

Medical Image Segmentation Using Minkowski Algorithm

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ABSTRACT

Picture segmentation can be a way of segmentation of a image into completely exceptional gadgets. There's a primary difference between picture partials and spoliation. In picture breaking into pieces approach is to segmentation the taken photo quality with connection to photo appearance (brightness, contrast, texture). On this segmentation technique, the actual part of a picture is highlighted in line with the problem mentioned. Right here during this paper we will be predisposed to peer the performance of the numerous steps to creation for various images.

Medical photo procedure dreams non-stop upgrades in terms of techniques and packages to assist improve fine of offerings in health care business. The strategies used for interpolation, photograph nomination, zipping for adjusting size, prognosis vicinity unit to be stepped forward to be processing with developing needs inside the commercial enterprise and growing technologies referring to mobile computing field and cloud computing fields. The mixture of scientific devices and packages with sharable devices is moreover introducing space for extra evaluation. This paper affords beneficial insights into the parts of science image segmentation system and attempts to outline the very long time consuming term scope of segmentation.

Keywords : Medical image processing (MIP), medical diagnosis, MIP methods and applications

I. INTRODUCTION

Clinical picture segmentation introduced to the action of splitting images found in the form of information to a sequential of non overlapping cause .Those areas denote completely exceptional human tissue structures and apply appropriate approach for accuracy of scientific identification..Normally the essential theory of photograph segmentation might be

a way of partitioning a virtual photo into a couple of segments. The aim of breaking image in to small pieces is to balance and modify the illustration of a image into one issue it truly is additional that means and easier to research. There is full-size quantity of data parts like existing data-based visible statistics accessible (CBVIR) system for searching of virtual photos in huge databases. In item identification, police research times of related objects of a exact class

(such as person, homes, avenue ,forest) in a completely without manual face identification device might be a laptop software for routinely special or manuals someone from a digital photograph. Fingerprint popularity refers back to the automated-controlled approach of manuals a healthy between multiple persons fingerprints, for scientific procedures is employed to form a image to show, recognise or examine the part of anatomy. Developing interest in health care domain has made-up approach for progressive techniques for diagnosing and medical practices. When you consider that disease is taken under consideration to be health, the care commercial enterprise always try to use revolutionary clinical tactics and medical health practices plus advanced technologies in modern computations, In medical harnessing of advances in hardware existing resources. Completeness in un wellness recognition and accuracy in medical practices and growth in health in innovative instrumentality is that the ever-ending necessity in the health care business. This has advanced rectifier to severa exceptional practices that region unit medically proven. But, extra ought to be via with ever-growing scientific know-how, called massive knowledge presently days, with the intention to find hidden data from the info.

II. EDGE DETECTION METHOD

Image Side detection is an important part in all the estimation steps in picture procedure, picture analysis, picture sample reputation, and pc vision strategies. Commonly part refers to a edge detection among several regions at some point of a photo. Place barriers and edges location unit very carefully related, considering the fact that there's typically an edge adjustment in frequency on the certain location boundaries. The aim of edge detection in image is part identification to identify the factors all through a digital photo at that the picture clearance modifications sharply or, a whole lot of formally, has discontinuities. Discontinuities of depth constituent

see both line area, step area or ramp facet. If the edge detection step is essential, the following project of interpreting the information contents inside the authentic photo might for that reason be notably simplified. Aspect detection may be a very simple tool which in photo technique, machine vision.

And laptop imaginative and prescient, significantly inside the areas of function detection and feature extraction. There location unit 2 important strategies for side detection like search-based and 0-crossing based. The quest-based totally techniques police research position and course of edges by estimating gradient significance victimisation 1st order spinoff technique. In zero-crossing based totally strategies, facet smoothness is calculable by using applying Laplacian operator. The foremost common troubles of aspect-based totally segmentation is to are seeking for out a technique actual border exists.

III. REGION-BASED SEGMENTATION METHOD

Edge-based totally segmentation is be a method for essential the location at once. Place based totally by and large techniques ar strong because of, areas of edge in medical field additional pixels than edges and so have extra additional info on the medical fields a good way to represent photograph location. As soon as sleuthing a phase ,use texture that isn't always simple once coping with edges. Area developing techniques ar usually better in clangourous images wherever edges ar tough to find out.

