Pancreatic Cancer Using Image Processing

A.krishnaveni , Leenaprema kumari

Fatima college, India

ABSTRACT:

Image enhancement is one of the challenging issues in image processing. The objective of Image enhancement is to process an image so that result is more suitable than original image for specific application. Digital image enhancement techniques provide a lot of choices for improving the visual quality of images. Appropriate choice of such techniques is greatly influenced by the imaging modality, task at hand and viewing conditions. This paper will provide an overview and analysis of different techniques commonly used for image enhancementand presented which technique is used in pancreatic cancer image.

Key points— Digital Image Processing, Histogram, and Image Enhancement.

1.INTRODUCTION

Digital image processing is a broad subject and often involves procedures which can be mathematically complex, but central idea behind digital image processing is quite simple. The ultimate aim of image processing is to use data contained in the image to enable the system to understand, recognize and interpret the processed information available from the image pattern.

Generally, image enhancement techniques is used to analysis the details to highlight the certain features of image. Image enhancement is used different areas of medical science and engineering. Image enhancement has advanced in variety of field.It approaches of histogram technique, contrast stretching, transformation and masking.

Pancreatic cancer is the major cancer and more effective cancer. The symptoms of pancreatic cancer are vague and abdominal conditions or back pain, weight loss and diabetes. Generally it takes a time of these symptoms. Most of patients are diagnosed with pancreatic cancer after it reaches a stages surgery is not possible. A lot of research detection of brain cancer, lung cancer, breast cancer, skin cancer and liver cancer etc. these images are pre-processed using image processing techniques and then a basic classifier is used to classify the tumor area in the image.

2.METHODOLOGY

2.1 HISTOGRAM:

 Histogram is used for analysis a graphical representation of a digital image. In horizontal axis of the graph is used to represent the variations and vertical axis is used to number of pixels in that particular pixel .Dark and black areas are represented the left side of horizontal axis and middle axis are represented in medium grey and vertical axis represented in size of area. The fig.1 (a) Original image and (b) Result of histogram image
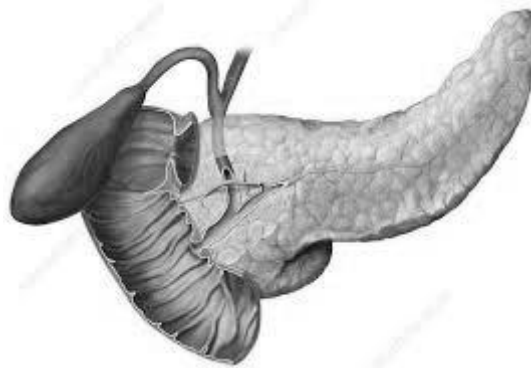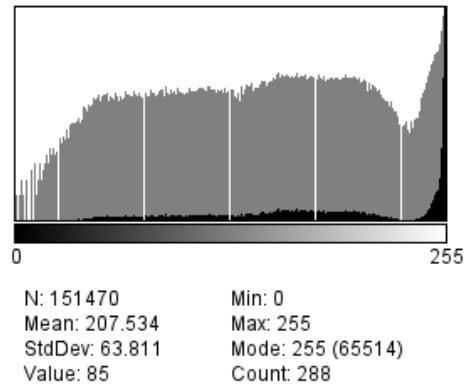

Fig.1 (a)

N: 151470   Min: 0
Mean: 207.534   Max: 255
StdDev: 63.811   Mode: 255 (65514)
Value: 85   Count: 288

Fig.1 (b)

