ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Detection of the Lung Cancer by Using the Wiener Filter with K'means Segmentation Algorithm.

[1] Amancha Rakesh, [2]K Malathi*.

[1]UG Student, [2]Assistant Professor, Saveetha School of Engineering, Saveetha University, CHENNAI, Tamil Nadu, India.

ABSTRACT

Abnormal growth of the tissues in the lung is called lung cancer. There two types of lung cancer. Two identify this cancer in the medical field the will use the Gray Scale Image Processing but it is very difficult to identify the cancer. To avoid this problem here I'm using wiener filter with K'means segmentation algorithm, it is very efficient to detect the cancer all the people.

Keywords: Lung Cancer, Wiener Filter, K'means, Canny Edge Detector.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Lung Cancer: Abnormal growth of the tissues in the lung is called lung cancer. Lung cancer is the second most common cancer in all. This cancer is one out of five malignancies in men and one out of nine in the women for every year There are two kinds of lung cancer. 1. Non-Small Cell Lung Cancer (NSCLC) 2. Small Cell Lung Cancer (SCLC).

The aggressiveness of the illness and treatment options depend on the kind of tumour diagnosed. Because there are many types of lung cancer produce swiftly and range quickly and because the lungs are vital structures, main detection and punctual treatment usually surgery to remove the tumour is critical.

Symptoms: Lung cancer is does not have any cause signs and symptoms but later it may include

1. Coughing blood
2. Breathing problem
3. Chest pain
4. Hoarseness
5. Losing weight without trying
6. Bone pains & Headache

Statics of people who were affecting the people:

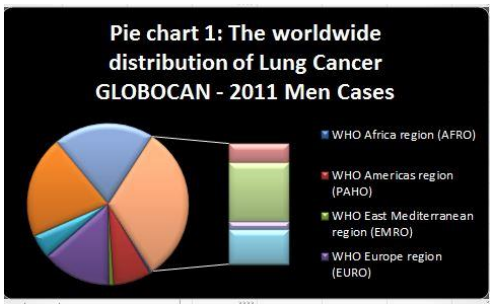

Fig: 1 The Worldwide distribution of Lung Cancer GLOBOCAN

Image processing:

Image processing is a technique to change the image from one form to the other. To obtain good image or information we perform few operations. Normally image process consist 3 steps to perform. They are

i. i. Import the image which is need to process.
ii. Evaluating and handling the image
iii. Outcome is the final stage.
While extracting the original data the digital image processing maybe follows the following steps.

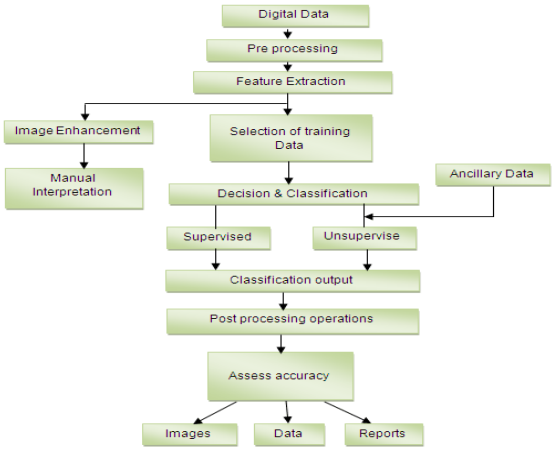

Fig: 2 Architecture Diagram

Purpose of image processing:

The intention of picture processing is categorized into 5 clusters

- Visualisation
- Image improving and renovation
- Image retrieval
- Measurement of pattern
- Image reorganization

Related Work:

Pre- processing, labeled image data and training image registration are not essential. It utilizes just two user defined factors and can be executed in real-time [1][4]. Wiener filter is proven to be competent to de noise noisy images in a broad array of noise levels and produce enhanced performance [2][3]. By integrating segmentation and K-means clustering, these papers are proposes a competent method for automatic brain tumor segmentation for the removal of tumor tissues from MR images. For enhanced performance, segmentation is executed by utilizing K-means clustering algorithm. Thus, contrasted to the supervised segmentation methods, the unsupervised segmentation methods are superior because of the fact that prior processing is vital for the supervised segmentation and additionally substantial amount of training and assessing data commanded that makes the procedure supplementary complicated. Thus in contrast to the commonly used fuzzy clustering methods, the K-Means clustering method is less complicated and enhances the tumor borders more and is very quick [5][6][7][8].

