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ABSTRACT

We focuses on the detection of retinal blood vessels which play a vital role in reducing the proliferative diabetic retinopathy and for preventing the loss of visual capability.

The proposed algorithm which takes advantage of the powerful pre-processing techniques such as the contrast enhancement and thresholding offers an automated segmentation procedure for retinal blood vessels. To evaluate the performance of the new algorithm, experiments are conducted on 40 images collected from DRIVE database.

The results show that the proposed algorithm performs better than the other known algorithms in terms of accuracy. Furthermore, the proposed algorithm being simple and easy to implement, is best suited for fast processing applications.

Due to the rapid development in computing technology and techniques, algorithms that support automated medical diagnosis have been gaining importance. Retinal vasculature has received attention by specialists in different pathologies, where the detection and analysis of retinal vasculature may lead to early diagnosis and prevention of several diseases, such as hypertension, diabetes, arteriosclerosis, cardiovascular disease and stroke.

One of the well-known and commonest diseases that need a computer-aided medical diagnosis is diabetic retinopathy (DR), which leads in most cases to partial or even complete loss of visual capability.

The accurate diagnosis of this disease depends upon some features which have to be analyzed in order to quantify the severity level of the disease. Retinal blood vessels are considered as one of the most important features for the detection of DR. As diabetic retinopathy is a progressive disease, regular screening of the human retina is essential for reducing the proliferative diabetic retinopathy and for preventing the subsequent loss of visual capability.

The screening should be done every 6 months, which includes obtaining and analysing a sequence of fundus images and observing the early changes in blood vessel patterns as well as the presence of micro aneurysms

TABLE OF CONTENTS

RETINAL IMAGE CLASSIFICATION USING NEURAL NETWORK

Objective:

- The image feature we propose a new method for finding the blood vesals in that.
- It introduces the principle of optimal entropy into the image processing technique, and classifies the intermediate result image of ratio-based Segmentation blood vesals.
- Applied results of true SAR imagery are in good agreement with the theoretical study, which shows its effectiveness and applicability.

CHAPTER 1

INTRODUCTION:

Diabetic retinopathy (DR) is the result of damage caused by diabetes to the small blood vessels located in the retina. Blood vessels damaged from diabetic retinopathy can cause vision loss. Diabetic retinopathy is a leading cause of adult blindness, and screening can reduce the incidence. Screening just increases the chances that a condition will be avoided, found early, or are able to be cured.

It is widely recommended that all persons with diabetes mellitus should be regularly screened for diabetic retinopathy.

Computer based analysis for automated segmentation of blood vessels in retinal images will help ophthalmologists screen larger populations for vessel abnormalities.

A wide variety of approaches have been proposed for retina blood vessels segmentation. Many image processing methods proposed for retinal vessels extraction.

This literature is based on optimized Gabor filter with local entropy thresholding.

Gabor filters have been widely applied to image processing and computer vision application problems such as face recognition and texture segmentation [8]. Optimized Gabor filter methods often produce false positive detections and fail to detect vessel of different widths.

Also detection process much more complicated when retinal image abnormal condition. This paper has been proposed a much robust and fast method of retinal blood vessels extraction using optimized Gabor filter with local entropy thresholding.

EXISTING SYSTEM:

- In clinical environment, the brightness and contrast of the back ground in fundus images will be main obstacles for DR lesions detection.

- The approaches for MIs detection presented in the literatures can be roughly divided into different types.
- Such as mathematical morphology base analyses on the characteristics of MIs i.e size, pixel range, shape etc.
- The authors propose a method to detect MIs based on eigenvalue analysis using the Hessian matrix.
- Supervised learning method train the algorithm with 21 images to classify MIs candidates based on kernel density estimation.
- Support Vector Machines was applied to classify MIs candidates after extracting the features using different morphological operations.