2.2 IMAGE ENHANCEMENT:

Image enhancement is the process of manipulating a stored image using software. The tools used for image enhancement include many different kinds of software such as filters, histogram and other tools for changing the entire image or part of the image. The fig.2 (a) Original image (b) Result of enhance image
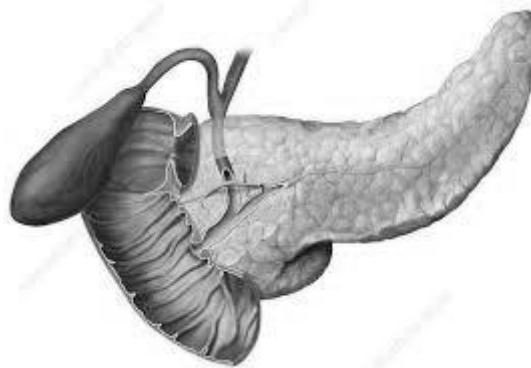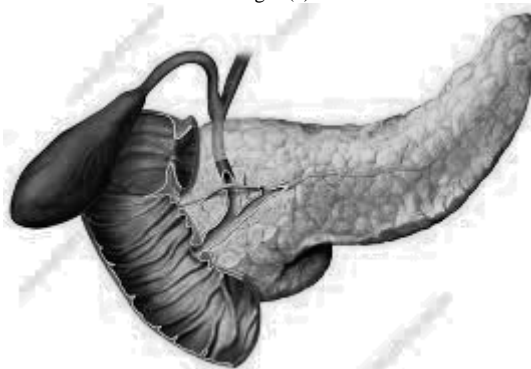

Fig.2 (a)

Fig.2 (b)

2.3 LOG TRANSFORMATION:

The log transformation maps a narrow range of low input grey level values into a wider range of output values. The inverse log transformation performs the opposite transformation. Log functions are useful for when the input grey level values may have extremely large range of values. It has dynamic range of values in processed image for exceeds the capability of the image, in this case only the brightest parts of the images are visible on the display screen. To solve this problem an effective way to compress the dynamic range of pixel values is to use the Log Transformations, which is given by, $s = c\log(1 + r)$ Where c is constant and it is assumed that $r \geq 0$. This transformation maps a narrow range of low-level grey scale intensities into a wider range of output values. Log Transformations is used to expand values of dark pixels and compress values of bright pixels. The fig.3 (a) Original Image (b) Result of log transformation image
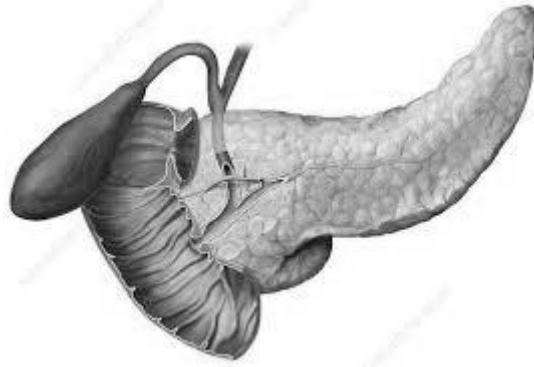
Fig.3 (a)

Fig.3 (b)

2.4 UN-SHARP MASKING:

Un-sharp masking approach for image enhancement, a fraction of the high-pass filtered image is added to the original one to form the enhanced image. The input/output relation for the un-sharp masking filter can be written as follows, Where are the inputs, output images and is a positive constant which controls the fraction of the high-pass filtered image z to be added to the input image. The fig.4 (a) Original Image (b) Result of Un-sharp Mask
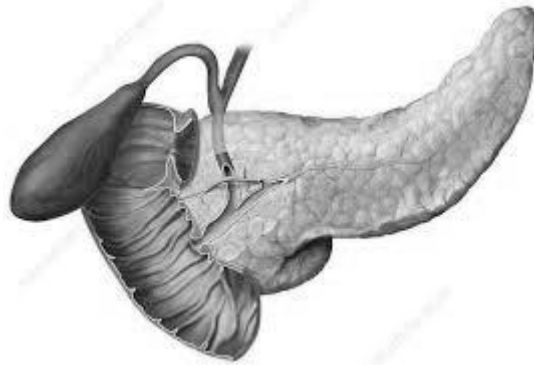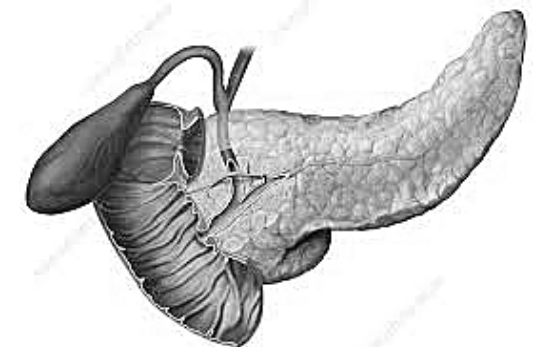

