ANALYSIS OF IMAGE PRE-PROCESSING USING VARIOUS METHODS

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Abstract : Preprocessing is a significant operation in image analysis using CAD system and is a personal preference of a researches or software developer. The process to be implemented and the hierarchy of execution are determined by the programmer. Main objective of preprocessing is to remove unwanted artifacts and to increase the quality of MR image to be analyzed. Low quality images and unwanted regions provide unwanted information during noise analysis. For the effective execution of segmentation algorithms, the images must be preprocessed efficiently. In this paper proposed two analysis such as colorless model and color model. The color model provide the better result.

IndexTerms **- Improved linear iterative clustering and improved color based histogram equalization.**

I. INTRODUCTION

Lung cancer occur due to abnormal division of cells in lung which causes lung to function in an improper way. There are more than 100 types of lung cancer currently discovered. Normally, when the cell in the body are aged, they are replaced by new cells. In the case of tumors, the cells are not replaced by new cells and they multiplied abruptly. This will leads to accumulation of cells and formation of masses called tumor. Lung cancer is a disease that can occur on any part of human lung and the symptoms depends entirely on the affected lung region. Ionizing radiations, neurofibromatosis and vinyl chloride are the common risk factors. Studies show that there is no link between radiations from cell phone and lung cancer. But according to WHO, the usage of cellular phones may be carcinogenic. There is a risk of developing gliomas in continuous wireless and cell phone users. The survival rate is high if the tumor is detected in early stages. Detection of tumor is a very complicated process because tumors are covered by overlapping lung tissues.

Literature review:

[1]skull stripping algorithm using Chan-Vese ACM. The method is fully automatic and middle slice was used for computation. The method is very effective for extracting the lung region in T1 and T2 weighted images. This method makes use of the binary form of the lung MR image to process. This binary image is used to develop active contour. [2]used hybrid edge based method using watershed algorithm to develop initial mask of lung. A deformable structure is developed based on global features of the image. The algorithm is referred to as Hybrid Watershed Algorithm (HWA). The accuracy is analyzed using atlas based methods. [3]developed an accurate meta algorithm for stripping skull region. Four different algorithms are executed and a combined result is generated. Each algorithm works best for different anatomic locations. A Boolean logic is used to combine the result of different algorithms. Computational complexity and computation time increases due to the use of many numbers of algorithms. [5]developed a smart histogram based method for efficiently skull stripping T1-weighted lung image. Initially background is removed from the image. Double thresholding is used to separate various regions in lung image. Rough binary classification is used to select the regions. Mathematical morphology was incorporated to remove regions by obtaining a lung mask and this method was not dependent on parameter tuning.

[6]studied the delineation performance of Gadolinium-induced MR images in finding tumor boundaries. Spectral pattern of lung tumor were detected in enhancing tumor regions of patients during clinical progression. [7]used morphological filtering for the removal of background regions from the image. Boada et al demonstrated the application of TQF_ lung image for monitoring lung tumors and it provides good contrast while monitoring neoplastic changes. [8]improved the contrast of lung using the accumulation of contrast agent. The contrast of the overall images is improved and the contrasts of unwanted tissues are also enhanced.

[5]proposed a denoising method based on tracking algorithm for lung image. Lower efficiency was obtained because of the use of random seed point in tracking algorithm.

[9]used histogram matching and Insight Tool Kit (ITK) normalization Tool Tustison et al for correcting the bias field. This method help to reduce inter volume diversity among lung of different patients. [10]used Legendre polynomial for the estimation and removal of bias fields. Histogram matching is used to normalize the intensities level of all images used for the experiment.

Gupta and Jha used Dynamic Stochestic Resonance (DSR) for enhancing dark areas in lung image. Edge sharpening was performed using a fast and adaptive method called Anisotropic Diffusion (AD). An efficient and computationally fast CAD system was proposed for the identification of Gliomas. The fusion scheme of different image pulse sequence of the same modality makes the system more efficient. The adaptive global threshold and proposed RLCP texture features improve the efficient of the decision support system. Run length matrix extracted from these centralized patterns was used for tumor identification.

Methodology:

In pre-processing can be done in two ways, which includes gray color model and hsv color model pre-processing. Both are same, only one difference appears i.e., color conversion. The pre-processing model can be classified into two types such as

1. Colorless model
2. Color model

In colorless model image is like a gray level image. So it produce the same color model image (gray level image). Initially the input is get by the database, after getting database the image can be resized. Because the input images consist of various sizes. So it should be resized throughout the processing. Otherwise various size of images are obtain in the whole process. After resized images are given to the pre-processing section. Here, two types of process are carried out.

