A Hybrid Approach of Detection of Glaucoma using SDC based Method and LBP Features

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***Abstract*----Glaucoma is an eye ailment which prompts enduring visual inadequacy which is made in view of extension in the intraocular weight at the dividers of the eye. It is said that glaucoma is the second sickness on the planet which prompts visual deficiency. At the essential stage glaucoma does not demonstrate any detectable side effects and at the propelled stages it specifically prompts visual deficiency. There is a solitary identifier for this sickness called "Container to glass" proportion which gives exceptionally precise consequences of glaucoma identification. The glaucoma determination experience numerous stages like first the specific instruments it needs to look at optic plate, optic glass, appropriate emission of inward liquids to the retina all these procedures are exceptionally tedious and analyzing these elements when the infection is propelled won't give any option. It specifically cause loss of visual perception. Consequently glaucoma screening by container to plate proportion will be extremely proficient technique for screening in vast populace based frameworks. Self assessed disk segmentation is the methodology which consolidates the superpixel division, edge recognition and round hough change. Edge location is essential element for the identification of the region of container and the plate in the division process. It will classify the input image into normal, medium and severe cases. This will be very helpful for the patients to know that in which stage the disease is progressed and they can take some preventive measure against vision loss.**

Keywords: Container to glass ratio, Glaucoma screening, Superpixel division.

I. INTRODUCTION

Glaucoma is an endless eye ailment which prompts the perpetual loss of vision. It might a probability that by the year 2020 it may effect 80% of the world's population. By the progression of the disease to the advanced stages it leads to affect peripheral side of the eye. Hence it is also called "Sneak thief of vision".[1] Normally there are three methods of detection of glaucoma:

Intraocular pressure:

The increase in intraocular pressure there will be damage of optic nerves inside the eye.

The aqueous humor liquid does not secret properly at the front of the eye. There will be blocking of inside channel which leads to vision loss.

Visual field test:

It requires specialized instruments which will be available at specialized hospitals. It is not efficient method.

Optic nerve head:

The destruction of this optic nerve is distinguished as a noteworthy sign of glaucoma. Hence this is the most promising factor in detecting glaucoma.

Over 8.4 billion individuals will be along the side visually impaired from glaucoma and it is assessed that 12 % of world visual impairment is brought about by glaucoma. Glaucoma is brought about by various diverse eye issues that outcome in steady vision misfortune because of harm to the optic nerve. Since early recognition and treatment are fundamental to counteracting glaucoma and the going with vision misfortune, it is critical to have routine eye exams by the specialists. For detecting the severe population based glaucoma the task becomes more tedious, time consuming by examining using specialized instruments. In order to avoid these factors it is essential to introduce an efficient method called "Cup to Disk ratio"(CDR). It will prevent most of the patients to suffer from loss of vision. It helps to take some preventive measure against glaucoma.

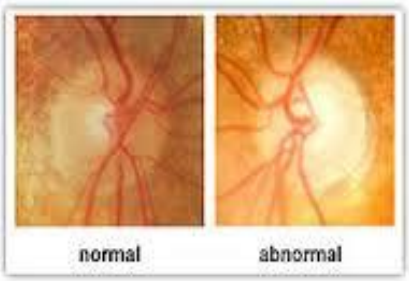

Figure 1 image of normal and abnormal eye.

II. RELATED WORK

As of now the air-puff intraocular pressure (IOP) estimation, visual field test and optic nerve head(ONH) evaluation are frequently utilized as a part of glaucoma appraisal. Be that as it may, the IOP estimation gives low precision in glaucoma discovery and visual field test examination requires unique hardware just present in specific doctor's facilities. Along these lines, they are appropriate for screening in populace. ONH evaluation is all the more encouraging for glaucoma screening. It should be possible by a prepared proficient. However manual appraisal is subjective, tedious and costly. Lately robotized calculations for ONH appraisal have gotten much consideration. There is some exploration into mechanized container to circle

ratio(CDR) evaluation from 3-D pictures, for example, stereo pictures and optical cognizance tomography pictures. However the expense of getting 3-D pictures is still high, which makes it unseemly for minimal effort expansive scale screening. The 2-D retinal fundus pictures can be gained at much lower cost on the grounds that such fundus cameras are generally accessible in clinics, polyclinics eye focuses and optical shops. In this way, there is minimal extra equipment expense to assemble a glaucoma screening program utilizing existing fundus cameras.

III. PROPOSED METHODOLOGIES

The CDR will process the input image in certain number of steps. The productive glaucoma screening technique CGR(Container to glass ratio) which will fragment the optic glass and optic plate and figure the region of the circle and territory of the container. It will at long last control Cup to Disk proportion which will arrange the quantity of info pictures into ordinary, moderate and medium model. By this proportion the patient will have the capacity to recognize the infection at the essential stages and takes preventive measure against vision misfortune. [5]

Superpixel segmentation contains huge number of pixels and the pixel intensity is not evenly distributed. For this we use an algorithm called Simple Linear Iterative Clustering(SLIC). This algorithm forms an aggregation of nearby pixels with same property, texture are grouped to a single cluster which is a superpixel segmentation.

Edge detection which is used to deduct the exact shape of the optic cup because cup will be smaller compared to neuroretinal rim and cup is enlarged which will lead to error in the CDR. Circular hough transform is a feature extraction technique which reshapes the irregular input image and to extract the particular feature which can be further enhanced.