A. Area of edge and merge for an algorithmic steps / Watershed algorithmic steps.

- i) The taken image is divided in to many unconnected causes. for example $P(R_i)=\text{false}$. If every pixels have totally different image detection levels in an exceedingly region.
- ii) The edge detection method is continual till to induce no additional extra partition.
- iii) Merge the nearest edge in image regions, if they need to share an extra component intensity. for

instance $P(R_i \cup R_j) = \text{true}$. if 2 region share same grey level.

The main advantage of this algorithmic rules are sometimes less advanced, and straightforward to search out edge in image for object detection

B. Watershed algorithmic rule

A watershed can be a basin-like some rules mentioned by rule of High points and ridge lines that formal descend into very lower edge and deep elevations and circulate valleys. Watershed algorithmic rule can be a part on the basis in most cases edge detection strategies images that uses photo classification. Watershed algorithmic rule is partner degree repetitious adaptation threshold algorithmic rule.

- i) Check the consistent and inconsistent between try of regions.
- ii) for every region in segmentation, check the worth of predicate P with its neighbouring regions.
- ii) Merge the pairs of neighbouring regions whose predicate of P is true.

The main advantage of this rule, which let us connected elements and before information may be implemented by strange are in markers. The most drawback of this algorithm is fragmentation and over another edge of images problem.

. Region growing algorithmic rule

An easy technique to photograph partition is to start from some available pixels (seeds) in images and representing wonderful image regions and to develop them, till they cover the entire picture. For location growing, ought to be compelled to comply with a rule describing a growth mechanism and a rule checking the homogeneity of the areas when every increase step.

- i) Choose a medical image of initial points, those that have sure grey level vary.
- ii) Grow edge image in no fast access as long because the component that has same image for medication image segmentation. (intensity, grey value).
- ii) The higher than edge detection is continual till to grow no additional image.

The advantages of edge growing technique are the construct is easy, no speed many sensible image variety of seed purpose enough to grow image edge. By mi understanding this technique we are able to properly misguide separate the regions that have a similar properties and supply original pictures with have clear edges. The disadvantage of this technique is, it take as practice high computation power and tough to seek out measurable start line.

IV. Related work on Medical Image Segmentation

The previous methodology was developed to identify the various factors involved in image but the ground health position are not such in a good way to have the multiple resources for identifying the disease so the medical segmentation depends on the survey which was done by and we have taken many things from previous papers as a reference which are as follows by different author we are implementing in our paper

1) Title: Medical Image Segmentation Using Soft Computing Techniques

Author: Dr.Nookala Venu

Publication Year: 2022IUSST

Method:

The use of a deep learning approach to create an interactive framework is advocated. The framework is divided into two stages, the first of which is P-Net, which is used to generate an initial automatic segmentation. After translation into geodesic distance maps, the second stage includes an R-Net to further process the output based on user involvement, which is integrated into the input of the R-Net.

Finding: MRI used in the medical field to distinguish pathological tissues from normal tissues and to obtain images of various body sections for subsequent analysis and processing. In several computer-aided medical imaging applications, image segmentation is the most important task. Tumour segmentation is regarded an essential operation based on MRI data; however, it is time demanding if done manually. As a

result, automated image analysis becomes critical for picture-based diagnosis. Medical image analysis can be done using a variety of techniques that have been used in a variety of applications. The analysed computer-based images are utilised in computer-aided systems to assist radiologists and clinicians in making speedier diagnoses. The current paper discussed many techniques used in the segmentation of MRI images.

2) Title: Medical image segmentation using deep learning: A survey

Author: Risheng

Publication Year: 2021 IET

Method: For medical image segmentation tasks, supervised learning is the most popular method since these tasks usually require high accuracy.