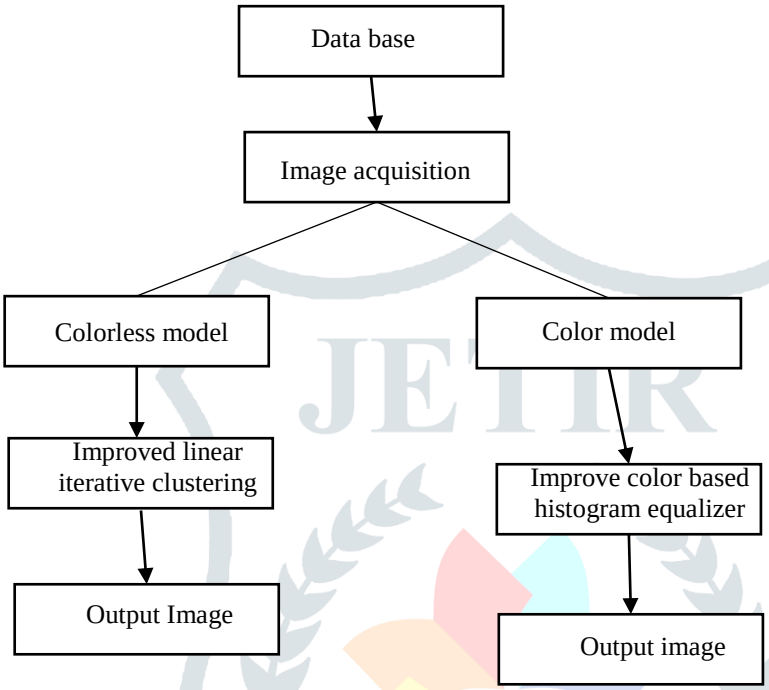


Fig: Proposed system

Colorless model:

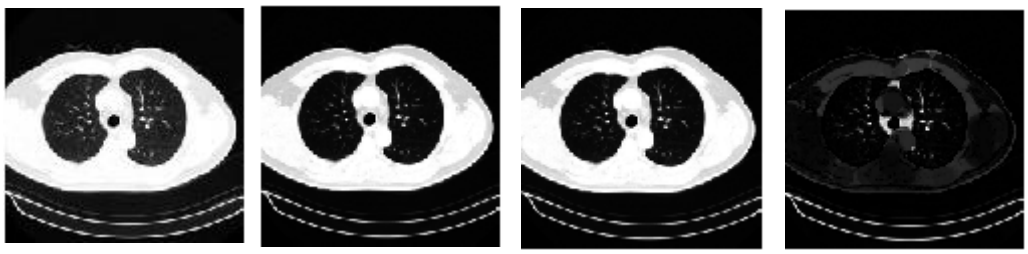
In colorless model improved linear iterative clustering method is proposed. This method is based on the clustering technique. The input image pixels are taken by the image intensity. In this method, cluster is depend on the color such as black, white and gray. The three color image intensity values are carried out by this step. Based on cluster it will produce the best mean value. Depending on the three mean values the each clustering group are enhanced.

Color model:

The color model is same as the colorless model, only one difference is the input image is converted into rgb color space to hsv color space. The hsv color converted image should be resized. After resizing the pre-processing technique can be carried out. Here, improved color base histogram equalizer is used. In this method, cumulative distributive function is calculated. Image intensity value is rounded by using cumulative distribution function result. In this way to improve the clarity of the image.

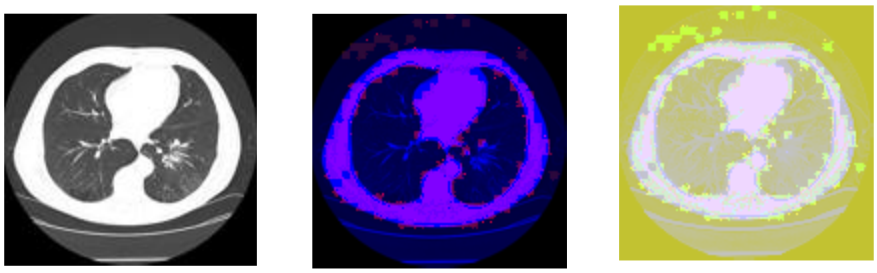
Result and discussion:

In pre-processing section carried out in this paper. This paper deals with two model, which includes colorless and color model. Here, the color model provide the better result compared to the colorless model.



a) b) c) d)

Fig 2:Experimental result of colorless modellung tumor image (a)MRI image of tumor affected lung (b)Gray scale image (c)Resized image (d)Pre-processed image



a) b) c)

Fig3: Experimental result of color model pre-processing malignant image (a) Resized image (b) Color space conversion image (c) Modified color based Histogram Equalization

Conclusion:

In this paper mainly focuses on MRI preprocessing methods such as contrast enhancement and removal of noisy region. De-noising is performed using 3 x 3 and enhancement is based on modified color based Histogram equalization algorithm. The accuracy of this algorithm is computed using manually database images. The proposed algorithm is a fast one because the average time required for preprocessing is 0.84 seconds. Since our prime focus is on developing a robust and accurate segmentation algorithm no further studies have been done on the proposed algorithm. Since the accuracy of proposed algorithm is high the quality of segmentation will be increased.

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