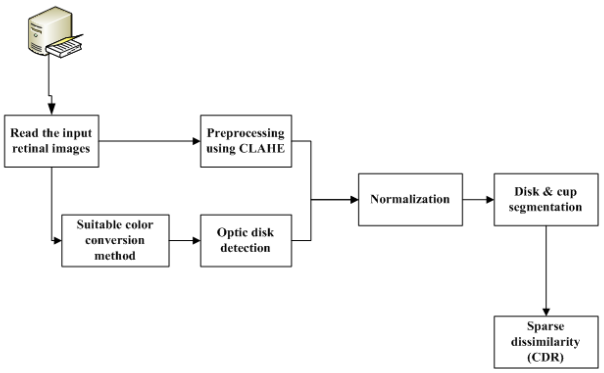

Figure 3.1 System architecture

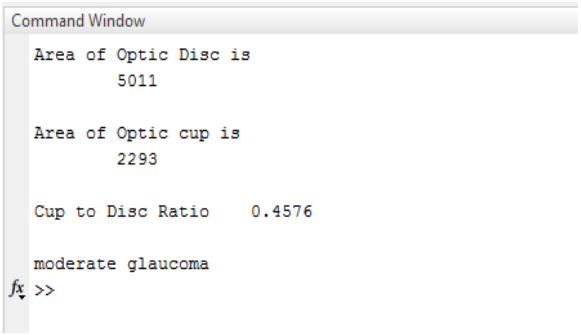

Figure 3.2 CDR calculation

The figure shows system architecture that input is processed in certain steps to get expected results. [5]

Input image: First we read the input image.
Preprocessing using CLAHE: It is the differentiation restricted versatile histogram adjustment which is a propelled adaptation of versatile histogram leveling. It is utilized to build the difference of an info picture which encourages simple perception.
Suitable color conversion: The color conversion is required because to have efficient only green channel is more suitable for computing the CDR.
Optic disk detection: It is important to recognize the edges of the optic circle for effective calculation of cup to disk proportion**.**
Normalization: It is the method which is used to achieve consistency of the images by removing the blood vessels and illumination of the green channel image.
Disk and cup segmentation: Finally we extract the cup and disk from the input image as a result of segmentation.
Sparse dissimilarity: The sparsity and dissimilarity constraints are enhanced to the CDR.

IV. EXPERIMENTAL RESULTS

The successor effects of data picture is grouped into moderate glaucoma and ordinary glaucoma. We have extricated plate and removed glass from which we discover the range of the container and the circle and control their proportion. It gives more accurate results.

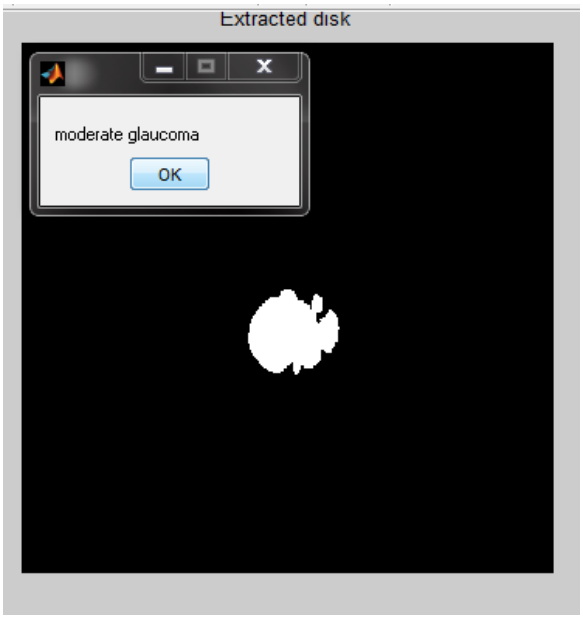

Figure 4.1 Extracted disk

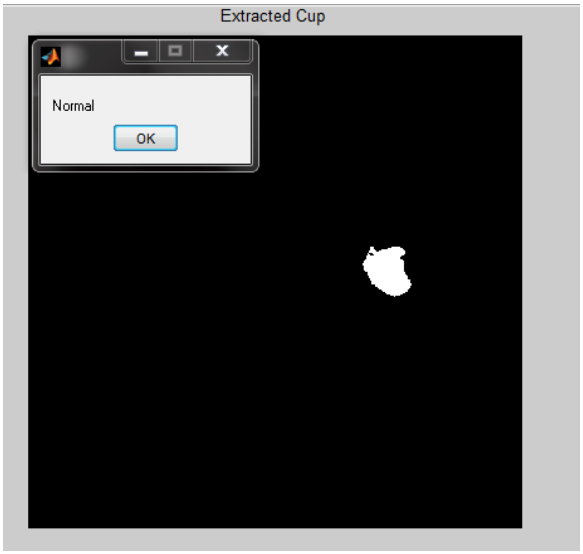

Figure 4.2 Extracted Cup

The extracted portion and the container and the glass will make the ratio of the container and the glass compute their ratio and the disease will be classified into normal, moderate and the severe. The disease type if severe has to take some preventive measure.

V. CONCLUSIONS

This paper used the earlier learning of cup area by utilizing area highlight to defeat this issue. Albeit some change can be seen, it likewise prompts the methodical predisposition. Since CDR just reflects one part of the plate, consolidating it with different components is relied upon to promote enhance the execution. Future work will investigate the combination of different variables to enhance demonstrative results towards a more solid and effective glaucoma screening framework.The proposed technique processes the dissimilarities between the container and the glass from their general power changes and uses them as the divergence imperative in the SDC-based plate remaking. The portion of the circle utilizing the plate division strategy as a part of which first preprocessing, for example, picture filtration, shading contrast upgrade are performed which is trailed by a consolidated methodology for picture division and arrangement utilizing surface, Thresholding and morphological operation for fragmenting the Optic Cup. In view of the sectioned plate and container, CDR is processed for glaucoma screening.

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