



Applying Image Processing Techniques in Lung Cancer

¹Priyanka, ²Leena Prema Kumari

^{1,2} Fatima College

ABSTRACT:

In this paper we study the methodology employed for preprocessing the lung cancer image. The various image preprocessing technique is covered in this paper. The various methods are Gaussian blur filter, Gamma correction, histogram, Edges detection, sharpening, smoothening are applied in lung cancer image.

1. INTRODUCTION

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Image processing is among rapidly growing technologies. It forms core research area within engineering and computer science disciplines too. Image processing basically includes the three steps:

- Importing the image via image acquisition tools
- Analyzing and manipulating the image
- Output in which result can be altered image or report that is based on image analysis

There are two types of methods used for image processing namely, analogue and digital image processing. Analogue image processing can be used for the hard copies like printouts and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques. Digital image processing techniques help in manipulation of the digital images by using computers. The three general phases that all types of data have to undergo while using digital technique are pre-processing, enhancement, and display, information extraction.

2. IMAGE PROCESSING TECHNIQUES

Classification of Image Processing techniques are:

2.1 IMAGE PREPROCESSING

Image pre-processing is the name for operations on images at the lowest level of abstraction whose aim is an improvement of the image data that suppress undesired distortions or enhances some image features important for further processing. It does not increase image information content Image preprocessing are the steps taken to format images before they are used by model training and inference. This includes, but is not limited to, resizing, orienting, and color corrections.

2.2 IMAGE ENHANCEMENT

Image enhancement approaches fall into two categories: spatial domain and frequency domain methods. The term spatial domain refers to the image plane itself, and approaches in this category are based on direct manipulation of pixels in an image. Spatial domain methods are procedure that operate directly on these pixels Frequency domain processing techniques are based on modifying the fourier transform of an image. Enhancing an image provides better contrast and a more detailed image as compute to non-enhanced image. Image enhancement has very good applications. It is used to enhance medical images, images captured in remote sensing, images from satellite.

2.3 IMAGE ANALYSIS

Image analysis involves processing an image into fundamental components to extract meaningful information. Image analysis can include tasks such as finding shapes, detecting edges, removing noise, counting objects, and calculating statistics for texture analysis or image quality.

2.4 IMAGE REPRESENTATION

Digital image is a finite collection of discrete samples of any observable object. The pixels represent a two or higher dimensional view of the object, each pixel having its own discrete value in a finite range. The pixel values may represent the amount of visible light, infrared light, absorption of x-rays, electrons, or any other measurable value such as ultrasound wave impulses. The image does not need to have any visual sense; it is sufficient that the samples form a two-dimensional spatial structure that may be illustrated as an image. The images may be obtained by a digital camera, scanner, electron microscope, ultrasound stethoscope, or any other optical sensor. Examples of digital image are: digital photographs, satellite images, radiological images, binary images, computer graphics.

2.5 IMAGE COMPRESSION

Image compression deals with reducing the amount of data required to represent a digital image by removing of redundant data. Image compression is used to represent a quality of information. The main goal is to save storage space and shorten transmission time, as well as the human visual system tolerance to a modest amount of loss, have been the driving factors behind image compression techniques.

It Uses Gaussian kernel for convolution and good at removing Gaussian noise from the image. It is much faster compared to other Blurring techniques but fails to preserve edges which may affect OCR output.

3. IMAGE PROCESSING TECHNIQUES USED HERE

Image Pre-processing is to improve the quality of the image so that we can analyze it in a better way. By Preprocessing we can suppress undesired distortions and enhance some features which are necessary for the particular application we are working for. Those features might vary for different application. Image Pre-processing techniques are:

3.1 GAMMA CORRECTION

Gamma correction is a non-linear adjustment to individual pixel values. While in image normalization we carried out linear operations on individual pixels, such as scalar multiplication and addition/subtraction, gamma correction carries out a non-linear operation on the source image pixels, and can cause saturation of the image being altered.