The two algorithms are compared in terms of histogram and probability function, discrete entropy and root mean square of images[9][10]. A technique for supervised description and classification of tumor lesions in brain is proposed in this paper. It is established on the examination of abnormalities at the lesion contour on T2-weighted MR images. Process for segmentation with a threshold chosen from the histogram of intensity levels is applied to segregate the lesion, subsequent the choice of a specific image [11][12]. Watershed algorithm is employed to the image for each region and Canny edge detector is employed to the output image [13].By applying the threshold subsequent of morphological operations are applied on the image. Lastly the image subtraction method is utilized to acquire the tumor region [14][15]. The method discussed in this paper categorizes the irregularity into benign or malignant in an automated way [16].

PROPOSED WORK

Wiener filter:-

Wiener filter was counseled by Wiener in 1940's and published in 1949's. The main aim of wiener filter is to remove the noise, which has corrupted a signal. The design of the wiener filter seizes a disparate approach. One is consented to have vision of the spectral properties of the early gesture and the sound, and one seeks the linear time-invariant filter whose output should come as close to the early gesture as possible. Wiener filters are characterized by the following:

A. Assumption
B. Requirement
C. Performance

K-means segmentation algorithm:-

In this the problem statement divided into number of clusters (k clusters). The main aim is to identify the k-centroids in the image.

ISSN: 0975-8585

Our approach:

In this paper we are retaining wiener filter to notice and produce a guesstimate of a desired part of the image. And K-means clustering algorithm is used to detect the exact location of the brain cancer with the colors. The following steps are involved

Wiener filter:-

1. Load the raw CT-scan image into MATLAB and connect with wiener filter to reduce the noise from the gray scale image.

2. The input of the wiener filter is assumed to a signal $s(t)$, corrupted signal is $n(t)$. The production is $\hat{s}(t)$, designed by the means filter is $g(t)$

$$\hat{s}(t) = (g * [s + n])(t) = \int_{-\infty}^{\infty} g(\tau)\,[s(t-\tau) + n(t-\tau)]\,d\tau,$$

3. Where $s(t)$ is the early gesture and $n(t)$ is the noise, $\hat{s}(t)$ is the approximated gesture (the intention is equal to $s(t+\alpha)$.

Where α of the wiener filter in supplementary words it is an error "difference between estimated gesture and real signal"

4. The error is defined as

$$e(t) = s(t+\alpha) - \hat{s}(t),$$

i. if $\alpha > 0$ then the setback is that of prediction
ii. if $\alpha = 0$ next the setback is that of filtering
iii. if $\alpha < 0$ next the setback is that of flattening

K-Means:

1. C = (1:G)*P / (k+1)

Calculation of distance between centroid and detection

2. d = abs (O (i) – C)

O(i) one dimensional array

3. NC(i) = sum (i.*h(i)) / sum (h(i))

EXPERIMENT AND RESULT

The following figure describes an original CT-scan image which consist the brain tumor in his brain. This is challenging to find by seeing the CT-image. So we are applying our proposed work to find easily.