Findings: Deep learning has been widely used for medical image segmentation and a large number of papers has been presented recording the success of deep learning in the field. A comprehensive thematic survey on medical image segmentation using deep learning techniques is presented. This paper makes two original contributions. Firstly, compared to traditional surveys that directly divide literatures of deep learning on medical image segmentation into many groups and introduce literatures in detail for each group, we classify currently popular literatures according to a multi-level structure from coarse to fine. Secondly, this paper focuses on supervised and weakly supervised learning approaches, without including unsupervised approaches since they have been introduced in many old surveys and they are not popular currently.

3) Title: Medical Image Processing Using Deep Learning

Author: Dr. S. Priyadarsini, S. Chitra, K. Pushpadevi.

Publication Year: 2022 IJCRT

Method: The paper presented diabetic data set which is divided into multiple segments on the basis of training purpose which can be arranged in pixel density and go through the Manhattan distance method and euclidean distance method the criteria criteria full fills the main Cosco distance algorithm

when finding the fitness method about Medical Image Processing using deep learning of the functions can be used to invent new techniques via this methodology.

Findings: In this paper the hybrid class genetic classified model is used for identifying the diabetic available in blood the simple taken in the form of pure black cement and goes through multiple stated stages to check the fitness.

4) Title: Medical Image Segmentation Using Machine Learning

Author: Masoud Khani

Publication Year: UWM 2021

Method: This paper presented a genetic algorithm consisting of multiple major operations like crossover mutations the model evaluate the fitness function using multiple mesigmentation by taking care of diseases available on body the chromosomes available in the blood unit can be defined as the symptoms of disease.

Findings: After implementation this technique coloured image can be processed. The all findings of a simple using grayscale image can be recognised by the object available in the search in genetic algorithm.

5) Title: Medical Image Segmentation A Review of Recent Techniques, Advancements and a Comprehensive Comparison

Author: Aarish Shafi

Publishing Year: IJCSE 2019

Method: This paper presented general segmentation problem in which various images can be segmented into h^{****} part by combining neighbours it gives heterogeneous segments many techniques for error famous partition can be used but simple probability distribution function can be used to slicing the image many age best detection tool like lesson and other Method can be used.

Finding: In the segmentation part 8 find the multiple Universal segmented images that must be used to take various as detections and find out the disease by using images slicing this method can be advance and comprehensive comparison in between the multiple images.

6) Title: Medical Image Classification and Cancer Detection using Deep Convolution Neural Networks

Author: Akshay Kumar S

Publishing Year: IJERT 2021

Method: A scheme is proposed which is based on SOM neural network for segmenting brain MRI. In this paper we apply the scheme only on three normal and three abnormal brain MRI images. This scheme segments the brain MRI into WM, GM and CSF regions. But if the image is abnormal our scheme segments the tumor region also. These regions could be regarded as segmentation outcomes reserving some semantic meaning.

Finding: This paper enhances to test the axial view images of the web database by using the scheme discussed in. This scheme automatically classifies the regions into WM, GM, CSF and tumor. Results of the extraction of regions of WM, GM, CSF and tumor of normal and abnormal brain. Test and compare the results of the brain MRI images from the database given on the web. Then further calculate the confusion matrix where each column of the matrix represents the instances in a predicted class and each row represents the instances in an actual class. There are total 49 images of axial view in which 29 are TP images, 08 cases are TN images, 01 case is FP images and 11 are FN images.

7) Title: A Survey on Medical Image Segmentation

Author: Gagandeep k

Publishing: PIMCSIT 2017

Method: In this paper the method which are used to explain the principle of segmentation will be in a multiple form and comparison with the multiple methodology to find out the best one it uses the genetic algorithm for explaining the slicing of images to take a disease in human body it combines multiple research in a single platform and explain in various way which can be used in the form of multiple resources the methodology cannot be find out without taking a risk.

Finding: In a finding multiple approaches had given there input to detect such type of method which are not be a part of actual things the methods can be compared with multiple order and find out the answer or research by taking care of things.

8) Title: Brain image segmentation using semi-supervised clustering

Author: Sriparna Saha

Publishing IJCSIT 2016

Method: This paper proposed the brand is segmentation by detecting brain tumor and the refinement of the images by having many slices in the mode of supervised learning whenever learning for supervised platform can be used then it receives a feedback from users and can be define in more clear than previous Technology.