Fig.4 (a)

Fig.4 (b)

2.5 NOISE FILTER:

Noise filter is used to variation of brightness or color transformation in images and is usually produced by the image sensor and scanner or digital camera. "Impulsive noise" is called salt and pepper noise or spike noise. It contains dark pixels in bright regions and bright pixels in dark regions. In sometimes we add noise filter in particular image. The fig.5 (a) Original Image (b) Result of the salt and pepper filter
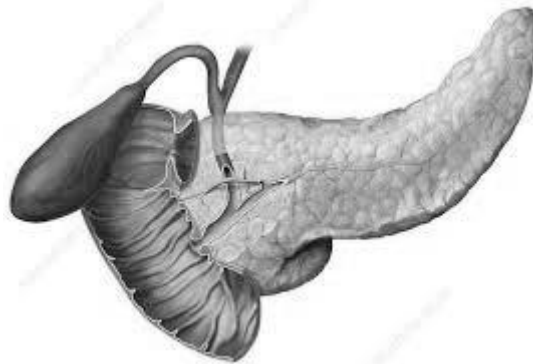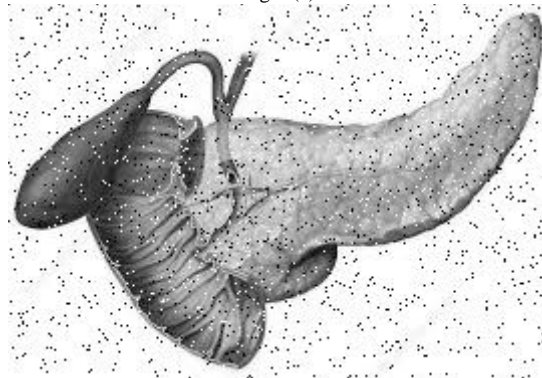

Fig.5 (a)

Fig.5 (b)