3.2 HISTOGRAM

A histogram of an image is the representation of the intensity vs the number of pixels with that intensity. For example, a dark image will have many pixels which are black and few which are white. Representing that like a graph is what is called a histogram.

3.3 EDGE DETECTION

Edge detection is a technique of image processing used to identify points in a digital image with discontinuities, simply to say sharp changes in the image brightness. These points where the image brightness varies sharply are called the edges of the image.

3.4 SHARPENING

Image sharpening is an effect applied to digital image to give them a sharper appearance. Sharpening enhances the definition of edges in an image. The dull images are those which are poor at edges.

3.5 SMOOTHENING

Image smoothening is a digital image processing technique that reduces and suppresses image noises.

4. LITERATURE REVIEWS




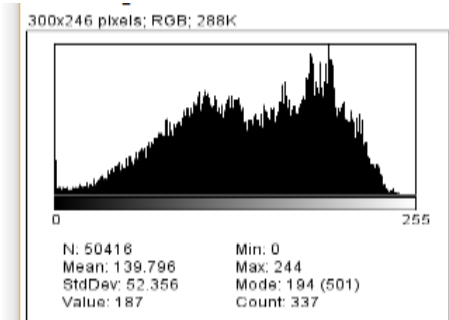

https://www.researchgate.net/publication/332446782_Lung_Cancer_Detection_Using_Digital_Image_Processing_Techniques_A_Review

<https://www.theguardian.com/business/2015/nov/13/astrazeneca-lung-cancer-drug-given-green-light-in-us>

<https://www.ijana.in/Special%20Issue/TPID20.pdf>

Digital image processing- Rafeal C. Gonzalez, Richard E. woods, 3rd Edition, Pearson, 2008

5. RESULT

	<p>GAUSSIAN BLUR</p>	
	<p>GAMMA CORRECTION</p>	
	<p>HISTOGRAM</p>	 <p>300x246 pixels; RGB; 288K</p> <p>N: 50416 Min: 0 Mean: 139.796 Max: 244 StdDev: 52.356 Mode: 184 (501) Value: 187 Count: 337</p>
	<p>EDGE DETECTION</p>	



	SHARPEN	
	SMOOTHEN	

TABLE 1. DIFFERENT IMAGE PREPROCESSING TECHNIQUES

6. CONCLUSION

In this paper, we say different kinds of pre-processing methods which is applied in lung cancer image. One of the image pre-processing techniques which is used to make the image a sharpen one and it makes the diagnostics a perfect and accurate for finding the affected parts.

BIBLIOGRAPHY

- <https://www.google.com/search?q=image+preprocessing+techniques&oq=image+preprocess&aqs=chrome.1.0i51213j69i57j0i51215.10959j0j7&client=ms-android-oppo&sourceid=chrome-mobile&ie=UTF-8>
- <https://neptune.ai/blog/what-image-processing-techniques-are-actually-used-in-the-ml-industry>
- <https://www.google.com/search?q=image+analysis+in+image+processing&oq=image+analysis&aqs=chrome.1.69i57j0i51217.7481j0j7&client=ms-android-oppo&sourceid=chrome-mobile&ie=UTF-8>
- https://www.google.com/search?q=lung+cancer+images&tbm=isch&chips=q:lung+cancer+images,g_1:xray:MLuYjtROxdc%3D&rlz=1C1JJTC_enIN970IN970&hl=en&sa=X&ved=2ahUKEwjJvaeN4_j5AhWq_zgGHXNEAM8Q4IYoAXoECAEQJQ&biw=1349&bih=568#imgrc=ALCELIfe_gT6xM
- https://www.google.com/search?q=image+preprocessing+techniques&rlz=1C1JJTC_enIN970IN970&oq=&aqs=chrome.0.69i59i45018.70337684j0j15&sourceid=chrome&ie=UTF-8