Finding: In the finding the methodology which is used in this research will be able to find out the tumor available on Brain which is very dangerous for the future can be identified by a this method multiple images can be simulated in a single platform and the process which takes care about the images is called brain semi supervised learning.

9) Title: Volumetric Medical Image Segmentation with Deep Convolution Neural Networks

Author: Manvel Avetisian

Publishing ITCSCP 2022

Method: In in this research various methods have been used to define Medical Image classification to detect cancer the methods taking the image from MRI and circulate it to multiple segmented forms to process that Technology can be extended by using more method to detect tumor in brain MRI cameras take pictures and methodology make it more clear than the original form so that the tumor can be identified.

Finding: The finding of the research are to clear the image taken by MRI for future reference a data set can be formed using various images to take a part of result of an image in the form of process image Brain Tumor can be determine after sliding the page.

10) Title: A Framework for Medical Image Classification Using Soft Set.

Author: Saima Anwar Lashari

Publishing ICEEI 2013

Method: This method proposed the classification methods for framing at data set for taking multiple faces in research like a position of data reprocessing data data partition set of software Analysis of data and evolution of performance whenever a Method can be applied to the data set result from original format.

Finding: In the finding various types of image classification are used to fulfill the major objective of the current study by improving the accuracy of the image with hell in detecting the tumor or any disease available in body then it can be Saar to various images.

11) Title: Medical and Natural Image Segmentation Algorithm using M-F based Optimization Model and Modified Fuzzy Clustering: A Novel Approach.

Author: Bingquan Huo

Publishing IJSPIPPR 2015

Method: Medical Image segmentation for neural images can be find out the Fuzzy Logic clustering in the form of boundaries of pixels to state grey scale images and it can be another form to be suppressed the image for future use this methodology can be define over the previous methodology to detect the cancer by Noble approach.

Finding: In the finding of this research is to propose a method which uses the fuzzy clustering for taking the musical in a segmentation and it may be very sensitive to in her inherent the multiple stages of graceful skill mode images can be by forced in multiple parts like others.

12) Title: Medical Image Segmentation with 3D Convolution Neural Networks: A Survey.

Author: S Niyas

Publishing IJCSIT 2022

Method: In this method 3D convolutional neural network and be used and multiple methods can be compare compared to each other this method can be SAP the images and detect the tumor so it takes a

model to appear the random image by using shape and structure for future use.

Finding: The finding of this proposed method has in the various parameter Respective to application field which is meant that everyday can be divided into multiple parts and can be by forcatod into multiple research so that can be stronger than others.

13) Title: A review on deep learning in medical image analysis

Author: S. Suganyadevi

Publishing IJMIR 2022

Method: This paper take review on the planning to have an medical image and also in which the research can be controlled by flooding across multiple coverage areas and to identify the boundary across the image the technique used in this is best technique the original water cycle can be a modified marker control for this research so the deep learning can be asset a milestone to research the area.

Finding: In finding multiple cases can be introduced like the MIG segmentation can be acrossal path of processing other parties the segmentation technique can be required for different features to son in the last one is sementation techniques which import the image in multiple phases to take the benefit of medical.

14) Title: Application of AI Techniques in Medical Image Segmentation and Novel Categorization of Available Methods and Tools

Author: M. Rastgarpour

Publishing IMECS 2011

Method: This research uses AI techniques in medical measurementism and grey scale images for identifying the disease increasing in body tumor is one of the dangerous disease and which must be identified at the beginning stage So the technology provides various methods and tools to take a category of image sequences that is also called the novel approach.

Finding: In finding the paper presented a method using fuzzyclasting is a part of the research and discloses the results for tumor section using multiple

methods the tools which are used to identify with tumor can be introduced as initial part of the test.

15) Title: Medical Image Segmentation using Genetic Algorithm

Author: Divya Kaushik

Publishing IJCA 2013

Method: In this research the medical image segmentation uses genetic research model for taking care of the techniques which are basically used in research to optimise the problem solver and many of the techniques can be used as a matter of Medical Image Segmentation for detecting the tumors.

