

A Survey on Medical Image Segmentation

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ABSTRACT

Picture segmentation may be a manner of partition of a photo into completely exquisite devices. There's a primary difference between image sweetening and segmentation. In picture sweetening approach is to reinforce the given photo satisfactory with relation to picture appearance (brightness, evaluation, texture). On this segmentation method, the real part of a image is highlighted consistent with the hassle noted. Right here during this paper we have a propensity to peer the overall performance of the numerous algorithms for various pictures.

Clinical photograph technique goals non-forestall upgrades in phrases of techniques and programs to help enhance pleasant of services in health care commercial enterprise. The techniques used for interpolation, picture registration, compression, prognosis vicinity unit to be progressed to be abreast with growing needs inside the commercial enterprise and rising technology relating to cell computing and cloud computing. The combination of medical instrumentation and packages with wearable gadgets is moreover promising space for extra assessment. This paper offers beneficial insights into the field of scientific photo machine and tries to define the long term scope of labour.

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

I. INTRODUCTION

Clinical picture segmentation refers to the procedure to partitioning found graphics information to a serial of without overlapping regions. Those areas explains completely exceptional human tissue structures and apply method in 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 segmentation is to adjust and alter the illustration of a image into one issue it truly is additional that means and easier to research. There is full-size quantity of applications like content-based visible statistics retrieval (CBVIR) system for searching of virtual photos in giant databases. In item detection, police research times of linguistics objects of a exact class (such as humans, homes, avenue ,forest) in a completely automatic face recognition device might be a laptop software for

routinely special or edificatory someone from a digital photograph. Fingerprint popularity refers back to the machine-controlled approach of edificatory a healthy between 2 human fingerprints, for scientific functions is employed to form a image to show, diagnose or examine the part of anatomy. Developing interest in health care domain has made-up approach for progressive techniques for diagnosing and clinical practices. When you consider that health is taken under consideration to be wealth, the care commercial enterprise has been try to use revolutionary clinical tactics and operational practices plus various technologies in computations, harnessing advances in various hardware primary resources. Preciseness in object identification and accuracy in clinical practices and improvisation in innovative instrumentality is that the important requirement in the health care business. This has crystal rectifier to severe exceptional practices that region unit clinically 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

Side detection is single in all the elemental steps in picture procedure, picture analysis, picture sample reputation, and pc vision strategies. Commonly part refers to a boundary among 2 regions at some point of a photo. Place barriers and edges location unit carefully related, considering the fact that there's typically a pointy settlement in object intensity on the location boundaries. The aim of victimisation part detectors to identify the factors all through a digital photo at that the picture brightness 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 sting detection step is efficient, the following project of interpreting the information contents inside the authentic photo might for that reason be notably simplified. Aspect

detection may be a simple tool 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

Region-based totally partition will be a method for essential the location at once. Place based totally by and large techniques ar strong because of, areas for extra density pixels than slice and so have more info on the market place which is a good way to represent photograph location. As soon as slicing is a phase, use existing information that isn't always very easy once coping with edges. Area developing techniques are usually better in clangourous images wherever edges ar tough to find out.

A. Region segment and proposed algorithmic rule / Watershed algorithmic rule[2]

i) The given picture is spirited in to four parts

Regions. for example $P(R_i)=\text{false}$. if completed pixels have totally heterogeneously grey in colour levels in an beyond region.

ii) The bifurcation method is parallel till to take no other rule no additional partition.

iii) Merge the sibling regions, if they need to share a similar object intensity. for instance $P(R_i \cup R_j)=\text{true}$. if 2 region circulated same colour variety.

The main features of this algorithmic steps are sometimes no advanced, and directed to search out region for object identification

B. Watershed algorithmic rule

This algorithm is all about the grounded area that can be introduced in many ways. It is a degree repetitive with respect to threshold algorithm.

The threshold algorithmic rule.

i) Check the harmonious and inconsistent between pass of regions. ii) for every region in segmentation, check the worth of predicate P with its neighbouring regions.

ii) combine the dyads of neighbouring regions whose predicate of P is true.

The high advantage of this algorithm, which provides connected rudiments and former word may be enforced by mistreatment labels. the most disadvantage of this algorithm is fragmentation and over fragmentation problem.

Region growing algorithmic rule

An easy fashion to snap splitting is to start from some pixels introducing awful image object and to develop them, while they cover the whool picture. For position growing, ought to be impelled to misbehave with a rule describing a growth medium and a rule checking the unity of the areas when every increase step.

i) Seed points can be collected by choice, those that have sure slate position vary.

ii) Increasing the reason in slow manner.

iii) Increasing upto higher lever.

The main advantage of region going to describe and construct in very easy manner which make come after the processing of image slicing which is very important for medical image segmentation but the reason behind growing the image in various manner must be typical like other things which are not sustainable for long time.

II. 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 IJSPIPR 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 introduce as initial part of the test.

16) Title: Medical Image Segmentation using Genetic Algorithm

Author: Divya Kaushik

Publishing IJCA 2013

Method: In this research the medical in segmentation uses genetic research model for taking care of the technique which are basically used in research to Optimisation 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 of images and provides the result to detect the cancer increasing in brain any cells can be spotted by using the grey scale images .

IV. Clinical Applications

In this section, we overview study medical facility according to provided data related to decease which include nervous system. Images can not be in operational form so we need to fragmented in various part. To be operation specific, AI algorithms in medical picture single analysis for the following Adviser situations inclusive of brain ails, cardiac ails, And liver conditions, in addition to orthopaedic trauma, are bandied. On this paper, we bandy various maximum important mind tricks, specifically thinking on images, intra clinical data may be found , and helps us to find the exact disease.

Segmentation is one of the best features for leading of identifying and disease protected symptoms to global and imposes an diffrent burden for Health care systems. Correct and automated segmentation Of images can offer essential information for Neurologists. In the medical study image plays a crucial role to identify the image partials . Chen etal. used DWI snaps As processing to section acute ischemic lesions and performed an Common cell score for image. Another method proposed a Deep getting to know methodology for finding and segment stroke Lesion segmentation the use of multimodal MRI snaps,

and the Bones scores of the 2 segmentation liabilities were zero.84 and0.59, independently.

In this section, we overview contemporary medical packages In 4 principal systems of the human body involving the nervous System, the cardiovascular gadget, the digestive device, And the skeletal system. To be extra specific, AI algorithms On systematic picture diagnostic analysis for the following identified diseases including various important images of brain illnesses, cardiac illnesses, And liver diseases, in addition to orthopaedic tumour in brain are identified using medical images.

V. Conclusion

In this look at, the summary of medical image segmentation methodologies inherited impact out for computer image procedure is studied briefly indication. The examiner important opinions the evaluation on numerous identified methodologies. That carried out for image segmentation and sundry evaluation issues in the course of this subject of study. This have a look at targets to deliver a sincere guide to the research worker for those carried out their analysis take a look at within the photograph segmentation. Photo segmentation carries a promising future because the frequent segmentation algorithmic rule and has come to be the primary focus of recent analysis. Despite many many years of evaluation as much as presently to the records of authors, there is no universally standard method for image segmentation, because the effects of picture segmentation is littered with different factors, such as: similarity in images of images, spacial traits of the photograph continuity, texture, image content. Therefore there may be no single method which is probably thought of thinking for neither all reason of pixels nor all strategies equally clever for a specific kind of photograph. Due to all better than factors, image segmentation stays a hard drawback in photo

procedure and computer vision and remains a unfinished downside within the international.

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