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A Survey on Efficient Method of Noise Reduction and Segmentation of Medical Images

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ABSTRACT

Automated segmentation of fine objects details in a given image is becoming of crucial interest in different imaging fields. In this work, we will propose a new variational level-set model for both global and interactive selective segmentation tasks, which can deal with intensity in homogeneity and the presence of noise. We will work on histopathological medical images. In this work, we will propose a new variation level-set model for both global and interactive\selective segmentation tasks, which can deal with intensity in homogeneity and the presence of noise. First we will check the presence of noise in input medical image. If the noise are present in given image then we will removed this noise using filtrations techniques. In addition, by using machine learning approach using Image segmentation using fuzzy entropy technique to segment the medical image. After that we will get the segmentation result in histopathological images.

1. Introduction

A. Background

Various models for image segmentation have been extensively studied and successfully implemented in image analysis, pattern recognition, image understanding, computer vision, etc. There are two different segmentation classes: 1) global segmentation, where the contour of all the objects in a given image is required to be segmented, and 2) interactive\ selective segmentation where the task of segmentation is to segment a particular object\ feature of the given image.

Medical imaging is the approach and process of creating visual representations of the indoors of a frame for medical evaluation and scientific intervention, as well as visible illustration of the characteristic of a few organs or tissues (physiology). Medical imaging seeks to reveal inner systems hidden via the skin and bones, in addition to to diagnose and deal with disease. Medical imaging additionally establishes a database of regular anatomy and physiology to make it viable to identify abnormalities. Although imaging of removed organs and tissues can be completed for clinical reasons, such procedures are usually considered part of pathology in place of medical imaging.

Images with intensity in homogeneity with or without noise are a challenge for all the global segmenting models. An early attempt to segment images with intensity in homogeneity was an extension of the 2-phase Chan-Vese (CV) model to a multi-phase model, where several level set functions were employed to increase the number of regions of distinct objects. The drawback of the multi-phase model for objects with intensity in homogeneity is that one object can be segmented by different level sets and recognized as two different objects.

In this work we propose a new variation region-based active contour model for both tasks of segmentation, global and selective, for intensity in homogeneity images with or without noise. To handle high image noise we will filtration techniques. Also this work deals with the concept for image segmentation. In this work the histopathological image is taken for the entire process.

In this work, one algorithm is used for segmentation, fuzzy entropy technique. So it gives the accurate result for image segmentation. In this work we will focused on segmentation of image with the help of histopathological images.

B. Motivation

A reliable method for segmenting medical image would clearly be a useful tool. Fuzzy entropy based segmentation method is a useful kind of segmentation method. Compared with the traditional fuzzy entropy-based image segmentation method, the proposed method segments an image using the threshold with membership degree m (0<m<1), and increases the opportunity of choosing appropriate thresholds. Also, we will de-noise the histopathological images and segmenting medical images which is useful for medical practitioners.

C. Objectives

- Improved noise reduction in histopathological images using Median filtration technique.
- To make efficient segmentation on medical images using Fuzzy Entropy Technique.

2. Related Work

This Paper has proposed the Image de-noising and image segmentation are the fundamental task in image processing. The aim in a de-noising process is to recover a clean image *in a* noisy image This work implemented the new variational global and selective segmentation model suitable for segmenting a range of images that have intensity in homogeneity, noise and a combination of both [1].

Meena and Raja proposed an approach of Spatial Fuzzy C means (PET-SFCM) clustering algorithm on Positron Emission Tomography (PET) scan image datasets. Proposed algorithm is incorporated the spatial neighborhood information with

traditional FCM and updating the objective function of each cluster. This algorithm is implemented and tested on huge data collection of patients with brain neuro degenerative disorder such as Alzheimer's disease. It has demonstrated its effectiveness by testing it for real world patient data sets. [2].

Proposed system look at three algorithms namely K Means clustering, Expectation Maximization and the Normalized cuts and compare them for image segmentation. This project addresses the problem of segmenting an image into different regions. We analyze two unsupervised learning algorithms namely the K-means and EM and compare it with a graph based algorithm, the Normalized Cut algorithm. The K-means and EM are clustering algorithms, which partition a data set into clusters according to some defines distance measure [3].

Funmilola et al proposed the Fuzzy K-C-means method, which carries more of Fuzzy C-means properties than that of K-means. This work has mainly focused attention on Clustering methods, specifically k-means and fuzzy c-means clustering algorithms. These algorithms were combined together to come up with another method called fuzzy k-c-means clustering algorithm, which has a better result in terms of time utilization. The algorithms have been implemented and tested with Magnetic Resonance Image (MRI) images of Human brain. Results have been analyzed and recorded [4].

Wilson and Dhas used K-means and Fuzzy C-means respectively to detect the iron in brain using SWI technique. An accurate assessment of iron accumulation is required for diagnosis and therapy of iron overload in various neurodegenerative diseases. Susceptibility Weighted Imaging (SWI) offers information about any tissue that has a different susceptibility than its surrounding structures. [5].

