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A Survey on Detection of Macular Retinal Edema

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Abstract— Retinal images of humans play an main role in the detection and diagnosis of many eye diseases for ophthalmologists. Diabetic Retinopathy is a severe and largely spread eye disease which can be regarded as manifestation of diabetes on retina. Retinopathy exactly means damage to retina. There are two types of retinopathy.The most common type is background or non proliferative diabetic retinopathy.A feature extraction technique is introduced to capture the global characteristics of the fundus images and inequity the normal from DME images.Exudates are the primary sign of diabetic retinopathy.So detection of exudates is very important in diagnosis of diabetic retinopathy.While detect the exudates, segmentation of blood vessels in retinal images is necessary.

Keywords*:DiabeticRetinopathy,Exudates,Fundus,Diagnosis,Retina.*

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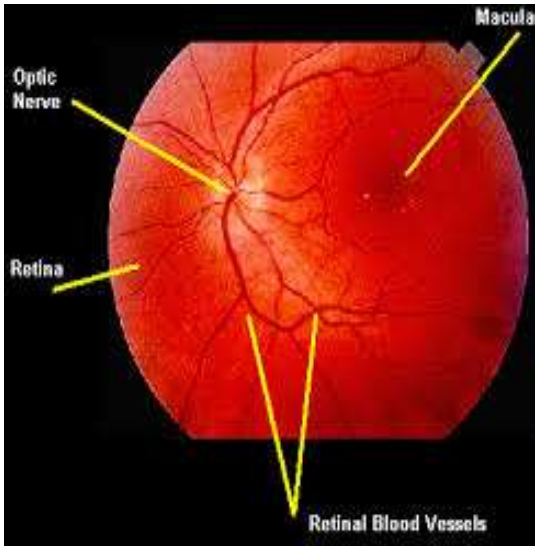
I. INTRODUCTION

Diabetic Macular edema caused by complications of diabetes, which can finally lead to blindness.Diabetic Retinopathy is a eye disease characterized by abnormal blood vessel growth stimulated by increased blood glucose level which finally leads to detached retina[1].However, if the symptoms are identified earlier and a proper treatment is used through regular screenings, blindness can be avoided. In order lessen the cost of these screenings,image processing techniques are used to willingly detect the existence of abnormalities in the retinal images acquired during the screenings[3]. Exudates are a major guide of diabetic retinopathy that can possibly be quantified automatically. As new blood vessels form at the back of the eye as a way of proliferative diabetic retinopathy (PDR), they can bleed (ocular hemorrhage) and blur vision. The first time this occur, it may not be very severe[4]. In most cases, it will leave just a few leaks of blood, or spots, floating in a person's visual field, though the spots very often go away after a few hours. These spots are often displaced within a few days or weeks by a much over leakage of blood, which blurs vision. In severe cases, a person will only be able totell light from dark in that eye[3]. It may use the blood anywhere from a few days to months or even years to clear from the inside of the eye, and in such a cases the blood will not clear. These types of huge hemorrhages tend to happen more than once, often during sleep.



Exudative retinopathy is a defined by the presence of white or yellow mass that occurs due to leakage of fats and proteins plus with water from blood vessels in the retina[4]. It is essential to detect the presence of exudates in the fundus because growth of these exudates may lead to complete blindness.The weakening of the blood vessels causes leakage of blood and lipoproteins, which causes irregular in the retina. The major abnormalities that occur in eyes due to diabetic retinopathy include microaneurysms, exudates, haemorrhages and neovascularisation[3]. This paper presents a method for automated detection of exudates pathologies in retinopathy images effect on Machine Learning Algorithm. The color retinal images are segmented using following some preprocessing steps to use color normalization and contrast enhancement. The entire segmented images establish a dataset

of regions[5]. To classify these distribution regions into exudates and nonexudates, a set of initial features such as color, size, edge strength, and texture are extracted.

II. LITERATURE REVIEW

Automated detection of retinal exudates

Retinal exudates are a simple manifestation of vascular damage in a variety of retinal diseases.It used computerized image analysis to detect and part of area of exudates from digitized colour fundus slides of patients with diabetic retionpathy and have check the repeatability, reproducibility, and accuracy of the technique[1].

The coefficient of variation for repeatability was between 3% for huge areas of exudate and 17% for small areas of exudate. The reproducibility was within this range. It was between 61 and 100% o (mean 87%)[3]. False-positives were observed in 5 of 30 regions evaluate, and these could have been eliminated by using more stringent criteria for selection of images for analysis[2].