Finding: In the genetic algorithm it may be useful for future reference for taking a look at images and provides the result to detect the cancer increasing in brain any cells can be spotted by using the grey scale images.

Problem Identification and Related Work

Medical image method desires continuous medical image enhancements in terms of techniques which are used in segmentation and applications which are applied to help improve quality of services in health care trade. The techniques used for interpolation, various image segmentation registration, image compression, various diagnosing are to be improved to be abreast with growing demands edge detection within the planning and rising various technologies touching on mobile modern computing and cloud computing. During this paper we have a tendency to gift this progressive of medical image process and its skills to harness the hardware resources as well as ever growing GPU platforms for rising quality of clinical practices in terms of speed, accuracy, innovation, and globalisation then on. From the analysis of the literature it's understood that the health care domain has abundant scope for any analysis within the areas of designation life threatening diseases, usage of remote health observance applications for real time functioning to alert aid personnel. The mixing of medical instrumentation and applications with wearable

devices is additionally promising space for any analysis.

V. Previous Work

Deep learning with image specific fine-tuning: The dataset that was used was (B) (2-D segmentation of multiple organs) Stacks of T2-weighted MRIs are acquired using single-shot fast spin echo (SSFSE). (3-D segmentation of T1c and FLAIR brain tumours) The training set for the 2015 Brain Tumor Segmentation Challenge (BRATS) is used (B). Obtainable outcomes the suggested model outperforms traditional CNNs in terms of segmenting previously undetected items.

Observations: For interactive 2-D/3-D picture segmentation, a deep learning-based framework with a bounding box-based CNN is used. They're good at segmenting objects that haven't been seen before. For both supervised and unsupervised modifications of initial segmentations, image-specific fine-tuning based on a weighted loss function is presented.

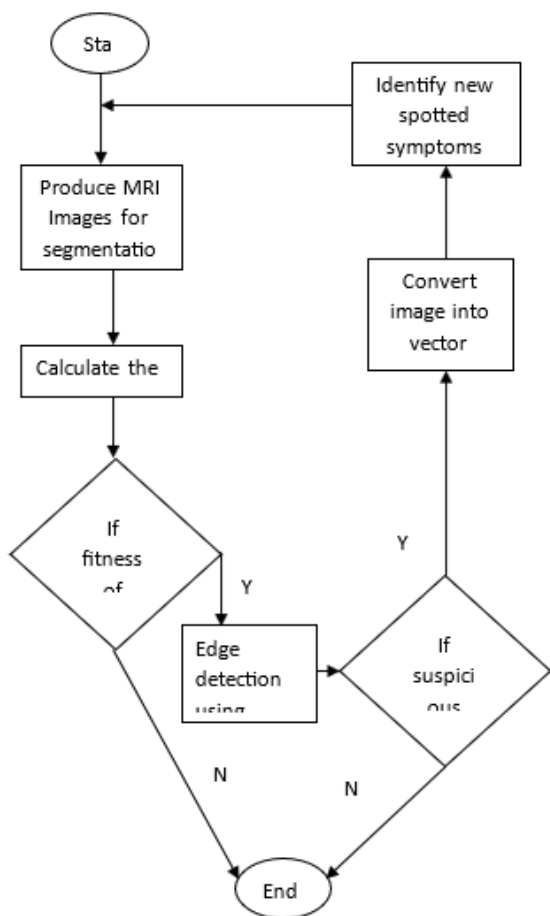
VI. Methodology

In our system we utilize Minkowski Algorithm strategy rather than Soft Computing technique for identifying brain tumour. K-mean algorithm provides minkowski algorithm for segmenting images in clearer form. K-MEAN utilizes watchful edge recognition for edge segregation. This strategy is extremely valuable for perceiving the edge of pictures lastly takes resultant information in type of many edges in single picture. This strategy at last uses Genetic calculation to locate its definitive yield.