Proposed dip study of brain tumor. It describes different type of diagnosis approaches. This paper presents a systematic Type-II fuzzy expert system for diagnosing the human brain tumors (Astrocytoma tumors) using T1-weighted Magnetic Resonance Images with contrast. The proposed Type-II fuzzy image processing method has four distinct modules: Pre-processing, Segmentation, Feature Extraction, and Approximate Reasoning. [6].

In the field of pattern recognition due to the fundamental involvement of human perception and inadequacy of standard Mathematics to deal with its complex and ambiguously defined system, different fuzzy techniques have been applied as an appropriate alternative [7].

Proposed work has suggested a synergistic and an effective algorithm for the detection of brain tumors based on Median filtering, K Means Segmentation, FCM Segmentation, and finally, threshold segmentation. In this proposed approach we enhance the quality of the tumor images acquired by the aid of MRI and then to detect the size of the tumors, approximate, reasoning are applied. [8].

Proposed work, the author gives a study of the various algorithms that are available for color images, text and gray scale images. The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image. Each of the pixels in a region is similar with respect to some characteristic or computed property, such as color, intensity, or texture [9].

In this work proposed k-means and C-mean to extract the features from the images [10].

Proposed system of image registration and data fusion theory adapted for the segmentation of MR images. Propose a system of image registration and data fusion theory adapted for the segmentation of MR images. This system provides an efficient and fast way for diagnosis of the brain tumor. This system provides an efficient and fast way for diagnosis of the brain tumor called K-means algorithm [11].

3. System Overview

Image de-noising and image segmentation are the fundamental tasks in image processing. The aim in a de-noising process is to recover a clean image. We will work on histopathological medical images. First we will check the presence of noise in input medical image. If the noise are present in given image then we will removed this noise using filtrations techniques. To remove the noise from image for further processing, we will use median filter technique.

After that additionally, the image segmentation is carried out by fuzzy entropy technique. I.e. finally implement a system to remove noise from histopathological image and also segment the histopathological image which is easier, cost reducible and time savable.

Advantages of Proposed System

1. This system will use median filter for noise removal so will get accurate clear image.
2. It consist algorithm for segmentation which effectively able to segment the histopathological image and gives the actual final result.

This proposed system effectively able to extract all the spatial characteristics of an Image.

System Architecture

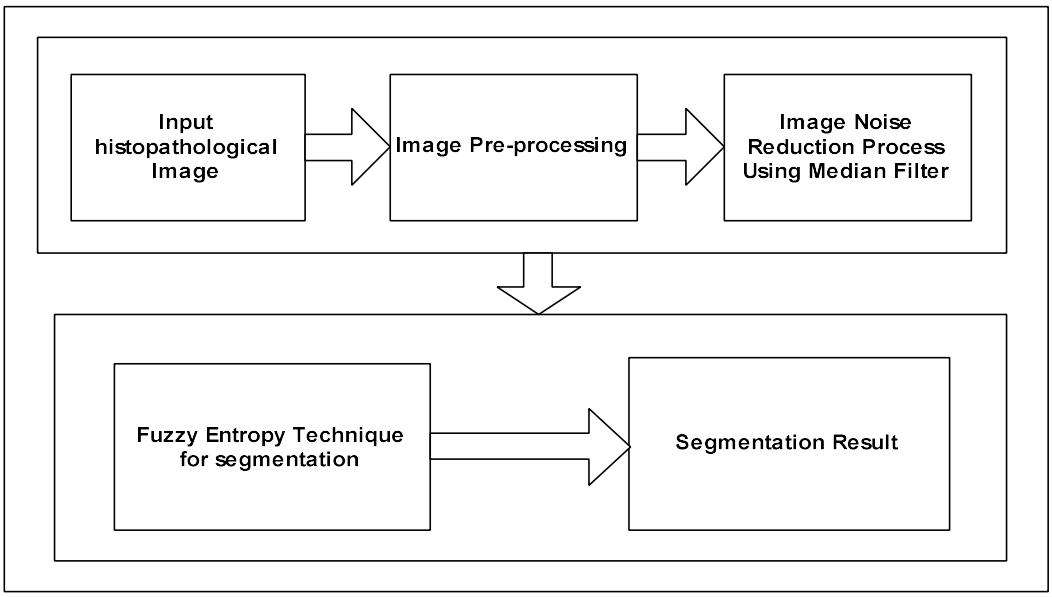

Fig: System Architecture

4. Conclusion

We will propose a new variation global and selective segmentation system suitable for segmenting a range of histopathological images. We will remove the noise of images using median filter technique. We will propose a new variation global and selective segmentation system suitable for segmenting a range of histopathological medical images. This technique is very effective to remove the noise from image. The noise free image is given as an input to the fuzzy entropy method for the image segmentation Finally show the segmentation result which is easier, cost reducible and time savable.

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