Detection of exudates for diabetic retinopathy screening

Automated image analysis is being reduce the workload required for grading images resulting from diabetic retinopathy screening[5]. The recognition of exudates in retinal images is an essential goal for automated analysis since these are one of the guide that the disease has progressed to a stage involving referral to an ophthalmologist. Candidate exudates were detected applying a multi-scale morphological process. Based on local properties, the likelihoods of a candidate being a representative of classes exudate, drusen or background were determined[6].

Assessment of macular edema from color retinal images

Diabetic macular edema (DME) is an symptom of diabetic retinopathy and can lead to irreversible vision loss. In this paper, a two-stage technique for the detection and classification of DME severity from color fundus images is proposed[3]. A feature extraction technique is introduced to capture the global characteristics of the fundus images and segregate the normal from DME images. Disease severity is assessed using a rotational asymmetry metric by examining the symmetry of macular region. The achievement of the proposed methodology and features are evaluated against several publicly available datasets. The detection performance has a 100% with specificity between 74% and 90%[3].

III. EXISTING SYSTEM

Diabetic Retinopathy is the microvascular changes that cause detectable in the appearance of the retinal blood vessels.

It provides information on retinal blood vessel morphology that can be calibrated to normal expected blood vessel diameters and detect fine blood vessel anomalies that characterize the blood vessel pathology[4].

Gray-level grouping is a general and powerful technique, which can be conveniently applied to a broad variety of low-contrast images and outperforms regular contrast enhancement techniques[5].

LIMITATION OF EXISTING SYSTEM

In previous methods Exudates are found using their high grey level variation, and their contours are determined by means of morphological restoration techniques[5].

The detection of the optic disc is indispensable for this approach.It detect the optic disc by morphological filtering techniques and the watershed transformation.

The algorithm has been tested on a small image only. They can't detect the all image.

1V. PROPOSED SYSTEM

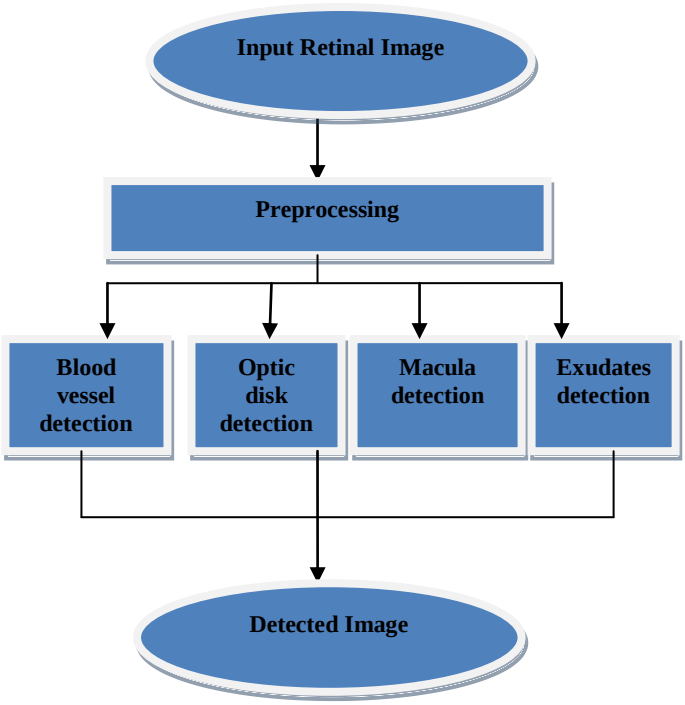
Currently, there is an increasing interest for medical systems that can screen a large number of people for appearence threatening diseases, such as diabetic retinopathy[4]. This paper presents a method for automated identification of exudates pathologies in retinopathy images build on Machine Learning Algorithm. The color retinal images are segmented using following some preprocessing steps such as color normalization and contrast enhancement. The entire segmented images provide a dataset of regions. To classify segmented regions into exudates and nonexudates, a set of original features such as color, size, edge strength, and texture are separted[3].

Currently, there is an developing interest for setting up medical systems that can cover a large number of people for appearence threatening diseases, such as diabetic retinopathy[4]. This paper allow a method for automated detection of exudates pathologies in retinopathy images based on Machine Learning Algorithm. The color retinal images are segmented testing some preprocessing steps such as color normalization and contrast enhancement[3]. The whole segmented images establish a dataset of regions. To classify segmented regions into exudates and nonexudates, a set of essential features such as color, size, edge strength, and texture are extracted[2].

