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A Survey on Diabetic Retinopathy

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ABSTRACT- Diabetic retinopathy is an eye abnormality caused by long term diabetes and it is the most common cause of blindness before the age of 50. *Microaneurysms* resulting from leakage from retinal blood vessels, are early indicators of *DR*, yielding a large body of diagnostic work focused on automatic detection of *MA*. However, automated detection of diabetes is difficult because the small size of *MA* lesions and low contrast between the lesion and its retinal background, the large variations in color, brightness and contrast of fundus images, and the high prevalence of false positives in regions with similar intensity values such as blood vessels, noises and non-homogenous background. In this system, we analyzed diabetes detectability from retinal images in the Diabetic Retinopathy Database - Calibration Level Raw pixel intensities of extracted patches served directly as inputs into the following classifiers: *CNN*

KEYWORDS: - Microaneurysms , Diabetic Retinopathy , CNN , SVM , AI , OCT , Angiography**.**

I. INTRODUCTION

Diabetes is a disease which occurs when the pancreas does not secrete enough insulin or the body is unable to process it properly. As diabetes progresses, the disease slowly affects the circulatory system including the retina and occurs as a result of long term accumulated damage to the blood vessels, declining the vision of the patient leading to diabetic retinopathy. After 15 years of diabetes about 10% of people become blind and approximately 2% develop severe visual impairment. According to an estimate by WHO, more than 220 million people worldwide have diabetes [1]. It is the sixth largest cause of blindness among the people of working age in India, making it the world's diabetic capital

II. RELATED WORK

A. "Blood Vessels Extraction from Retinal Images Using Combined 2D Gabor Wavelet Transform with Local Entropy Thresholding and Alternative Sequential Filter."

Authors : Abdullah Biran, Pooya Sobhe Bidari

Date of Conference: 15-18 May 2016

Date Added to IEEE *Xplore*: 03 November 2016

Journal- IEEE explore

Description –

The proposed method has been tested on fundus images from Structured Analysis of the Retina and Digital Retinal Images for Vessel Extraction (DRIVE) databases using MATLAB codes. The results show that this method is perfectly capable of extracting blood vessels.

B. "A Deep Learning Method for *Microaneurysm* Detection in Fundus Images."

Author : Juan Shan

Date of Conference: 27-29 June 2016

Date Added to IEEE *Xplore*: 18 August 2016

Journal- IEEE explore

Description-

In this paper, a Stacked Sparse Autoencoder , an instance of a DL strategy, is presented for *MA* detection in fundus images. Small image patches are generated from the original fundus images. The *SSAE* learns high-level features from pixel intensities alone in order to identify distinguishing features of MA

C. "The Detection of Diabetic Retinopathy in Human Eyes Using Pre-Processing Segmentation Techniques."

Authors : Yogesh Kumaran, Chandrashekar M. Patil

Date of Journal publications – December 2018

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Journal – IRJET
Descirption –
In this research article, a brief insight into the detection of DR in human eyes using different types of preprocessing segmentation techniques is being presented.