ISSN: 0975-8585

Fig: 3 CT – Scan Image with Wiener Filter

By applying the wiener filter on the CT-scan image we removed the noises on the CT-scan image

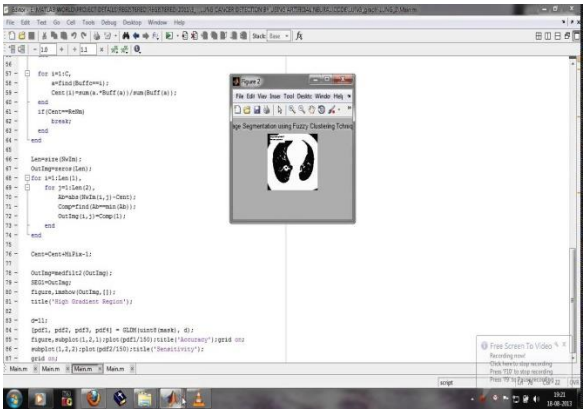

Fig: 4 K – Segmentation Algorithm

Now we are applying the K-means segmentation algorithm to output image of the Wiener filter. After applying the K-means algorithm the area which is affected by the tumor is detected.

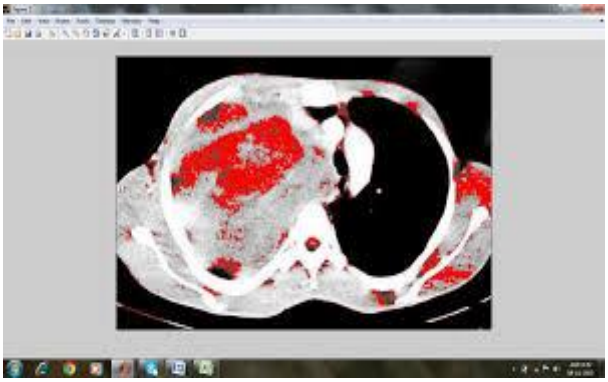

Fig: 5 Lung Cancer Disease Detected

CONCLUSION

In Lung Cancer the abnormal growth of the tissues in the lung is detected. There two types of lung cancer. Two identify this cancer in the medical field the will use the Gray Scale Image Processing but it is very difficult to identify the cancer. To avoid this problem in this paper wiener filter with K'means segmentation algorithm is used, it is very efficient to detect the cancer all the people. The Lung cancer is detected and verified by K'means segmentation algorithm.

REFERENCES

[1] Ray, N.; Saha, B.N.; Graham Brown, M.R., "Locating Brain Tumors from MR Imagery Using Symmetry," Signals, Systems and Computers, 2007, ACSSC 2007.Conference Record of the Forty-First Asilomar Conference on vol., no., pp.224,228, 4-7 Nov.2007 doi: 10.1109/ACSSC.2007.4487200

[2] Suhaila, S.; Shimamura, T., "Power spectrum estimation method for image denoising by frequency domain Wiener filter," Computer and Automation Engineering (ICCAE), 2010 The 2nd International Conference on , vol.3, no., pp.608,612, 26-28 Feb. 2010 doi: 10.1109/ICCAE.2010.5451801

[3] Benesty, J.; Jingdong Chen; Huang, Y.A., "Study of the widely linear Wiener filter for noise reduction," Acoustics Speech and Signal Processing (ICASSP), 2010IEEE International Conference on, vol., no., pp.205,208, 14-19 March 2010

[4] Satheesh, S.; Reddy, A.S.; Prasad, K.V.S.V.R., "Noise suppression using Wiener filtering in the nonsubsampled contourlet domain for Magnetic Resonance brain images" Intelligent Human Computer Interaction (IHCI), 2012 4th International Conference on, vol., no., pp.1,4, 27-29 Dec. 2012 doi: 10.1109/IHCI.2012.6481836

[5] Ming-Ni Wu; Chia-Chen Lin; Chin-Chen Chang, "Brain Tumor Detection Using Color -Based K-Means Clustering Segmentation," Intelligent Information Hiding and Multimedia Signal Processing, 2007. IIHMSP 2007. Third International Conference on, vol.2, no., pp.245, 250, 26-28 Nov. 2007

[6] Vijay, J.; Subhashini, J., "An efficient brain tumor detection methodology using K-means clustering algoriftnn,"

