown in figure 4.

Step 3-this step represents the noise removal image for enhance the image as shown in figure 5.

Step 4-this step show the infected region with whiter color in that noise removal image as shown in figure 6.

Step 5- this is final image step enhance image with the infected region as shown in figure 7.

TABLE 2: COMPARISON BETWEEN INPUT AND OUTPUT IMAGES

Sr no.	Image	EN	STD	MEAN
1	Img35.jpg (input)	5.44	43.91	47.68
	Img35.jpg (output)	5.91	71.77	79.17
2	Img13.jpg (input)	5.71	47.22	47.87
	Img13.jpg (output)	6.15	69.24	72.46

TABLE 3: COMPARISON OF EXISTING AND PROPOSED METHOD

Sr no.	Method	EN	STD
1	EM	5.36	61.91
	PM	14.70	90.91
2	EM	6.60	69.05
	PM	15.66	94.88

Above table is the comparison of existing method (EM) and proposed method (PM). Existing method is Adaptive enhancement method. Our proposed method results are better than the existing method.

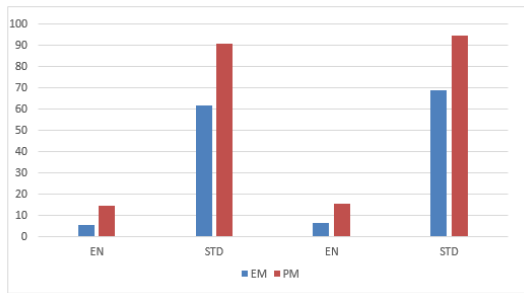
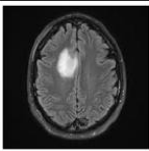
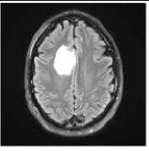
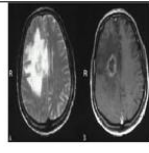
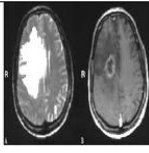
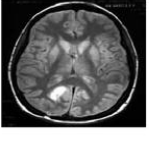
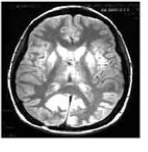


Fig 8: Chart of EM and PM

The above table represents Entropy and Standard deviation of existing method (EM) and proposed method (PM). The Entropy and Standard deviation of proposed method is high than the existing method. Existing method is Adaptive enhancement method.

TABLE 4: VARIOUS TEST IMAGES

images	Input image	Output image
Img16.jpg		
Img8.jpg		
Img32.jpg		

The above table represents the input and output of various test images.

VI. CONCLUSION

In this work, enhancement of multimodal medical image scheme using Gabor wavelet filter image is enhance with infected region. In the proposed algorithm, input images is extracted with region of interest, then divide that image into several parts and take those part of image which represents the whole image of finding the infected region. For enhancing upgrade pixels value of that image and calculate the values of each component by using enhance factor. Finally enhance image show with infected region with some parameters. The qualitative and quantitative analysis shows that the proposed method produce better enhance output. The superiority of the proposed algorithm is compared with Adaptive Enhancement [16] and the performance is evaluated with the qualitative analytical measurement of mutual information between input and output images, entropy, standard deviation. The performance measures proven that, the proposed method is better method to obtain more information in enhance image with infected region.

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