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Automation of OPG image segmentation

S. S. Dhole [1], Prof.R.V.Mante [2], Dr. P. N. Chatur [3]

M.Tech., Department of CSE, Government College of Engineering, Amravati, Maharashtra, India[1]

Assistant Professor, Department of CSE, Government College of Engineering, Amravati, Maharashtra, India[2]

Head of Department, Department of CSE, Government College of Engineering, Amravati, Maharashtra, India [3]

Abstract: OPG images are critical for diagnosis and study of disease. It is hard to detect affected area by viewing/seeing the x-ray image. So patient has to go with different test to get that affected area which takes few days for processing. Again to detect it has to concern with the specialist and the other procedure. This process is expensive which cannot afford by economically weak people. Manual segmentation of OPG is not only demanding for experts but also inherently subjective and excessively time consuming for clinical use and different annotators often yield different results. To address these difficulties, different approaches for automated segmentation of OPG have been tried with varying levels of success. So this paper aims to provision of s/w or tool for segmenting the affected area may become a good solution which is economically feasible.

Keywords: Diagnosis, OPG, Processing, Subjective, X-ray

I. INTRODUCTION

Dental radiographs have been widely used by dentists in finding periodontal lesions or monitoring the progress of the periodontal defect treatment that is either impossible or difficult for human naked eyes. With the advantage of digital dental X-ray images, such as the immediate availability, the lower radiation dose, the possibility of image enhancement, and image reconstruction, etc., the usage of digital dental X-ray images has a great increase in the past decade in both forensic identification and clinical diagnosis.[2] Despite of rapid growing popularity of digital dental X-ray images, automatic lesion detection in these images by computers still is a big challenging task because of the following reasons: (1) poor image quality such as noise,low contrast, varying illumination; (2) complicated topology of lesion regions; (3) arbitrary teeth orientation; (4) lack of clear lines of demarcation between healthy and problem teeth or gums.

Segmentation is a vital aspect of medical imaging. It aids in the visualization of medical data and diagnostics of various diseases. Segmentation is defined as partitioning portions of an image. It adds structure to a raw image. In the case of medicine, this can involve identifying which portions of an image is the tumor. The main goal of image segmentation is domain independent partitioning of an image into a set of disjoint regions that are visually different, homogeneous and meaningful with respect to some characteristics or computed property such as grey level, texture or colour to enable easy image analysis. We propose a software tool for segmenting the affected area may become a good solution which is economically feasible.

The rest of this paper is organized as follows: In Section II describes literature review. Section III describes proposed work. Finally section IV concludes the paper.

II. LITERATURE REVIEW

The Almi'ani, Barkana developed an automatic segmentation algorithm for brain Magnetic Resonance Angiography (MRA) images to extract the vascular structure based on region-growing method. Intensity information is used as a criterion of homogeneity. MRA was introduced into clinical practice about two decades ago and it provides a variety of significant advantages over competitive methods in vascular imaging. The value of MRA is widely accepted for head and brain imaging. Automatic image segmentation is a prominent process that partitions a digital image into disjoint connected sets of pixels, each of which corresponds to structural units, objects of interest or region of interests (ROI) region in image analysis. The proposed algorithm contains two major stages: (a) Image enhancement and (b) Image segmentation. It provides a parameter-free environment to allow no user intervention. Image denoising and vessel enhancement are useful for improving the display and the segmentation. In order to improve the performance of the region–growing method, applied contrast enhancement by power-law transformation by the gamma correction technique. Conventional low-pass filter is used as a noise reduction method [6].

Jie WuSkip Poehlman, Michael D. Noseworthy, Markad V. Kamath (2008) proposed a new texture feature based seeded region growing algorithm is proposed for the automated segmentation of organs in Abdominal MR image. Co-occurrence texture feature and semi-variogram texture feature are extracted from the image and the seeded region growing algorithm is run on these feature spaces. With a given Region of Interest (ROI), a seed point is automatically picked up based on three homogeneity criteria. A threshold is then obtained by taking a lower value just before the one causing

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'explosion'. This algorithm is tested on 12 series of 3D abdominal MR images [7].

