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DETECTION AUTOMATION OF MALIGNANT NEOPLASM USING CLUSTERING TECHNIQUES WITH MATLAB

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Abstract: Malignant neoplasm is the most common through worldwide that attacks the greatest number of people, which is to be controlled and detected at early stages with necessary treatments. Our current work focus on finding early symptoms of the diseases appearing on this CT images by using modified clustering algorithm approach .We are aiming at computerizing by passing the available lung cancer images and its database in basic three stages to achieve more quality and accuracy in our experimental results.
Keywords: Clustering, CT images, C-Means, Phase identification, Pseudo color image, Tumor

1. Introduction

Lung cancer is a disease characterized by uncontrolled cell growth in tissues of the lung. If left untreated, this growth can spread beyond the lung in a process called metastasis into nearby tissue and eventually, into other parts of the body Parkin, D M [1]. Malignant neoplasm is the primary lung cancer develops from mucus making cells in the lining of the airways. It is often found in the outer areas of the lungsWang CC, Chen M L et al,.[2]. There are different techniques to detect cancer like Ultra sound, MRI, CT scan. All the above methods use the image segmentation D.Judehemanth, D.Selvathi et al.,[3] in which the image of the organ with tumor is diagnosed to detect cancer. In our work we used c-means clustering A.K. Jain, M. N. Murty, et al,[4] algorithm to detect the area of interest using MAT Lab software for detection and automation on CT scan Image samples.

2. Algorithm Design

Algorithm Designing comprises of multiple modules which are resulting in the process of highly accurate outputs of automatic disease identification. Various modules of the algorithm are discussed in the sequential process.

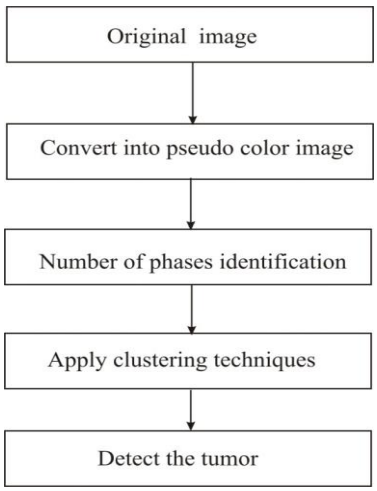

Figure 1: Algorithm processing steps

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2.1 Pseudo Color Image

Representation of image also decides the Speed in the process of retrieving outputs. so there is a huge necessity to convert maximum bit represented image information in to minimal information representation. This necessitates the technique called pseudo-color image processing. This technique involves the process of mapping between original color pixels with a understandable color information by a specific functional table used Kapoor P, Prasad SVAV et al., [5]. This conversion process is easy to understand and store the image. Pseudo-coloring may increase the information contents of the original image.

2.2 Phase Identification

Detection process involves in the greater area segments to identify the objects [6] with necessary sizes which are very small and the identification involves with the consideration of scale terms used by Strong, in the context of total Variation (TV) de-noising [7]. Scale term has to be defined with the relation between the length and the area of objects, and denoted as scale=(area)/(length).

$$S_i := \frac{P(\chi_i)}{|\chi_i|}$$

Where P (Xi) denotes the perimeter of a phase Xi and $|Xi|$ denotes the 2-D area of a phase Xi. By minimizing this term, the segmentation favors phases with large areas. M. Jung, S. H. Kang e tal.,[8].

2.3 clustering

It is a process of grouping of data with characteristic similarity .The division of data is done with objects [9] our clustering process focus on the distance functions to find the similarity of two objects in the data set.

2.4 C-Means

The c-means algorithm is most similar as, k-means algorithm. The better benefit of the c-means usage in our work is minimization of objective function [10].Feature vector to have multiple membership grades to multiple clusters [11, 12] and effective grouping data point with suitable clusters.

3. Results

The below results shows the automation detection process of Malignant neoplasm in the CT images with effective segmented quality and clustering.

4. Conclusion

This paper presents a new unsupervised multiphase segmentation with automatic stable number of reasonable phases K. This algorithm can be most preferable for medical experts in identifying the tumors because of effective clustering technique of segmentation implemented in the algorithm .In addition to this features with high processing and précised grouping in critical medical images requirement the modified CM algorithm can be suggested.

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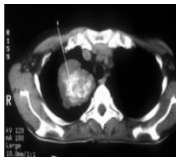
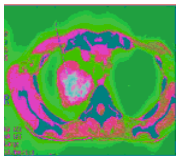
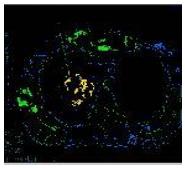
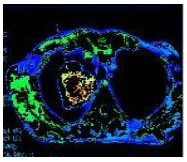
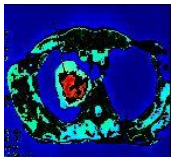
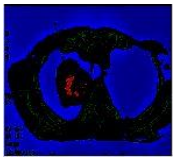
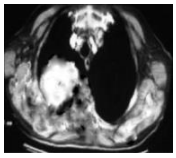
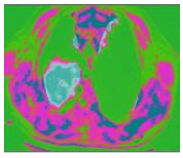
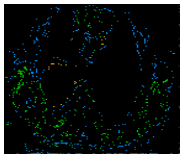
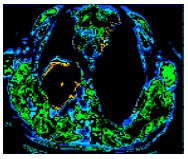
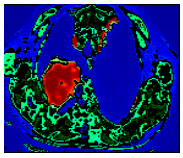
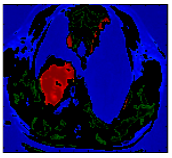
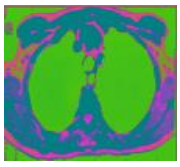
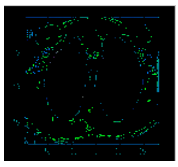
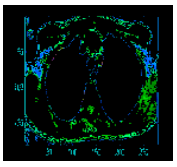
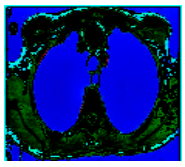
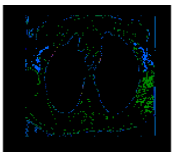
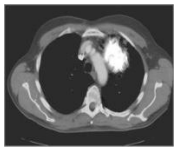
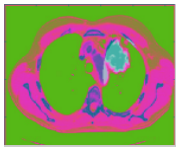
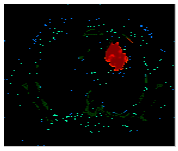
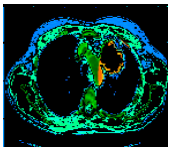
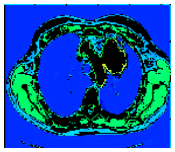
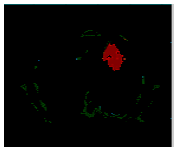
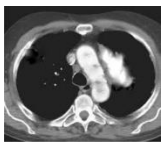
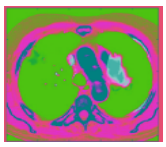
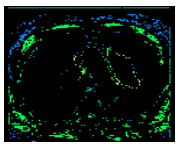
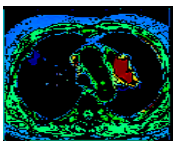
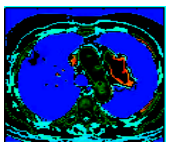
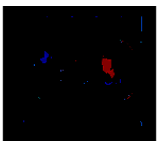
Original image	Multiphase Segmentation	Objects in cluster 1	Objects in cluster 2	Objects in cluster 3	Segmented image
					
					
					
					
					

Figure 2: Phases of tumour detection using MATLAB

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