[7] Communications and Signal Processing (ICCSP), 2013 International Conference on , vol., no., pp.653,657, 3-5 April 2013 doi: 10.1109/iccsp.2013.6577136

[8] Bose, S.; Mukherjee, A.; Madhulika; Chakraborty, S.; Samanta, S.; Dey, N., "Parallel image segmentation using multi-threading and k-means algorithm," Computational Intelligence and Computing Research (ICCIC), 2013 IEEE International Conference on, vol., no., pp.1,5, 26-8 Dec. 2013 doi: 10.1109/ICCIC.2013.6724171

[9] Deepak, K.S.; Gokul, K.; Hinduja, R.; Rajkumar, S., "An efficient approach to predict tumor in 2D Brain image using classification techniques," Information Communication and Embedded Systems (ICICES), 2013 International Conference on , vol., no., pp.559,564, 21-2 Feb. 201 doi: 10.1109/ICICES.2013.6508256

[10] Vij, S.; Sharma, S.; Marwaha, C., "Performance evaluation of color image segmentation using K means clustering and watershed technique" Computing, Communications and Networking Technologies (ICCCNT),2013 Fourth International Conference on , vol., no., pp.1,4, 4-6 July 2013 doi: 10.1109/ICCCNT.2013.6726560

[11] Salem, N.M., "Segmentation of white blood cells from microscopic images using K-means clustering," Radio Science Conference (NRSC), 2014 31st National , vol., no., pp.371,376, 28-30 April 2014 doi: 10.1109/NRSC.2014.6835098

[12] Lassouaoui, N.Z.; Hamami, L.; Nouali, N.; Hadjar, S., "Neuron Networks in Recognition the Brain Lesions" Information and Communication Technologies, 2006 ICTTA '06. 2nd , vol.1, no., pp.1779,1784, 0-0 0 doi: 10.1109/ICTTA.2006.1684655

[13] Martin-Landrove, M.; Pereira, D.; Caldeira, M.E.; Itriago, S.; Juliac, M., "Fractal Analysis of Tumoral Lesions in Brain," Engineering in Medicine and Biology Society, 2007. EMBS 2007. 29th Annual International Conference of the IEEE , vol., no., pp.1306,1309, 22-26 Aug. 2007 doi: 10.1109/IEMBS.2007.4352537

[14] Maiti, I.; Chakraborty, M., "A new method for brain tumor segmentation based on watershed and edge detection Algorithms in HSV colour model," Computing and Communication Systems (NCCCS), 2012 National Conference on , vol., no., pp.1,5, 21-22 Nov. 2012 doi: 10.1109/NCCCS.2012.6413020

[15] Kazerooni, A.F.; Ahmadian, A.; Serej, N.D.; Rad, H.S.; Saberi, H.; Yousefi, H.; Farnia, P., "Segmentation of brain tumors in MRI images using multi-scale gradient vector flow," Engineering in Medicine and Biology Society,EMBC, 2011 Annual International Conference of the IEEE , vol., no., pp.7973,7976, Aug. 30 2011-Sept. 3 2011 doi: 10.1109/IEMBS.2011.6091966

[16] Natarajan, P.; Krishnan, N.; Kenkre, N.S.; Nancy, S.; Singh, B.P., "Tumor detection using threshold operation in MRI brain images," Computational Intelligence & Computing Research (ICCIC), 2012 IEEE International Conference on , vol., no., pp.1,4, 18-20 Dec. 2012 doi: 10.1109/ICCIC.2012.6510299

[17] Rajesh, T.; Malar, R.S.M., "Rough set theory and feed forward neural network based brain tumor detection in magnetic resonance images," Advanced Nanomaterials and Emerging Engineering Technologies (ICANMEET), 2013 International Conference on , vol., no., pp.240,244, 24-26 July 2013 doi: 10.1109/ICANMEET.2013.6609287