Mamoun Alazab, Mofakharul Islam, and Sitalakshmi Venkatraman presents an efficient segmentation algorithm that can segment a digital image of interest into a more meaningful arrangement of regions and objects. Image analysis is being adopted extensively in many applications such as digital forensics, medical treatment, industrial inspection, etc. Primarily for diagnostic purposes. Hence, there is a growing interest among researches in developing new segmentation techniques to aid the diagnosis process. Manual segmentation of images is labour intensive, extremely time consuming and prone to human errors and hence an automated real-time technique is warranted in such applications. There is no universally applicable automated segmentation technique that will work for all images as the image segmentation is quite complex and unique depending upon the domain application. Hence, to fill the gap, this paper presents an efficient segmentation algorithm which combines region growing approach with optimised elimination of false boundaries to arrive at more meaningful segments automatically. They demonstrate this using X-ray teeth images that were taken for real-life dental diagnosis [1].

III. PROPOSED WORK

The main stages of the project are as follows:

1. Input image
2. Image Preprocessing

Noise Removal

3. Image Segmentation
4. Output image

The project is designed in different stages as shown in the Fig. 1 below:

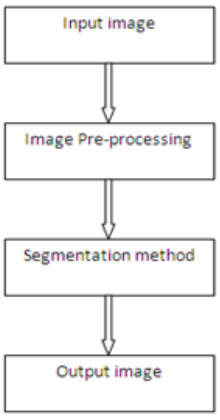

Fig. 1 Proposed outline

First Data is collected from different hospitals. Some images are available at following site http://rad.usuhs.edu/medpix/parent.php3?mode=single&pk=5653#images. These images are provided as a input image to the system. After that image preprocessing will be applied if required. Since most of the images are collected from hospital and medical colleges. Image preprocessing include noise removal step. Then most important segmentation method will be applied which provide the accurate segmentation to get the output as a affected area. Segmentation methods help to segment the image. There are Different image segmentation methods like thresholding method[3], active counter method[8], clustering method[9], Region Growing Method[10], split and merge segmentation, boundary based method. For segmentation watershed algorithm is used.Watershed algorithm based on morphological theory is first proposed by S. Beucher and L. Vincent and developed rapidly in image segmentation field in recent years. In geography, a watershed refers to a dam. The river systems in the area on either side of dam have different directions. We apply these concepts to the gray scale image processing system to solve the issues of segmentation. We need to regard the gray scale image as a topological surface. And $f(x, y)$ can be viewed as the height. Water always flows to the relatively low areas and would stop at the local Low-lyings called catchment basins. And we call the dam watershed. It has the same possibility for water to flow to different catchment basins. The purpose to apply this idea to the gray image segmentation is to get all the water catchment basins and watersheds. Watershed algorithm behaves well in positioning the edge rapidly and it is capable of detecting weak edges of the targets. But it also suffers from the serious problem of oversegmentation. The proposed methods of improving this phenomenon can be divided into two categories: preprocessing such as enhancement and markers and processing applied after watershed segmentation algorithm like merging the small regions. In this paper, we take the preprocessing to improve the phenomenon of over-segmentation.

IV. CONCLUSION

We proposed a software or tool for segmenting the affected area may become a good solution which is economically feasible. OPG images are hard to detect affected area by viewing/seeing the x-ray image. So patient has to go with different test to get that affected area which takes few days for processing. Presented Method is successful or not can be checked with the help of more and more images that can be present in dataset. It is possible to work and develop better criteria function then we can also provide accurate output of OPG image segmentation

REFERENCES

[1] Mamoun Alazab, Mofakharul Islam, and Sitalakshmi Venkatraman, "Towards Automatic Image Segmentation Using Optimised Region Growing Technique" A. Nicholson and X. Li (Eds.): AI 2009, LNAI 5866, 2009, pp. 131–139.

