RESEARCH ARTICLE   OPEN ACCESS

Detection Of Optic Disc In Retina Using Digital Image Processing

Vijaya R.Patil MPHIL (Computer Science)III Sem,
Vaishali Kumbhakarna MPHIL (Computer Science)III Sem,Dr.Seema Kawathekar(Asst.Prof)
Dr.Babasaheb Ambedkar Marathwada University , Department of Computer Science.Aurangabad

--**--

Abstract:-

The retinal fundus image is widely used in the diagnosis and treatment of various eye diseases such as diabetic retinopathy and glaucoma. We propose a method to automatically detect the optic disc in fundus images of the retina. The method includes edge detection using the canny operators and detection of circles using the Hough transform method .In the proposed method, the images are collected from the DIARETDB0, DIARETDB1 database that is publically available on the internet.

Keywords: - diabetic **retinopathy, glaucoma, canny, Hough transform...**

--**--

I.INTRODUCTION:-

Retinal Image Analysis is a key element in detecting retinopathies in patients. Diabetic Retinopathy is one of the most common diabetic eye conditions which cause blindness induced by alterations in the blood vessels of the retina[7] .The general image of human eye is as follows
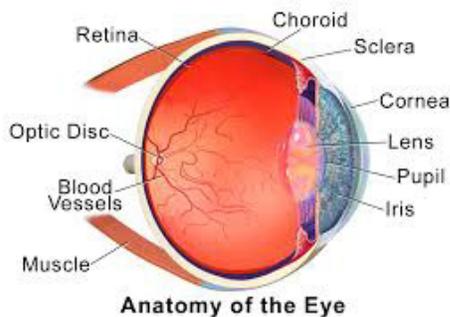

Fig.1.shows Anatomy of eye

Diabetic Retinopathy (DR) is a retinal disease derived from complications caused by the abnormally high glucose level in blood produced by diabetes mellitus. Nowadays DR is the leading ophthalmic pathological cause of blindness among people of working age in developed countries Automatic detection of optic disc from retinal images is very essential and

crucial for expert ophthalmologists to diagnose diseases. Localisation of the retinal optic disk has been attempted by

several researchers recently.[2] Typically the optic disc looks like an orange-pink donut with a pale centre
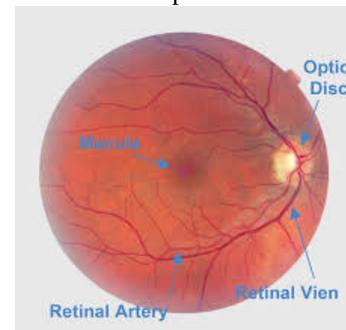

Fig2.shows Retina

Angel Suero[10] proposes a methodology for OD location in fundus images Input images are intensity images (I channel of the HSI color space), resized to have a retinal diameter of 300 pixels. A shade-correction method for homogenizing the background, as well as, a set of morphological opening and closing operations for enhancing bright structures, are applied to find a pixel within OD.

R R.Radha [9] Proposed a method for the Retinal image analysis through efficient detection of exudates and recognizes the retina to be normal or abnormal. The contrast image is enhanced by curvelet transform. Hence, morphology operators are applied to the enhanced image in order to find the retinal

image ridges. A simple thresholding method along with opening and closing operation indicates the remained ridges belonging to vessels.

Sopharak et al. [8] presented the idea of detecting the OD by entropy filtering. After pre-processing, OD detection is performed by probability filtering. Binarization is done with Otsu's algorithm [1] and the largest connected region with an approximately circular shape is marked as a candidate for the OD.

Adithya[11] propose method for the detection area is easily detected by using entropy map .In that

area could also be detected by using curvelet transform . In the region of interest (Roi) can be extracted using the average pixel and take the picture with the red channel gives the area centroid as the center .

Amanjot Kaur[12] proposed method consists of various steps: in the first step, a circular region of interest is found by first isolating the brightest area inthe image by means preprocessing, and in the second step, the Hough transform is used to detect the main circular feature (corresponding to the optical disk) within the positive horizontal gradient image within this region of interest and we done this feature extraction with the SIFT and LBP algorithm

II MATERIAL

  The database is freely downloaded and used for scientific research purposes. DIARETDB0 is a public database for benchmarking diabetic retinopathy. The current database consists of 130 color fundus images of which 20 are normal and 110 contain signs of the diabetic retinopathy. Images were captured with a 50 degree field-of-view digital fundus camera with unknown camera settings. The data correspond to practical situations, and can be used to evaluate the general performance of diagnosis methods. This data set is referred to as "calibration level 0 fundus images".

   DIARETDB1 is a public database for benchmarking diabetic retinopathy The database consists of 89 colour fundus images of which 84 contain at least mild non-proliferative signs (Microaneurysms) of the diabetic retinopathy, and 5 are considered as normal which do not contain any signs of the diabetic retinopathy according to all experts who participated in the evaluation. Images were captured using the same 50 degree field-of-view digital fundus camera with varying imaging settings. The data correspond to a good (not necessarily typical) practical situation, where the images are comparable, and can be used to evaluate the general performance of diagnostic methods. This data set is referred to as "calibration level 1 fundus images"..

