RESEARCH PAPER | Engineering | Volume : 3 | Issue : 10 | Oct 2013 | ISSN - 2249-555X

Edge Analysis of Optical Coherent Tomography Image by Statistical Methods

KEYWORDS: Optical coherent tomography; edge analysis; Statistical techniques

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ABSTRACT *The role of optical coherent tomography image is important for the diagnosis of retina layers in ophthalmology. Here OCT image is subject to computed by edge detection methods. The output of edge detection is applied to standard statistical techniques of Entropy, Kurtosis, slew, Standard deviation and variance. The result is analyzed on linear and non-linear output such that edge detection methods are valuated.*

INTRODUCTION

Optical coherent tomography is a new innovation technology in the era of ophthalmology in diagnosis the retina. This image gives the precise output of retina layers and effective diagnosis procedure can be carried out. In this paper, the diagnosis a disease of Central serous retinopathy (CSR) figure [1] is taken for analysis in the edge detection methods [1].

CSR is the disease, which occurs in the macular region. The effect caused is that, the fluid is accumulated between choroid and the photoreceptor layers. These make the vision poor and damages the retina layers if it is not identified and undiagnosed.

In the computation aids to diagnosis the CSR-OCT diseases, the edge detection is important process to identify the stage and level of effect in the retinal layers. To identify the effective edge detection methods [2], statistical techniques is applied. By the basic statistical techniques in the mode of identifying,

the linear and non-linear performance of image edging is evolved.

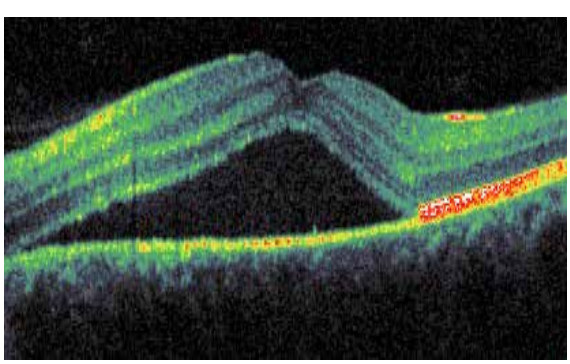

Figure 1: The effect of Central serous retinopathy diseases.

COMPUTATION METHODS

The edge detection is tedious process in retinal image of optical coherent tomography [3]. Before get into the new derivation of edge detection, it is most significant task to identify and analysis with existing and standard edge detection techniques.

Images in medical processing, the detection of effective tissues or layer must be priority identify. The most standard image processing edge detection techniques are computation. They are Zero Cross (ZC), Canny, FreiChen (FC), Sobel, Laplacian, Non-maxima, Prewitt and Robert edge detection methods [4]. By applying the edge detection operator in the software tool of Matlab, the output is obtained. The output is taken for the analysis in statistical techniques of Entropy, Kurtosis, Skew, Standard Deviation and Variance. The statistical techniques chosen here are standard and it have is own significant [5].

RESULT AND ANALYSIS

Here a value of statistical techniques is shown in the graph figure [2]. The values of statistical techniques are linear in values with respective to most of the edging methods [6]. Kurtosis and variance are drastic change in values and non-linear. The other statistical values are obtained the values in linear vales with respective to methods [7].

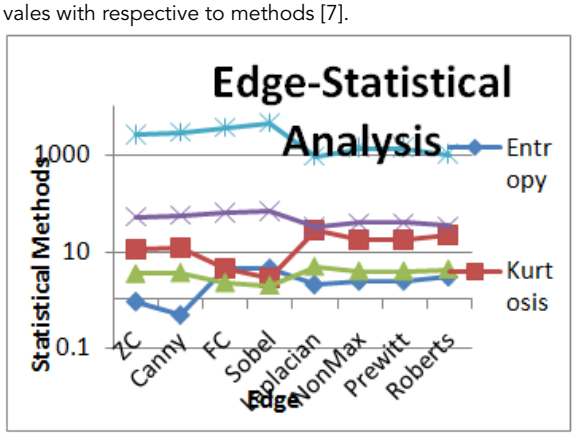

Figure 2: Statistical analysis in various edge detection methods

In Entropy, Sobel is higher in values and canny and ZC is lower in values. Consistency in values is fined in Laplacian, Non-max, Prewitt and Roberts's methods [8]. In Kurtosis, Lower and Higher values are Sobel and Laplacian Respectively. ZC and Canny are fined to have similar in values of the statistical techniques in Kurtosis. Other similarity is fined in Non-max and Prewitt. In Skew, the lower and higher value is as similar of Kurtosis. Higher values are FC and Sobel. Other ranger of values is fined in ZC and Canny. Other method resembles the same type of similarity in values of statistical output. In variance, the higher value is Non-max and Prewitt, both resembles the same values [9]. In other methods there seem to have drastic change in valued. Relation of similarity in values

Volume : 3 | Issue : 10 | Oct 2013 | ISSN - 2249-555X

is found in ZC and Canny.

CONCLUSION

The edging is effective role especially in retinal optical coherent tomography images. To identify the similar and linear edging methods, the new derivative of computation procedure in the retinal layers can be derived. On analysis the graphical result, the linear and non-linear is been explained in results. Taking the linear graphical output in edge methods, the path of finding towards of the new derivative of formulated to computation process in future works. In output of edging from MatLab, ZC and canny detection is mostly match with the objective but the layer is distorted with other unwanted detection also is obtained. The new work is derived based on the ZC and canny edge detection for the objective to compute the perfect detection of retinal layers.

ACKNOWLEDGMENT

I express my gratitude for the support of OCT image from RIO-GOH, Egmore, Chennai. Dr. R Ravanan, Department of Statistics, Presidency College, Chennai for MDS models. Special thanks to my Supervisor Prof. Dr. R. Ananda Natarajan for the support and guidance in the research work.

REFERENCE

[1] Mr. Salem Saleh Al-amri, Dr. N.V. Kalyankar and Dr. Khamitkar S.D "Image Segmentation By Using Edge Detection", International Journal on Computer Science and Engineering(IJCSE) Vol. 02, No. 03, 2010, 804-807 | [2] Richard J. Qian and Thomas S. Huang, "Optimal Edge Detection in Two-Dimensional Images," IEEE Transactions on Image Processing, Vol. 5, No. 7, July 1996, 1215-1220. | [3] Felice Andrea Pellegrino, Walter Vanzella, and Vincent Torre, "Edge Detection Revisited", IEEE Transactions on Systems, Man, and Cybernetics—Part B: Cybernetics, Vol. 34, No. 3, June 2004 | [4] Mark A. Ruzon and Carlo Tomasi "Color Edge Detection with the Compass Operator", In IEEE Conference on Computer Vision and Pattern Recognition '99, Volume 2, pages 160-166, June 1999. | [5] Tapas Kanungo, M. Y. Jaisimha, John Palmer, and Robert M. Haralick "A Methodology for Quantitative Performance Evaluation of Detection Algorithms" IEEE Transactions On Image Processing, Vol. 4, No. 12, December 1995. | [6] Z.J. Hou, G.W. Wei, "A new approach to edge detection", Pattern Recognition 35 (2002) 1559–1570. | [7] Qiang Ji, Robert M. Haralick, "Efficient facet edge detection and quantitative performance evaluation", Pattern Recognition 35 (2002) 689-700 | [8] John Canny, "A computational approach IEEE Transactions on PAMI, 8(6):679–698, 1986. | [9] J. Shi and J. Malik. "Normalized Cuts and Image Segmentation", In IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 22, 8:888-905, 2000.