SECONDARY GLAUCOMA DIAGNOSIS TECHNIQUE USING RETINAL LAYERS

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ABSTRACT:- Glaucoma is an eye contamination in which the optic nerve is hurt in a trademark plan. It is a second to waterfall as a primary wellspring of overall visual insufficiency and is the principle wellspring of irreversible visual incident. In this paper, Secondary Glaucoma Conclusion System using retinal nerve fiber layer supply courses is cleared up in inconspicuous component, for which we have code which expel the retinal nerve fiber layer passageways from data picture from HRF (High Determination Fundus picture) database containing healty, glaucomatous and diabetic retinopathy pictures and performs operations, for instance, hiding, shading plane extraction, green channel, histogram leveling, development and deterioration, 2d center channel, thresholding, HAAR wavelet change procedures and GLCM highlights extraction. Finally come to fruition as perplexity framework is created which recognizes the amount of healty, glaucomatous and diabetic retinopathy pictures in database and yield plot, precision with mix-up and without goof is determined for all these pictures of database.

KEYWORDS:- Shading Plane Extraction, Green Channel, Retinal Nerve Fiber Layer Arteries, HRF.

I.INTRODUCTION

Glaucoma is an eye disease in which the optic nerve is hurt in a trademark outline. It is a second to waterfall as a principle wellspring of overall visual lack and is the primary wellspring of irreversible visual setback. The purpose behind glaucoma is associated with raised intraocular weight. The part of acquired intraocular weight up glaucoma is ruined surge of liquid coming to fruition due to varieties from the standard inside the waste course of action of the front chamber edge (open-point glaucoma) or incapacitated access of watery to the leakage structure (edge conclusion glaucoma). The reactions of glaucoma depend on upon the kind of glaucoma, for instance, genuine desolation in one eye, squeamishness and disgorging, red eye, tearing, or may be see crowns around lights. Objective for glaucoma treatment is to diminish eye weight and it is depends of the kind of glaucoma. Glaucoma has been portrayed into specific sorts: 1. Crucial glaucoma 2. Developmental glaucoma 3. Helper glaucoma 4. By and large glaucoma

However Auxiliary Glaucoma Conclusion Strategy using retinal nerve fiber layer veins is cleared up in purpose of interest. For this work we have code which isolate the retinal nerve fiber layer supply courses from data picture from HRF (High Determination Fundus picture) database containing healty, glaucomatous and diabetic retinopathy pictures and performs operations, for instance, covering, shading plane extraction, green channel, histogram change, broadening and deterioration, 2d center channel, thresholding, HAAR wavelet change techniques and GLCM highlights extraction. In conclusion come to fruition as chaos cross section is delivered which recognizes the amount of healty, glaucomatous and diabetic retinopathy pictures in database and precision with screw up and without mix-up is figured.

II.BLOCK DIAGRAM

The block diagram is as shown below,

Firstly an image from database is chosen and is loaded,

For training dataset and testing dataset, preprocessing is done for the image, histogram equalization is done, nextly diailation and erosion is done, 2d-median filter is done to remove noise from the image, thresholding is also done for an image, lastly HAAR wavelet transform is applied for the image to obtain final output image.
II. METHODOLOGY

Firstly we have played out the preprocessing operations on high determination fundus pictures. In the preprocessing covering and shading plane extraction is done. Green channel is expelled from RGB picture, since green channel shows high power as appear differently in relation to red and blue independently. After green channel extraction histogram equalization is finished for update of picture, after histogram leveling picture is enhanced, then development and breaking down technique is finished, Then we have removed the optic circle from the photo since we have to extract the nerve fiber layers so to speak. After this we have used the 2D Middle channel for ousting the uproar. After this we have associated the Dim Edge limit and after that we have associated the HAAR wavelet on the isolated picture for expelling the nerve fiber layers. In the wake of Appling the HAAR wavelet limit, we get four sorts of yields. What's more, from these yields for the further setting we up have used the inaccurate picture and output is made.

Initially the picture is stacked and veiling is done then process is as per the following,

A. Pre-preparing

We have done preprocessing on fundus pictures that we have taken from the HRF (High Resolution Fundus) picture database. For preparing dataset,

B. Green channel

We have taken RGB picture and after that from RGB picture we have taken the Green Channel, since green channel demonstrates high force as contrast with red and blue.

recipe is \( g = \frac{G}{R+G+B} \)

Here \( g \) is a Green channel and \( R, G \) and \( B \) are Red, Green and Blue individually.