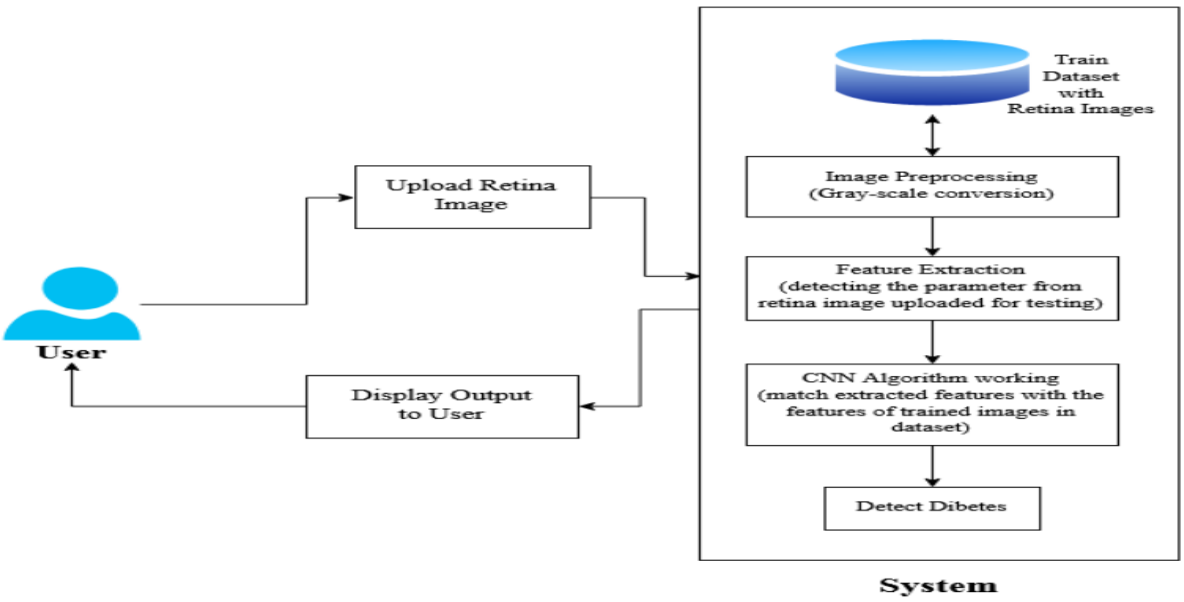
D. "Microaneurysm Detection Using Principal Component Analysis and Machine Learning Methods."
Author : Wen Cao, Juan Shan
Date of Publication: 24 May 2018
Journal – IEEE
Description -
A brief insight into the detection of DR in human eyes using different types of preprocessing segmentation techniques is being presented.

III. PROPOSED WORK

1. WE HAVE INTRODUCED A NON-INVASIVE PROCEDURE DEVELOPED OVER PREVIOUS METHOD FROM THE BASE PAPER WHICH MAKE USE OF BLOOD VESSEL EXTRACTION METHOD.
2. OUR METHOD EVALUATES PRESENCE OF DR IN THE EYE'S AND THE METHOD USED IN BASE PAPER DETECTS HEMORRHAGES DETECTION.
3. CLASSIFICATION CARRIED OUT USING SVM CLASSIFIER OVER THE METHOD OF BASE PAPER THAT CLASSIFIES CASES USING ADVANCED NONPARAMETRIC METHOD .
4. IN OUR WORK WE DO CALIBRATION AND JUSTIFY PROCESS USING VARIOUS COMBINATIONS OF TEXTURE AND STATISTICAL FEATURES.

The classification of diabetic diseased and normal eye IR images is done through Support Vector Machine classifier using var- ious combination of texture and statistical features The simulation results indicate that the classifier in the detection of diabetic diseased eye performed in the accepted level and provide accuracy, sensitivity, specificity using *SVM* classifier.

IV. ARCHITECTURAL DIAGRAM



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IV. DATA FLOW DIAGRAM 0-

Data Flow Diagram,we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system,
In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumor detected like wise in DFD 2 we present operation of user as well as admin.