2.6 EDGE DETECTION:

Edge detection is significant local changes of intensity in a digital image. Edge can be defined as a set of connected pixels that forms a boundary between two disjoint regions. It has segmenting an image into regions of discontinuity. It is widely used techniques in digital image processing like pattern recognition, image morphology and feature extraction. Edge detection allows users to observe the features of a images for a significant change in the grey level. It reduces the amount of data in an image and preserves the structural properties of images. The fig.6 (a) Original of the image (b) Result of the edge detection
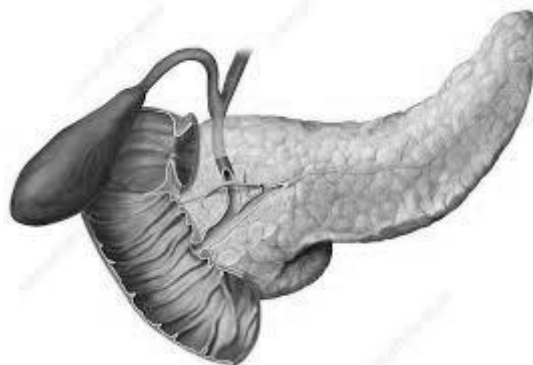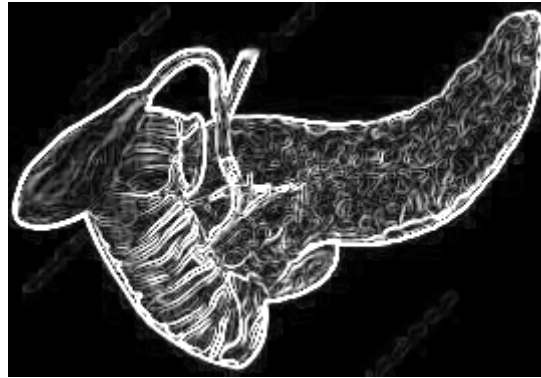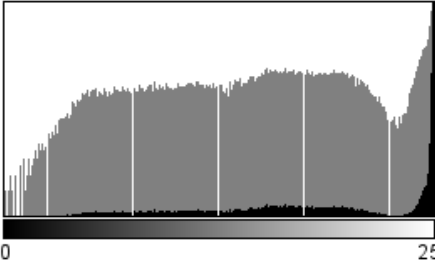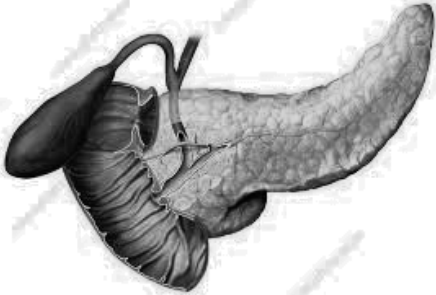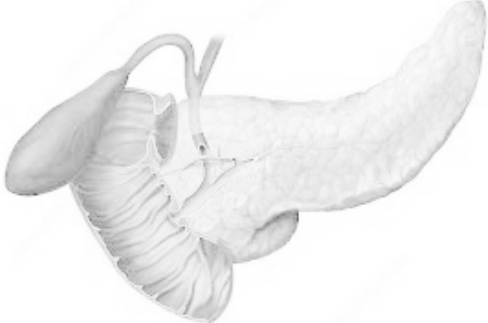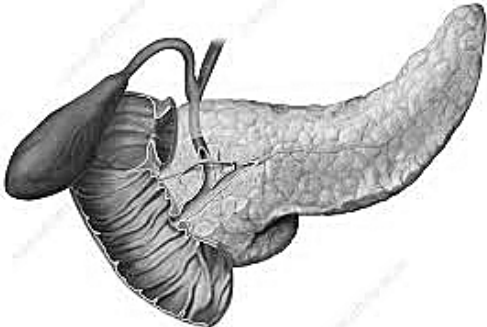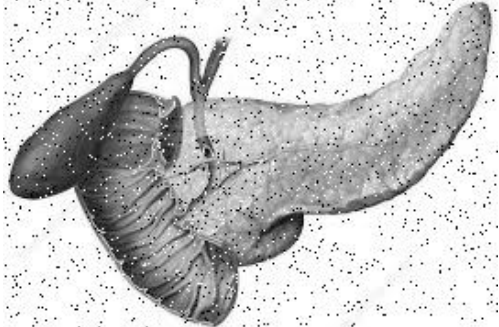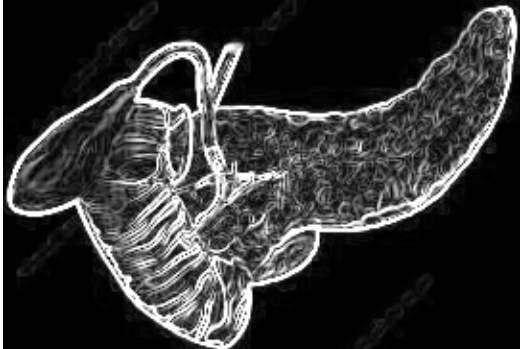

Fig.6 (a)

Fig.6 (b)

2.7 COMPARATIVE ANALYSIS OF IMAGE PROCESSING TECHNIQUES

IMAGE PROCESSING TECHNIQUES	RESULT OF IMAGE PROCESSING TECHNIQUES
1. **HISTOGRAM:** Histogram is the graphical representation. It analysis horizontal axis and vertical axis. It gives a range of the value in the particular image. It approaches frequency of occurrence of each grey level value.	
2. **IMAGE ENHANCEMENT:** Image enhance is used analysis the key features and adjusting the process of the image. It can remove noise, brighten and sharpen the image. In image enhancement is used for algorithms such as de-blurring, filtering and contrast methods.	

