Analysis for detection and diagnosis from lungs CT scan images by using neural network technique

Rutika Hirpara

Biomedical Department, Government engineering college, sector-28, Gandhinagar, Gujarat

Abstract: Early detection of lung cancer is very important for successful treatment. Diagnosis is mostly based on CT images. early symptoms of the diseases,appearing in patients' lungs We are aiming at computerizing these selections. By using neural network technique lung cancer images and its database in basic stages to achieve more quality and accuracy in our experimental results: pre-processingstage(enhancement,smoothing,segmentation),feature Extraction(morphological) stage andLung cancer identification in tumor is benign condition or malignant condition.

Key words:CT, Lung cancer, enhancement, segmentation, morphological

Introduction: Lung tumor detection system uses convolution filters with Gaussian pulse to smooth the cell images. The contrast and color of the images are enhanced. Then the nucleuses in the images are segmented by thresholding. All of those are simple digital image processing techniques. In the image Pre-processing stage we started with image enhancement by using Gobor filter. Image segmentation is an essential process for most image analysis subsequent tasks. Neural network technique for image description and recognition depend highly on the segmentation results and train the dataset. Thresholding is one of the most powerful tools for image segmentation. The segmented image obtained from Thresholding has the advantages of smaller storage space, fast processing speed and ease in manipulation, compared with gray level image which usually contains 256 levels.

Methodology:

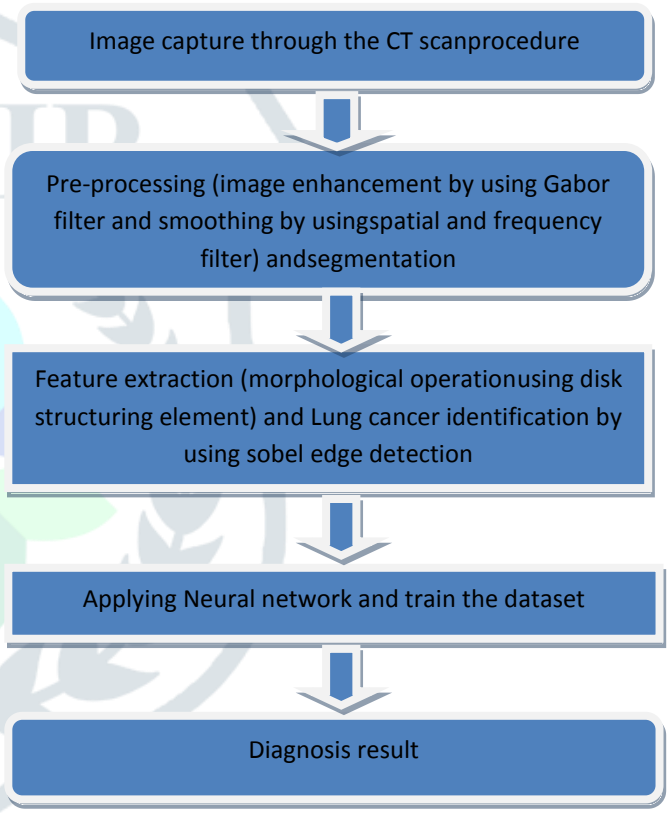


Fig.1 methodology of neural network technique

Image enhancement:

Image enhancement as away to improve the quality of image, so that the resultant image is better than the original one, the process of improving the quality of a digitally stored image by manipulating the image with MATLAB™ software.Spatial domain techniques, which operate directly on pixels.Frequency domain techniques, which operate on the Fourier transform of an image.

Gabor filter enhancement technique

A Gabor filter is a linear filter whose impulse response is defined by a harmonic function multiplied by a Gaussian function. Because of the multiplication-convolution property the Fourier transform of a Gabor filter's impulse response is the convolution of the Fourier transform of the harmonic function and the Fourier transform of the Gaussian function.

Fig:2 Original image

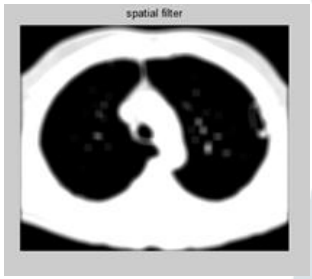


Fig:3 Image enhancement by using gabor filter

Image segmentation:

The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.

Neural network technique:

An artificial neural network is an interconnected group of nodes, related to the wide network of neurons in a brain. Here, each circular node denotes an artificial neuron and an arrow stand for a connection from the output of one neuron to the input of another.

In machine learning, artificial neural networks (ANNs) are a family of statistical learning algorithms inspired by biological neural networks and are used to estimate or approximate functions that can depend on a large number of inputs and are mostly unknown. Artificial neural networks are mostly presented as systems of interconnected "neurons" which can compute values from inputs, and are adequate of machine learning as well as pattern recognition.

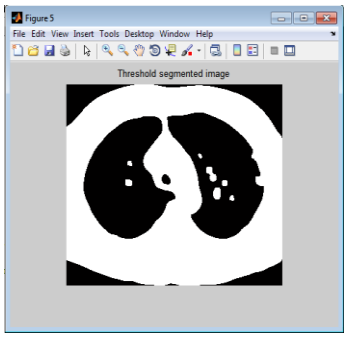


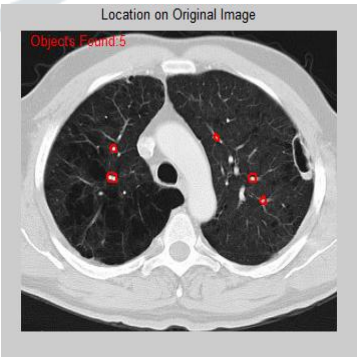
Fig.4 Segmentation: threshold by region growing algorithm

Feature extraction:

The Image features Extraction stage in algorithms and techniques to detect and isolate various desired portions or shapes of an image.The extracted morphologic features include the perimeter, area,roundness, and rectangleness of the nucleus and using erosion and dilation structuring element.lung cancer cell identification in using sobel edge detection algorithm, to set gradient value.If there are cancer cells, the cancer cell type is identified and find the location on origional image.

MORPHOLOGIC: The extracted morphologic features include the perimeter, area, roundness, and rectangleness of the nucleus and using erosion and dilation structuring element.

Result:



(Output)

Conclusion:

Computer aided diagnosis (CAD) system to detect cancerous cell in CT scan images. This CAD system comprises four stages: pre-processing, evaluating region of interest, feature extraction, final classification using ANN. To get better accuracy by using neural network technique.

Acknowledgement

I would like to express my special thanks of gratitude to my teacher as well as our principal who gave me the golden opportunity to do this wonderful project on the topic Analysis for detection and diagnosis from lungs CT scan images by using neural network techniquewhich also helped me in doing a lot of Research and i came to know about so many new things I am really thankful to them. Secondly i would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

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