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A Level Set Based Efficient Brain Tumor Classification Using self Organizing Map

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Abstract

Segmentation of structural sections of the brain is the essential problem in medical image investigation. While surveying the previous literature, it has been found out that no work has been done in segmentation of brain tumor by using Level-set method and self organization map which is further optimized (centroid selection) in MATLAB Environment. In this synopsis, a brain tumor segmentation technique has been established and validated segmentation on 2D MRI Data. This method can segment a tumor provided that the anticipated parameters are set appropriately. This method does not require any initialization while the others require an initialization inside the tumor. The visualization and quantitative evaluations of the segmentation results demonstrate the effectiveness of this approach. We are using level-set algorithm along with centroid optimized self-organization map along with thresholding and morphology for proper classification of medical data. Firstly, the work will carry over to calculate the area of the tumor of single slice of MRI data set and then it is extended to calculate the area of the tumor from multiple image MRI data set.

Keywords: Level set method; self organization map; segmentation; brain tumor.

Introduction

Brain cancer is one of the greatest deadly and obstinate diseases. Tumors may be set in areas of the brain that are critical to run the body's vital tasks, this tumor cells infect other parts of the brain, establishing additional tumors that are too minor to spot with the usual imaging techniques. Sometimes, it's a hard to identify the Brain cancer's position such complications make it a difficult task to cure it for those people who has to fight with their life.

In Current years we have observed that the growth in cancer patient has outstripped the previous facts. The tumor in the primary phase is certainly hard to recognize however once it gets recognized we can move towards its treatment and is treatable with methods like chemotherapy. But certainly late recognition of tumor is lethal. Cancer is a type of infection in which signs are recognized late. But the usage of computer supported technology has taken a wise step in recognizing the tumor, like used in Neuron surgery.

Related Work

WAVELET BASED IMAGE FUSION

This paper proposes an efficient wavelet based algorithm for tumor detection which utilizes the complementary and redundant information from the Computed Tomography (CT) image and Magnetic Resonance Imaging (MRI) images [1].

MEAN SHIFT ALGORITHM

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This paper introduces an efficient method for detection of brain tumor from Magnetic Resonance Images (MRI). In the process of detection of tumor from MRI, segmentation plays vital role for partitioning an image into different sub-region with homogeneous properties [2].

NEURAL NETWORKS

It classify neural networks by its processing goals and the nature of medical images. Main advantages and drawbacks of the methods are mentioned in the paper. Problematic issues of neural network application for medical image processing and an outlook for the future research are also discussed [3].

SUPPORT VECTOR REGRESSION

This paper describe a method based on Support Vector machines for Regression (SVR) to decode cognitive states from functional Magnetic Resonance Imaging (fMRI) data. In the context of the Pittsburgh Brain Activity Interpretation Competition, three participants were scanned during three runs of 20-minute immersion in a Virtual Reality Environment (VRE) where they played a game that engaged them in various search tasks [4].

Research Objective:

To explore possibilities of developing a robust algorithm for classification of brain MRIs as normal or abnormal based on the absence or presence of tumor of any grade.

- To determine the grade of tumor present in abnormal Brain MRIs.
- To study comparatively the applicability and implementation of various medical image segmentation and classification techniques and finally apply the best one.
- To Develop a more accurate and supervised method for the classification of brain tumor images which is computationally more efficient.
- A self-organizing map (SOM) or self-organizing feature map (SOFM) is a type of artificial neural network (ANN) that is trained using unsupervised learning to produce a low-dimensional (typically two-dimensional), discretized representation of the input space of the training samples, called a map. We will utilize this method for mapping of tumor data from the MRI images using the unsupervised learning through the level set method.

Methodology:

This research is carried out by using analytical methodology and experimental methodology in which findings from earlier researches are analysed to build software to study skin cancer using watershed algorithm and recurrent neural network. The consequence of algorithm is tested by taking different systems already available. The edges will be located in a superior manner. On the premise of these research methodologies the acquired result analyse the coding techniques. These research methodologies are the fundamental building blocks of research carried out.

Conclusion:

Different Techniques are applied in segmentation of brain tumor by using Level-set method and self organization map which is further optimized (centroid selection) in MATLAB Environment.

The physicians and cancer researchers compare imaging studies from cases similar to a selected patient or a drawn query region and create a similarity measure which is relevant. It is important to perform complex statements with logical operations to combine different similarity measures and to specify different query regions, all without having expertise in MATLAB. It is also necessary to give the user an intuitive interface to

specify a query region (whether on a study of a patient or on a brain atlas).

References:

[1] Vivek Angoth, CYN Dwith, Amarjot Singh, "A Novel Wavelet Based Image Fusion for Brain Tumor Detection", International Journal of Computer Vision and Signal Processing (IJCVSP), Volume – 2, issue - 1, pp. 1-7, 2013.

[2] V.B Padole and D.S. Chaudhari, "Detection of Brain Tumor in MRI Images Using Mean Shift Algorithm and Normalized Cut Method", 2012.

[3] Z. Shi, L. He, T.N.KSuzuki, and H. Itoh, "Survey on Neural Networks used for Medical Image Processing",International Journal of Computational Science
2009.

[4] M.G DiBono and M. Zorzi, "Decoding cognitive states from fMRI data using support vector regression", PsychNology Journal, 2008.