Algorithm

Proposed Algorithms measures tumour symptoms using image segmentation, it uses the features of minkowski algorithm to make images more clearer..A related Algorithm consists of five steps:

1. Start with a randomly generated images of Tumour symptoms of N molecules, where N is the size of symptoms, l – length of tumour symptoms x.
2. Calculate the fitness value of function $\varphi(x)$ of each molecule's x in the blood sample.
3. Repeat until N offspring's are created:
 - a. Probabilistically select molecules from current blood sample using value of fitness function.
 - b. Produce a minkowski k-mean algorithm to perform segmentation on MRI images to identify Tumour stages.
 - c. Minkowski Algorithm is a generalization of Euclidean distance and the Manhattan distance so it segment image into n dimensional real space.
 - d. Under Minkowski distance algorithm, two points P1 and P2 can be define to calculate N Dimension and set P to a specific value.
4. Mark all symptoms with highlighted molecules created one.
5. Go to step 2.

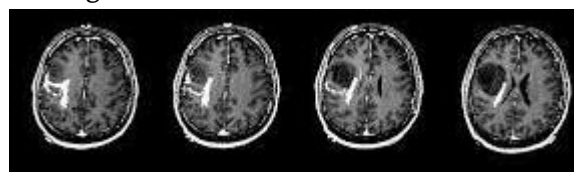


VII. Result Analysis

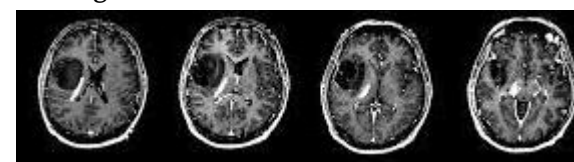
After implementation of this system we tend to continually get Associate in methodology output from the software system, and tried to predict the tumor disease and find a result clearer than previous methodology. Varied strategies square measure utilized in this idea for taking the advantage of software system as clear as attainable. Currently we are able to get smart result from this software system and predict the decease.

This methodology makes an attempt to resolve image segmentation by detective work the sides or pixels between completely different regions that have fast transition in intensity square measure extracted and connected to create closed object boundaries. The result's a binary image. Supported theory there square measure 2 main edge based mostly} segmentation methodologies- grey bar chart and gradient based method. Edge detection may be a well-developed field on its own inside image process. Region boundaries and edges square measure closely connected, since there's typically a pointy adjustment in intensity at the region boundaries. Edge detection techniques have so been used because the base of another segmentation technique. the sides known by edge detection square measure typically disconnected.

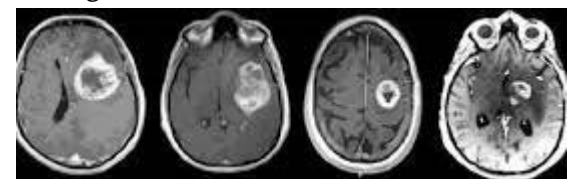
1. Images with various transformations Part 1.



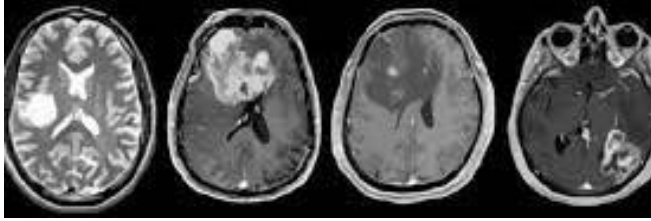
2. Images with various transformations Part 2.



3. Images with various transformations Part 1.



4. Images with various transformations Part 2



VIII. CONCLUSION

The methodology bestowed here is “Medical Image Segmentation using Mikowski Algorithm” that is completed by victimization K-mean methodology with manhattan algorithmic. By predicting the decease of brain tumour it's going to be potential to notice a lot of clear pictures with relevancy brain tumour symptoms. Each Image gets clear highlight and doctors shall able to notice the decease.

Digital Image process refers to process of digital pictures by digital computers. Now a day, in each field digital imaging is wide used. However image quality is major concern as varied instrumentation errors, unskilled fullness and environmental factors degrade the standard of pictures by introducing noises in pictures. Noise is Associate in Nursing unwanted signal gift within the image however modifies the particular image content. However in most of areas like medical, satellite, pattern recognition etc. need pictures with intolerance to those noises.

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