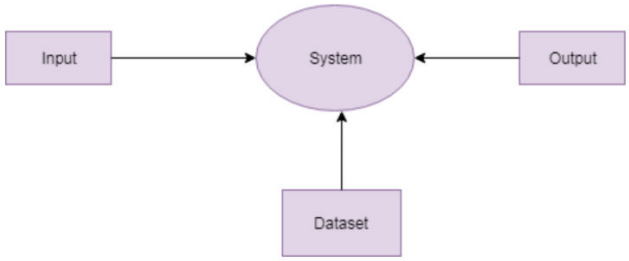

Fig. 5.1

V. DATA FLOW DIAGRAM 1-

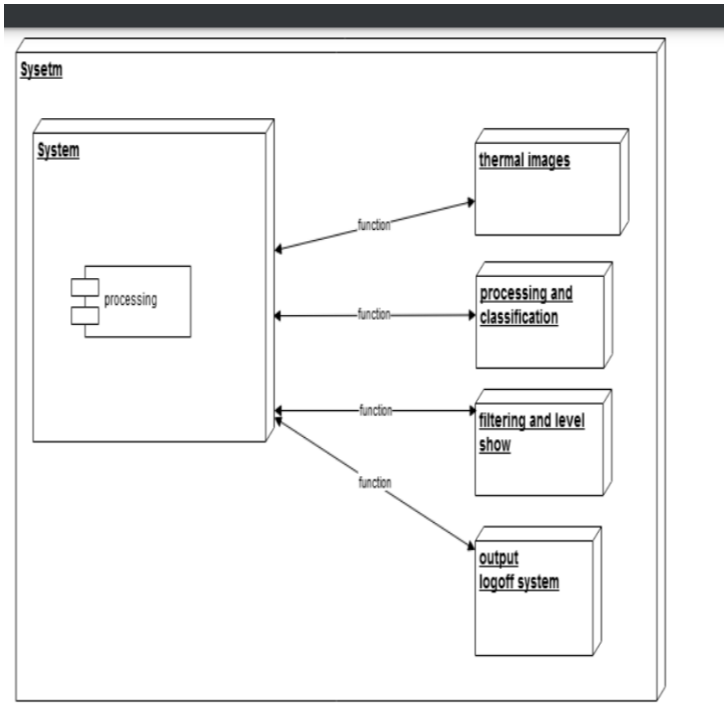

Fig. 6.1

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VI. FLOW CHART

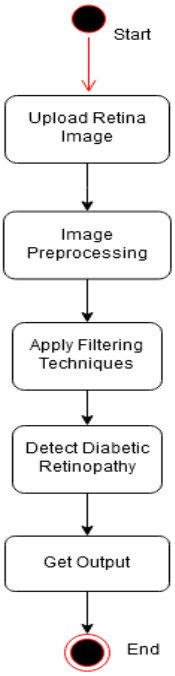

Fig. 7.1

VII. FUTURE SCOPE

[1] Scope of project includes we can use this in hospital. For detecting diabetic diseased using thermography images of an eye.

- Use of *AI* in medical diagnostics, especially in ophthalmology heralds a new era.
- If proven to be sensitive and specific enough this technology can totally change the way we look at screening programs and community-based ophthalmology programs.
- Most of the present systems use conventional of 30–50° fundus images. Perhaps applications based on wide field imaging and *OCT* angiography based vascular analysis might yield even more consistent results.

[2] However, the high cost of wide field imaging and *OCTangiography* may be a limiting factor for this at present

VIII. ADVANTAGES

1. User Friendly
2. Helps to detect diabetic retinopathy to avoid future Blindness or to start medication early

IX. LIMITATIONS

The abnormal blood vessels associated with diabetic retinopathy stimulate the growth of scar tissue, which can pull the retina away from the back of the eye.
This can cause spots floating in your vision, flashes of light or service vision loss.

X. APPLICATIONS

Diabetic eye screening is important as it helps to prevent sight loss.
As someone with diabetes, your eyes are at risk of damage from diabetic retinopathy.

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Screening can detect the condition early before you notice any changes to your vision.

XI. CONCLUSION

In the proposed work, a non-invasive procedure has been presented to evaluate the presence of diabetic diseases in the eye. The classification of diabetic diseased and normal eye IR images is done through Support Vector Machine classifier using various combination of texture and statistical features The simulation results indicate that the classifier in the detection of diabetic diseased eye performed in the accepted level and provide accuracy, sensitivity, specificity using SVM classifier.

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- Available at:https://medium.com/@swan1991m/convolutional-neural-network-cnn-implementation-for-diabetic-retinopathy-detection-with-tf-989ac802ce4b

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