![Green Channel](image1)

**Figure 1:** Green Channel

C. Histogram leveling

On the Green channel relating picture, we have associated histogram evening out limit for enhancing the photo.

\[
h(v) = \text{round} \left( \frac{\text{cdf}(v) - \text{cdf}_\text{min}}{(M \times N) - \text{cdf}_\text{min}} \times (L - 1) \right)
\]

cdf\text{min} is the base estimation of the aggregate circulation capacity, \( M \times N \) gives the picture's number of pixels and \( L \) is the quantity of dim levels.

![Histogram Equalization](image2)

**Figure 2:** Histogram Equalization
By then we have used the Morphological arranging part to highlight the retinal nerve fiber layers of the retina.

\[
I_{\text{dilated}}(i,j) = \max_{i+j+m=\text{true}} I(i+n, j+m) \\
I_{\text{eroded}}(i,j) = \min_{i+j+m=\text{true}} I(i+n, j+m)
\]

In the wake of using the Morphological arranging segment, we have used the Morphological opening limit for thickening the retinal fiber layers. What's more, subsequently we have emptied the optic plate.

**Figure 3:** Optic Disc Removal

**D. 2D-Middle Channel**

Ensuing to performing Histogram evening out operation, then we have removed the optic circle from the picture. Resulting to ousting the optic circle, we have associated 2D Middle channel operation on picture for emptying the clatter.

\[
y[m, n] = \text{median}\{x[i, j] \mid (i, j) \in \omega\}
\]

**Figure 4:** Filtered Output

**E. Grey Threshold**

At that point we have utilize the threshold capacity for separating the retinal veins.

\[
T = \frac{1}{2} (m1 + m2)
\]

Here m1 & m2 are the Intensity Values

**F.HAAR wavelet**

In the wake of extricating the dim edge of the picture we have utilized the HAAR wavelets capacity.

\[
\psi(t) = \begin{cases} 
1 & \text{if } 0 \leq t < 1/2, \\
0 & \text{otherwise.}
\end{cases}
\]

Its scaling function \( \phi(t) \) is given as

\[
\phi(t) = \begin{cases} 
1 & \text{if } 0 \leq t < 1, \\
0 & \text{otherwise.}
\end{cases}
\]

In the wake of using the HAAR wavelet's mother limit it gives four sorts of yield and for the further taking care of we are using the inferred picture. Four sorts of yield are showed up in taking after figure.

**Figure 5:** Grey Threshold Image

**Figure 6:** Four Output Images

**IV.RESULT**

Retinal nerve fiber layer extraction

Retinal nerve fiber layers are evacuated viably in the wake of using the HAAR wavelet. We can see
here the assessed picture gives the adequately extraction of nerve strands.

Nerve fiber layers are isolated into three segments, Arteries, Veins, Vessels.

**Figure 8:** Output Image

For testing dataset,

Confusion matrix
Firstly in database we have 45 pictures which is 15 healthy, 15 glaucomatous and 15 diabetic retinopathy images. This grid recognizes which is healthy, glaucomatous, diabetic retinopathy pictures from database as demonstrated as follows.

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>14</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>0</td>
<td>1</td>
<td>14</td>
</tr>
</tbody>
</table>

Precision
At last exactness with blunder and without mistake is produced from perplexity network and output plot is shown.

**V.III. Future Scope**

Glaucoma is the optic nerve sickness which causes visual deficiency on the off chance that it stays untreated. Glaucoma recognition is the most imperative examination subject of restorative field these days. Distinctive restorative gadgets have come into presence for the recognition and finding of glaucoma however their utilization is especially costly. An extensive number of individuals over the world are tainted of this genuine eye infection. In this overview paper, different picture preparing methods and in addition diverse computer-based frameworks included especially in the location and analysis of glaucoma are examined in point of interest. The fundamental motivation behind this paper is to highlight the seriousness of glaucoma over the globe and additionally covering the examination work done as such far on this illness. This paper likewise communicates minor exertion with respect to of glaucoma malady.

The future bearings with respect to identification of glaucoma can be assessment of different calculations talked about in this paper by actualizing and testing them on extensive measure of information. Thus different contentions like neuro-retinal edge range, width can be computed which show the improvement of glaucoma. Similarly force of glaucoma can be controlled by utilizing 3D reconstruction, machine learning methodologies will be utilized for finding of commendable contentions in numerous examples like edge level set and edge location. There is a framework required which achieves high execution by advancing substantial number of information for making class and mixing different location approaches for the conclusion of glaucoma.

**V.III. References**


AUTHOR’S BIBILOGRAPHY

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