[2] G.Ulaganathan, A.Banumathi, J.J Amutha , A.Jeevani Selvabala, "Dental Cyst Delineation Using Live Wire Algorithm", 978-1-4673-2322-2/12 IEEE 2012,pp.129-133.

[3] Nobuyuki Otsu, "A Tlreshold Selection Method from Gray-Level Histograms", 2EEE TRANSACTIONS ON SYSTREMS, MAN, AND CYBERNETICS, VOL. SMC-9, NO. 1, JANUARY 1979,pp. 62-65.

[4] Jagannathan, Jie Wu1, Skip Poehlman, Michael D. Noseworthy, Markad V. Kamath "Texture Feature based Automated Seeded Region Growing in Abdominal MRI Segmentation" International Conference on BioMedical Engineering and Informatics , H. Poor, *An Introduction to Signal Detection and Estimation*. New York: Springer-Verlag, 1985, ch. 4, 2008, pp. 263-267.

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[5] S. Lachure,Prof. Ravi. V. Mante ,Dr. Prashant N. Chatur, "A Simple Review On Supervised Blood Vessel Segmentation Methodologies In Retinal Images Along With Databases", International Journal of Management, IT and Engineering, Volume 3, Issue 2,February 2013, pp. 456-476.
[6] Muder M. Almi'ani, Buket D. Barkana, Automatic Segmentation Algorithm for Brain MRA Images,2011
[7] Jie Wu1, Skip Poehlman, Michael D. Noseworthy, Markad V. Kamath "Texture Feature based Automated Seeded Region Growing in Abdominal MRI Segmentation" International Conference on BioMedical Engineering and Informatics ,2008, pp. 263-267
[8] Ghassan Hamarneh, Artur Chodorowski, and Tomas Gustavssoni , "Active Contour Models: Application to Oral Lesion Detection in Color Images" IEEE 2000, pp. 2458-2463
[9] Ock-Kyung Yoon, Dong-Min Kwak, Dong-Whee Kim*, Kil-Houm Park, "MR brain image segmentation using fuzzy clustering", 1999 IEEE International Fuzzy Systems Conference Proceedings August 22-25, 1999, Seoul, Korea, pp. II852-853
[10] Harikrishna Rai G.N, T.R.Gopalakrishnan Nair, "Gradient Based Seeded Region Grow method for CT Angiographic Image Segmentation", InterJRI Computer Science and Networking, Vol. 1, Issue 1, July 2009, pp. 1-6.

BIOGRAPHIES

S.S.Dhole received her B.E. degree in Computer Science and Engineering from Raisoni college of Engineerin, Amravati, Maharashtra, India, in 2012, pursuing M.tech. degree in Computer Science and Engineering from Government college of Engineering, Amravati, Maharashtra, India. Her research interests include image processing. At present, She is engaged in medical application which detects segment Dental radiograph to detect affected area.

Prof. Ravi V. Mante received his B.E. degree in Computer science and Engineering, from Government college of Engineering, Amravati, Maharashtra, India in 2006, the M.tech. degree in Computer science and Engineering, from Government college of Engineering, Amravati, Maharashtra, India, in 2011. He is Assistant professor in Government college of Engineering, Amravati, Maharashtra, India. From 2007. His research interests include ECG signal analysis, soft computing technique, cloud computing. At present, He is working with Artificial neural network.

Dr. P N Chatur has received his M.E. degree in Electronics Engineering from Govt. College of Engineering Amravati, India and Ph.D degree from Amravati University. He Has Published twenty papers in national Conferences and Ten papers in international journals.His area of research includes Artificial Neural Network, Data Mining, Data Stream Mining and Cloud computing. Currently he is Head of Computer Science and Engineering Department at Govt. College of Engineering Amravati, Maharashtra Indi India. At present he is engaged with large database mining analysis and stream mining