V. DISCUSSION ON RELATED WORK

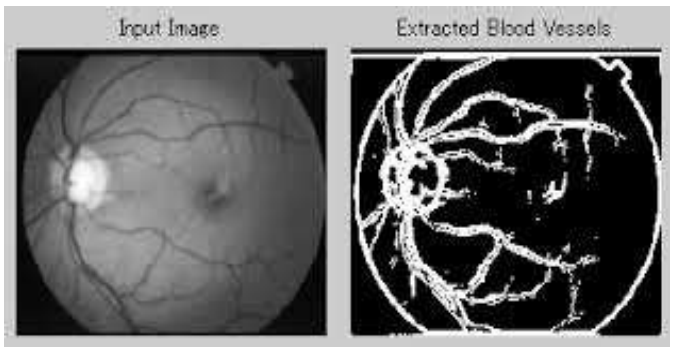
Every complex system is approached through a set of nearly independent views of a model; no single view is sufficient.

The best models are connected to reality[2].



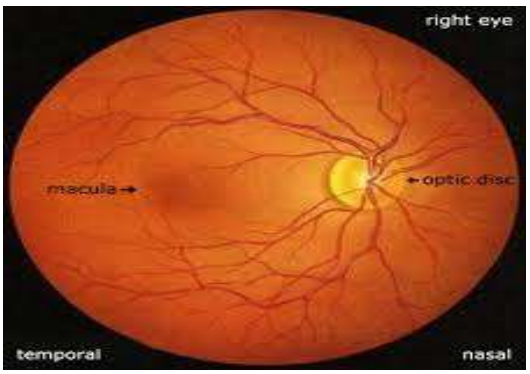
BLOOD VESSEL DETECTION

Blood vessel detection in an essential step in medical diagnosis of fundus images as it aids in the diagnosis of diseases.Retinal vasculature include the treatment of age related macular degeneration, algorithms and personal identification in security application[2]. Vessels occur darker than the background, their width is always smaller than a certain value, they are piecewise hold only approximately.



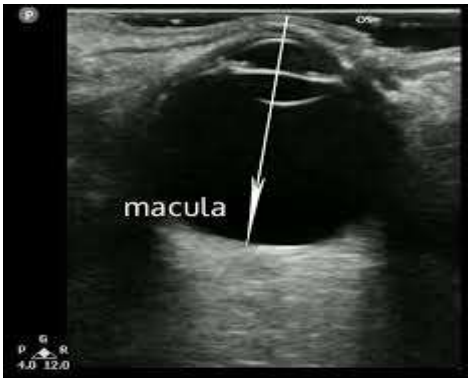
OPTIC DISK DETECTION

The OD localization and segmentation is a task in an automated retinal image analysis system. It is required as a essential for the identification of exudates and also helps in macula detection, as macula is the darkest area in the neighborhood of OD[2].OD region is found by of a multi-scale analysis pyramidal approach using a simple haar-based wavelet transforms. The brightest pixel that appears in a rude resolution image at an appropriate resolution level depending on the basic image resolution and the OD average element is assumed to be part of the OD.



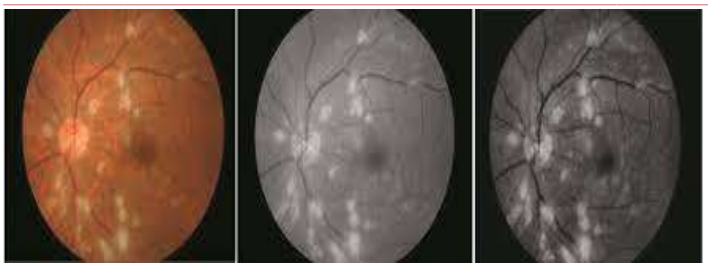
MACULA DETECTION

Macula is hugely sensitive region of the retina important for detailed central vision. Macular oedema is a special of DR caused by the flow of blood vessels in the macula region. Macula edema can be treated with laser if detected early enough[6]. Identifying the macular edema. Macula encircling helps establishing statistics regarding lesions position for disease gradation[3]. The exact center to the macula is then found by searching in the vicinity for the darkest pixel on the original fine resolution image.



EXUDATES DETECTION

The exudates can be observed on the opthalmoscope as areas with hard white or yellowish colors and varying sizes, shapes and locations, the leaking capillaries within the retina. Hard and soft exudates can be distinguished due to their color and the sharpness of their borders[4]. There is an extra feature in the images that appear as bright patterns, like the optic disc and because of changes in ordinary background pixels. Besides, they are not the vessels is high caused by the exudates.



V. CONCLUSION

This paper discussed about macula detection on diabetic retinopathy.To implement a computer system for the automatic detection of human structures in digital fundus retinal images such as blood vessels, Optic Disc and macula. there is an increasing interest for medical systems that can screen a large number of people for threatening diseases, such as diabetic retinopathy.Exudates are the primary sign of diabetic retinopathy.So detection of exudates is important in diagnosis of diabetic retinopathy. The entire segmented images establish a dataset of regions. To distribute these segmented regions into exudates and nonexudates, arrange a set of initial features such as color, size, edge strength, and texture are separate.

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