

Vessel & Optic Disk Detection using Statistical Measures

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Abstract—retina is the only tissue in human body from which The information of blood vessel can be obtained. The information gain from retinal vessel helps in treatment of various eye diseases like diabetic retinopathy, hypertension, glaucoma, hemorrhages, vein occlusion, and neovascularization. In modern technologies ophthalmologist are able to read all information from blood vessel & Optic disk. For which there are various image analysis methods. In this paper, we present local operators for calculation image values using the standard deviation, entropy and range method. This research shows the effect of three different texture filters based on calculating the variance like standard deviation, range and entropy over a locally defined neighborhood.

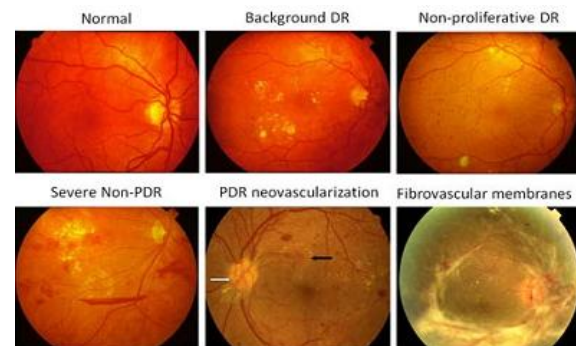
Index Terms—

Fundus Images, optic disc, Diabetic Retinopathy, Hypertension, Glaucoma.

I. INTRODUCTION:

The structure of the retinal blood vessel and the optic disk is an important indicator to determine the presence and severity of retinal diseases such as diabetic retinopathy. Ophthalmologists observes if the vessel structures are complicated or to assess the diameter and tortuosity of the retinal blood vessel or the shape of the optic disk, manual planimetry. The blood vessel information is then use to calculate approximately the position of optic disc. computer-aided diagnosis method is able to detect such complications. Eye diseases have various stages like diabetic retinopathy, hypertension, glaucoma, hemorrhages, vein occlusion, and neovascularization.

The optic disk & vessel segmentation is performed using filter methods.



II. METHODS OF DETECTION:

Texture features based on statistical measures:

Accordingly, texture measures the attempt to capture characteristics of the intensity fluctuations between groups of neighboring pixels, something to which the human eye is very sensitive. Note that texture measures based on statistical measures must generally be defined with respect to a certain neighborhood Ω which defines the local region over which the calculation is to be made.

In the simplest terms, texture is loosely used to describe the 'roughness' of something. The simplest such measures are the range defined as,

$$R_{\Omega} = \{\max(I(x, y)) - \min(I(x, y))\} \Omega 1$$

and the local variance defined as

$$\text{Var}_{\Omega} = \{I^2(x, y) - \min(I(x, y))^2\} \Omega 2$$

Where the angle brackets denote averaging over the neighborhood Ω . By first applying a degree of smoothing and varying the size of Ω , we can attempt to extract multi scale measures of texture. Figure an image with two contrasts in textures and the results of applying the local range, entropy and variance operators.

This paper shows the effect of three different texture filters based on calculating the variance standard deviation, range and entropy over a locally defined neighborhood. [1]

III. RESULTS

As Shown In figure, The response to the image is given by applying filters extending over a certain neighborhood region of the target pixel. Proceeding from left to right: The original input image is followed by the output images resulting from local operators calculating the standard deviation, entropy and range.

The results and comparison with alternative methods show that our method achieved exceptional performance in segmenting the blood vessel and optic disk.

Input Image Std.Dev. Entropy Range

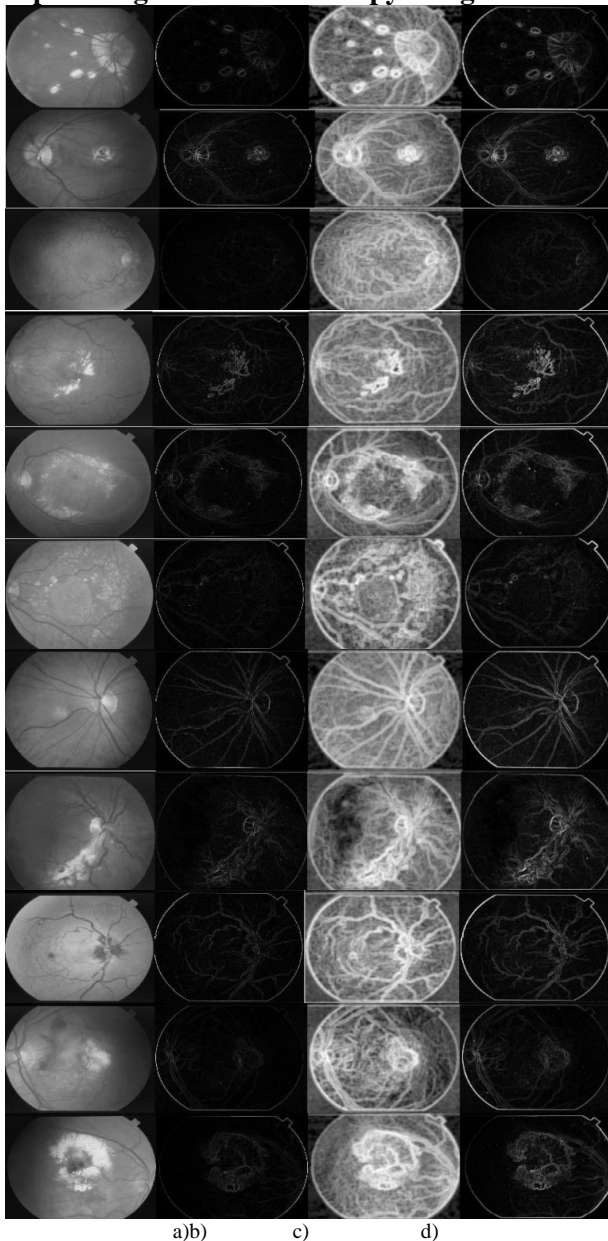


Figure 1) some basic local texture operators: a) Input Image b) Std.Dev c) Entropy d) Range

IV. CONCLUSION:

Due to eye diseases human eye has to face problems like Micro aneurysms (MA) and hemorrhages. So our image analysis system is important for comprehensive analysis and grading of Diabetic Retinopathy (DR) uses color fundus images [2]. For the diagnosis of complete diseases, assessment of retinal blood vessel is significant.

Methods used in this research like shows the effect of three different texture filters based on calculating the variance standard deviation, range and entropy over a locally defined neighborhood. It offers lot information conversely for easy recognition of exudates or micro aneurysms [3]. Diabetic retinopathy is cause by mutually the forms of diabetes. It is a extremely asymptomatic disease in the premature stages and it could lead to lasting vision loss if untreated for long time. The problem here is the patients may not know about it until it reaches advanced stages. Before reaching to last stage ophthalmologist can detect the disease prissily & can avoid vision loss [4].

V. REFERENCE:

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