International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622
International Conference on Humming Bird (01st March 2014)

RESEARCH ARTICLE OPEN ACCESS

Hybrid Glucoma Screening Method Using Optic Disc Segmentation and True Vessel Extraction

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Abstract
In this project the true vessel is identified using optic disc segmentation by using Gabor Wavelet Transform in retinal images. It gives the path to identify the true vessels for the retinal images. The earlier version was based on post processing step for identification, vascular vessel segmentation and identification of distinct vessel by linking the segments in vascular to get the connected graph. This graph help us to trace the true vessel after the segmentation process. In the post processing step, it requires the starting point of the vessel to be pre-determined in the optic disc. For finding the starting point in the optic disc takes more time and by using this method we can identify only one vessel at a time. By using vascular vessel segmentation we can identify multiple vessels at a time. We can find the shortest path by using Dijkstra's algorithm. The two main parameters used in these methods are crossover and bifurcation. The major drawback in this method is noise and there is no image enhancement. So we propose optic disc segmentation and true vessel extraction for identifying the true vessels in the retinal images and the noise filtering and the vessel enhancement are done by using Gabor Wavelet Transform

Keywords: Optic Disc, Crossover, Bifurcation, Gabor Wavelet Transform.

I. INTRODUCTION

Glaucoma is a chronic eye disease in which the optic nerve is progressively damaged that leads to vision loss. It is the second leading cause of eye blindness. [1] Progression of the disease leads to loss of vision. As the symptoms only occur when the disease is quite advanced, glaucoma is called as the silent thief of sight. Glaucoma cannot be cured but its progression can be slowed down by treatment. Therefore, detecting glaucoma in time is critical. In Singapore, more than 90% of patients are unaware that they have this condition [2], [3]. In Australia, about 50% of people with glaucoma are un-diagnosed [4]. Since glaucoma signs with few signs and symptoms and the vision loss from glaucoma is irreversible, screening of people at high risk for the disease is vital.

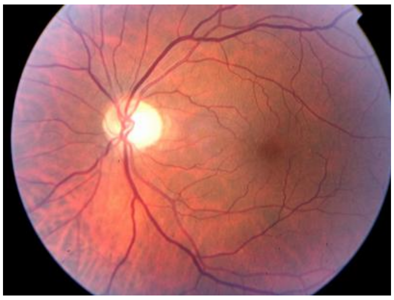


Fig. 1 Reflectance fundus image of a healthy retina

This method produces segmentations by classifying each image pixel as vessel or non-vessel based on the pixel wavelet transform responses taken at multiple scales. The Gabor Wavelet is capable of tunings to specific frequencies, thus allowing noise filtering and vessel enhancement in a single step. We use a Bayesian classifier with class- conditional probability density function (likelihoods) described as Gaussian mixtures, yielding a fast classification, while being able to model complex decision surfaces.

II. SYSTEM MODEL

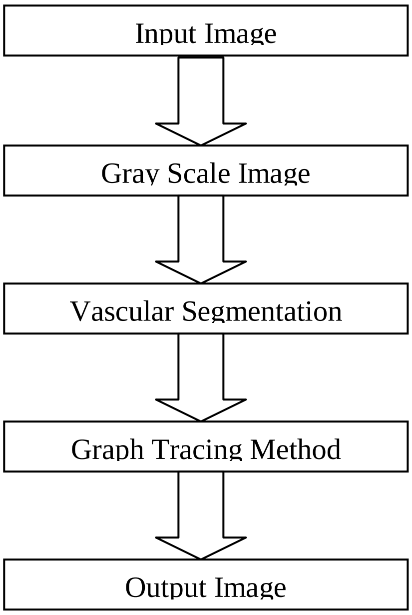
Several segmentation method has been proposed for identifying the true vessel in the retinal images. The post processing step which requires the starting point of the vessel to be predetermined, it takes long time to identify the true vessel and we can identify only one vessel at a time. In vessel vascular structure segmentation method the two main parameters has to be consider, they are crossover and bifurcation. By using this method we can identify multiple true vessel simultaneously. The shortest path can be identified by using the Dijkstra's algorithm. The major drawback in this method is, the output image we obtained is in noise, So by using this method there is no noise filtering and image enhancement for identifying the true vessels.

III. EXISTING METHOD:

STEPS:

- MRI image of the eye is given as the input.

- Then the binary input image is converted into the gray scale image.
- Vascular vessel segmentation is done
- Identification of distinct vessel by linking the segments in vascular to get the connected graph.
- Tracing is done to identify the true vessels
- Output image is obtained



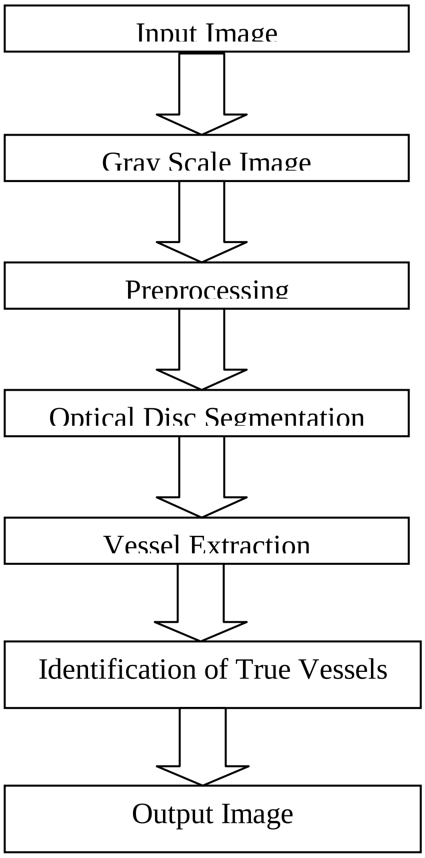
IV. PROPOSED WORK

The proposed work is done by using Gabor wavelet transform. The Gabor Wavelet Transform which is used to determine the sinusoidal frequency and phase content of the local sections of a signal in a retinal image as it changes over time. The function to be transformed is first multiplied by a Gaussian function, which can be regarded as a window function and the resulting function is then transformed with a Fourier Transform to derive the time frequency analysis.

STEPS:

- The MRI image(binary image) is given as an input
- The binary image is then converted into the gray scale image
- Preprocessing step
- Optic Disc segmentation
- Vessel Extraction
- Identifying the true vessels from the segmented retinal images.
- Required vessel as an output image

FLOWCHART:



V. CONCLUSION

We have presented a novel technique to identify true vessels from retinal images. The accurate identification of vessels is key to obtaining reliable vascular morphology measurements for clinical studies. The proposed method is a optic disc segmentation and the true vessel extraction by using Gabor Wavelet Transform. The problem is modeled as finding the optimal vessel forest from a graph with constraints on the vessel trees. All vessel trees are taken into account when finding the optimal forest; therefore, this global approach is acutely aware of the mis linking of vessels. Experiment results on a large real world population study show that the proposed approach leads to accurate identification of vessels and is scalable. The major advantage over existing methods are by using Gabor Wavelet Transform the noise filtering and the vessel enhancement are done automatically.

VI. ACKNOWLEDGMENT

The authors would like to thank the MESSIDOR program partners (see http://messidor.crihan.fr) and Analysis of Digital Retinal Images Project team for providing the MESSIDOR database and the manual optic disc ground truth.

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