3.	**LOG TRANSFORMATION:**Inlog transformation is used to dark pixels are compared to higher pixel values and compressed the pixels. In s=c log(r+1) s and r are the pixel values and c is constant. In value 1 is added to each pixel value because if pixel intensity is zero in the image and log(0) is infinity so it have minimum value is added.	
4.	**UN-SHARP MASKING:** It is used to change the relative highpass image by subtracting the low pass image or blurred image. In un-sharp masking a blurred images is subtracting from the original image to get the edges only and result is added to the original image.	
5.	**NOISE FILTER:**In noise filter it as many types and one of the types are salt and pepper noise. In salt noise refer as image by addition of random bright with 255 pixel of the image and pepper noise refer as image by addition of random dark with 0 pixel of the image. In salt and pepper noise is added to an image by addition of both random dark and bright of the image. It is also called as data drop noise.	
6.	**EDGE DETECTION:** Edge detection is used to detect the location and presence of edges by making changes in the intensity of an image. It has used different operations in image processing to detect the edges. It can detect the variation of grey levels and gives a response when a noise is detected. In this type of filter is applied to extract the edge points and sudden changes in an image. The edge of an image contour across the brightness of the image.	

4.CONCLUSION

This paper surveys some of the areas where image enhancement is done. This paper presents the most important techniques for image enhancement in digital image processing for grey scale images. Above table shows those different techniques and their advantages.Although this paper did not discuss the computational cost of enhancement techniques it may play a critical role in choosing a technique for real time applications. Despite the effectiveness of each of these algorithms when applied separately, in practice one has to devise a combination of such methods to achieve more effective image enhancement.

REFERENCES

- https://www.sciencedirect.com/science/article/pii/S1877050915007309#:~:text=Pancreatic%20Tumor%20Detection%20Using%20Image%20Processing%E2%98%86&text=It%20uses%20image%20processing%20techniques,detecting%20tumour%20is%20around%2060%25.
- https://jpinfotech.org/pancreatic-tumor-detection-using-image-processing
- https://www.google.com/imgres?imgurl=https%3A%2F%2Fpathology.jhu.edu%2Fbuild%2Fassets%2Fpancreas%2F_img400400%2Fspirallabel.jpg&imgrefurl=https%3A%2F%2Fpathology.jhu.edu%2Fpancreas%2Fdiagnosis&tbnid=M7IAWxFd7fvOTM&vet=12ahUKEwj8366Wy6L6AhWu_TgGHbY2DsEQMyg9egQIARBZ..i&docid=q1UgBwMbE9aanM&w=400&h=324&q=pancreatic%20cancer%20in%20image%20processing%20techniques&ved=2ahUKEwj8366Wy6L6AhWu_TgGHbY2DsEQMyg9egQIARBZ
- https://www.mathworks.com/discovery/image-enhancement.html#:~:text=Image%20enhancement%20is%20the%20process,easier%20to%20identify%20key%20features.

BIBILOGRAPHY:

- https://www.image-engineering.de/library/image-quality/factors/1080-noise
- https://medium.com/image-vision/noise-in-digital-image-processing-55357c9fab71
- https://www.mygreatlearning.com/blog/introduction-to-edge-detection/
- https://www.javatpoint.com/dip-concept-of-edge-detection
- https://www.sciencedirect.com/topics/engineering/image-histogram#:~:text=Histogram%20Approach,equal%20to%201024%20%C3%97%201024.
- https://homepages.inf.ed.ac.uk/rbf/HIPR2/unsharp.htm
- https://www.tutorialspoint.com/dip/image_transformations.html