PROPOSED SYSTEM:

- Pre-processing is applied to eliminate the noises in the fundus image. Regarding the acquisition process, retinal images have often low contrast that cause to hardly detect the blood vessels. This method is to improve the image dynamic range to prepare images for next step, detection the blood vessels, and attain to higher accuracy and precision of segmentation.
- Concerning our purpose, contrast enhancement, the green channel of colored retinal images is used, because compare to other channels it has the highest contrast.
- Combining advantages of brightness in red channel decreasing the contrast between the abnormalities and the retinal background; this helps to reduce some responses from abnormalities which do not resemble any blood vessels that would otherwise decrease the performance of blood vessels segmentation methods. Contrast-limited adaptive histogram equalization is used for this analysis that enhancing the contrast of the green channel retinal image.

Four processing steps are proposed for MIs detection:

- A. Pre-processing step,
- B. Micro aneurysms extraction,

- C. Small bright features filtering and finally
- D. Micro aneurysms detection.

Block diagram:

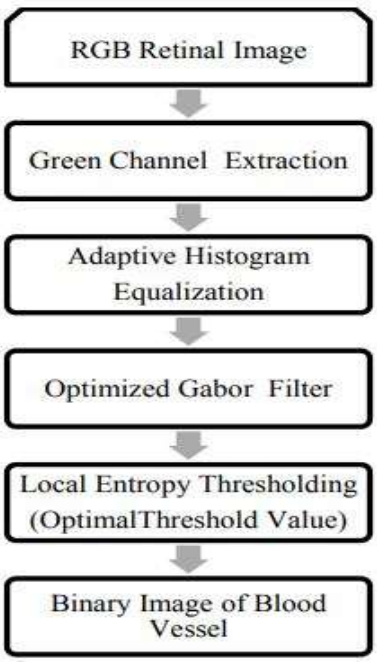
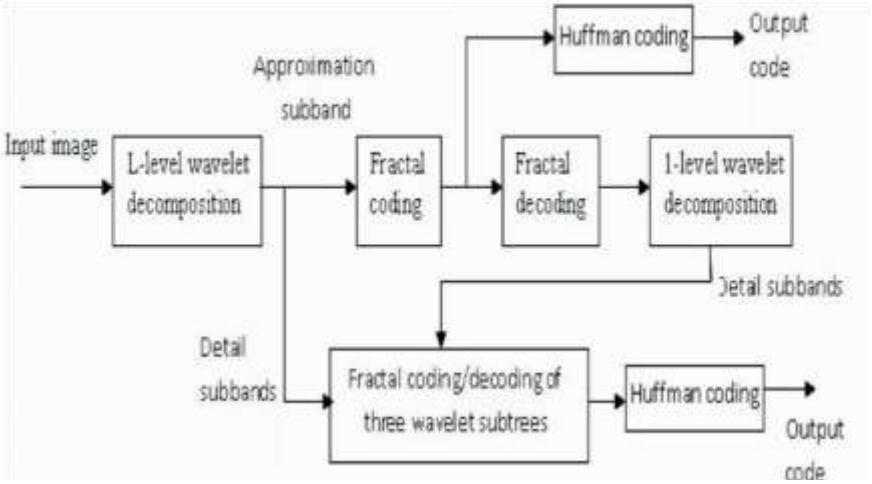


IMAGE COMPRESSION ALGORITHMS

The neighboring pixels in an image are highly correlated; this redundant information can be discarded by finding a less correlated representation of the image. This is the basic idea behind the image compression theory. The basic components of an image coding process which is performed in two stages, namely the image transformation stage followed by entropy coding stage. Image coding can be categorized under first generation and second generation image coding.

First generation image coding emphasize more on how well the information contained in a transformed image is efficiently encoded whereas the second generation places more importance on how we can exploit and extract useful information from the image. The second generation makes use of available techniques developed in the entropy coding stage to encode the sequence of information obtained from the image transform stage.



Process of image coding

Four of the most popular transform based image compression algorithms Joint Photographic Experts Group (JPEG), Embedded Zero tree Wavelet (EZW), Set Partitioning in Hierarchical Trees (SPIHT) and Embedded Block Coding with Optimized Truncation (EBCOT) algorithms are described under the first generation image coding. Pyramidal coding, directional decomposition based coding, segmentation based coding and vector quantization are then described under the second generation image coding.