III PREPROCESSING STAGE
A. Image Acquisition
All digital retinal images are taken from retinal fundus camera. The images are stored in JPEG image format file (.jpg) The original (RGB) image is transformed into appropriate colour space for further processes. And resize image And then, filtering technique is used to reduce the effect of noise. After using the filter technique, the noise such as salt and pepper noise are removed from the image

Orginal Image   resize

Gray Image

B.Median Filter
  The median filter is a non-linear filter type and which is used to reduce the effect of noise without blurring the sharp edge. The operation of the median filter is – first arrange the pixel values in either the ascending or descending order and then compute the median value of the the neighborhood pixels.

medain Filter
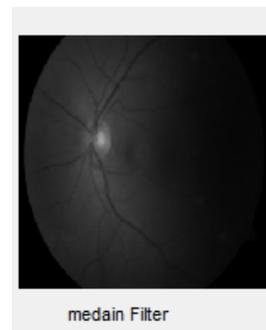
IV.OPTIC DISC DETECTION

The optic disc is the largest and brightest region of the image.The optic disc detection is useful because it can reduce the false positive detection of the exudates.

The Hough transform are used to detect the shape of object in image. Circular transform are implemented here which is used to find the optic disc in the fundus image The advantage is that it is tolerant of gaps in feature boundary descriptions and is relatively unaffected by image noise[6].

$$(x-a)^2+(y-b)^2+r^2=0.$$

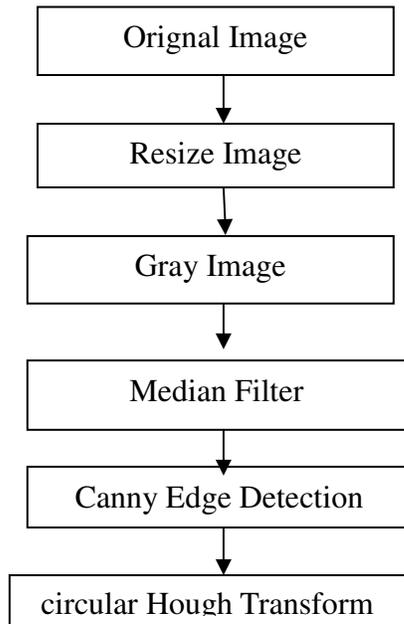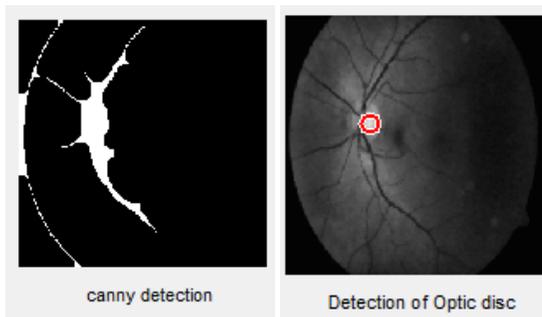Fig.3 shows the general flow chart of the optic disc detection

Fig 3.shows flow diagram of detection of optic disc

canny detection   Detection of Optic disc

V.CONCLUSION

Circular Hough transform method is used For optic disc detections, the input images are taken from DIARETDB0, DIARETDB1.The input image is in RGB colour space and for the further processes the image is converted into appropriate colour space. The median filter used for the noise reduction without blurring the edge.and then use canny edge detection method.Optic disc detection has the major role in the screening of eye diseases. The results of this work can be used in the future processes such as the screening of diabetic retinopathy,glaucoma and so on.

VI.REFERENCES:-

1. N. Otsu, "A threshold selection method from gray-level histograms," IEEE Transactions on Systems. Man, and Cybernetics, vol. 9, pp 62-66, January 1979.

2. Chanjira Sinthanayothin[a], James F Boyce[a], Helen L Cook[b], Thomas H Williamson[b] "Automated localisation of the optic disc, fovea, and retinal blood vessels from digital colour fundus images"12 February 1994

3. Sopharak A., Thet New K., Aye Moe Y., N. Dailey M., Uyyanonvara B., "Automatic exudate detection with anaive bayes classifier", International Conference on Embedded Systems and Intelligent Technology, Bangkok, Thiland, pp. 139-142,2008.

4. . Soumitra Samanta1, Sanjoy Kumar Saha2 and Bhabatosh Chanda1" A Simple and Fast Algorithm to Detect the Fovea Region in Fundus Retinal Image" Second International Conference on Emerging Applications of Information Technology 2011

5. Amin Dehghani1, Hamid Abrishami Moghaddam1* and Mohammad-Shahram Moin2 "Optic disc localization in retinal images using histogram matching" Dehghani et al. EURASIP Journal on Image and Video Processing 2012, 2012:19

6. Angel Suero, Diego Marin, Manuel E. Gegundez-Arias, and Jose M. Bravo" Locating the Optic Disc in Retinal Images Using Morphological Techniques" 18-20 March, 2013

7. S.Lavanya PG Student, Computer Science and Engineering,Bharath University, Chennai **"**Detection of Anatomical Structures in Optical Fundus Images" May 2013

8 Arumugam G1 and Nivedha S2 **"**Optic Disc Segmentation Based on Independent Component Analysis and K-Means Clustering**"** Volume 2, Issue 6, November – December 2013.

9. R.Radha1 and Bijee Lakshman2" Retinal Image Analysis Using Morphological Process And Clustering Technique" Signal & Image Processing : An International Journal (SIPIJ) Vol.4, No.6, December 2013

10.J.Ramya1,S.Soundarya2,A.Nagoormeeral@Rahmathnisha3,

E.Revathi4" detection of exudates in color fundus image" Vol. 3, Issue 3, March 2014**.**

11. Adithya Kusuma Whardana" A Simple Method for Optic Disk Segmentation from Retinal Fundus Image" I.J. Image, Graphics and Signal Processing, 2014, 11, 36-42

12 . Amanjot Kaur1, Rajdavinder Singh Boparai 2"   Localizing Optic Disk Using LBP, SIFT And ICA" *International Journal of Computer Applications (0975 – 8887)* Volume 102– No.12, September 2014