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Automatic Detection of Diabetic Eye Disease

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ABSTRACT

Recent technologies in diabetic user our aim at reducing unnecessary visits to medical specialists, reduse visiting time overall cost of treatment and optimizing the number of patients seen by each doctor. To detect diabetic diseased eye, here Support Vector Machine classifier is used for classification and their performance are compared. Extraction of features is performed on the segmented images of the breast. Multilayer neural perceptron network based on supervised technique of machine learning is used to classify breast thermo grams as normal, benign and perceptron.

Keywords : Diabetic, Perceptron, Perceptron, Segmented.

I. INTRODUCTION

Diabetic eye disease is a chronic disease affects various organs of human body including the eye. Infrared thermography offers a digitized thermal distribution called thermograph. It indicate the observation are with a thermal variation of the surface temperature. Various color are used to describe variations in temperature because color is a powerful descriptor. The use of computational methods that aid in the diagnosis of disease has contributed significantly to improve the quality of life of patients.The imaging modality also suitable for the detection of diabetes using foot images. Textural features are extracted from the segmented

II. PROBLEM STATEMENT

The diagnosis has attained in medical procedure by identifying the symptoms using emerging imaging modalities are many limitations which needs to be improved.

III. LITERATURE REVIEW

1. A Brief Review of the Detection of Diabetic Retinopathy in Human Eyes Using Pre-Processing & Segmentation Techniques

AUTHORS: Yogesh Kumaran, Chandrashekar M. Patil

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. There are a number of methods of segmenting the blood vessels that are present in the retina & once the retinal nerve fibres are segmented, one can detect whether the eyes are affected with diabetic retinopathy or not. In fact, this detection depends on the area of the RNFL network. If the total

area of the nerve fibre is less, then it is affected with diabetic retinopathy (DR)& if the area of the nerve network is more, then the eyes are not affected with the diabetic retinopathy and hence it is normal.

2. Detection of Diabetic Retinopathy using Image Processing and Machine Learning

AUTHORS: Salman Sayed, Dr. Vandana Inamdar, Sangram Kapre

Diabetes is a chronic disease caused by either failure of insulin production in body or inability to resist insulin in the body. Complications of Diabetes leads to heart disorders, vascular disease and stroke, Kidney disease, Neuropathy and Diabetic eye disease known as diabetic retinopathy. Diabetes for a prolonged time damages the blood vessels of retina and thereby affecting seeing ability of a person and leading to diabetic retinopathy. Diabetic retinopathy is classified into two categories, non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR). In this paper, detection of diabetic retinopathy in fundus image is done by image processing and machine learning techniques. Probabilistic Neural Network (PNN) and Support vector machines (SVM) are the two models adopted for detection of diabetic retinopathy in fundus image and their results analyzed and compared. Accuracy of detection in SVM is 90% and that of PNN is 80%. Thereby SVM model is outperforming the PNN model.

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

AUTHORS: Juan Shan, Lin Li

Retinal blood vessels extraction is a primary step for detecting eye diseases including diabetic retinopathy which causes blindness. It also simplifies other image processing techniques such as classification. Since manual extraction is a long task and it requires training, many automated methods have been proposed. In this paper, an algorithm for extracting blood vessels from fundus images has been proposed. The algorithm is based on two dimensional Gabor filter, local entropy thresholding and alternative sequential filter. The proposed method has been tested on fundus images from Structured Analysis of the Retina (STARE) 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.

4. A Deep Learning Method for Microaneurysm Detection in Fundus Images

AUTHORS: Juan Shan, Lin Li

Diabetic Retinopathy (DR) is the leading cause of blindness in the working-age population. Microaneurysms (MAs), due to leakage from retina blood vessels, are the early signs of DR. However, automated MA detection is complicated because of the small size of MA lesions and the low contrast between the lesion and its retinal background. Recently deep learning (DL) strategies have been used for automatic feature extraction and classification problems, especially for image analysis. In this paper, a Stacked Sparse Autoencoder (SSAE), an instance of a DL strategy, is presented for MA detection in fundus images.

Sr.no	Paper	Author	Description
1.	A Deep Learning Approach to Adherence Detection for Type 2 Diabetics	Ali Mohebbi1, Tinna B. Arad´ottir1,2, Alexander R. Johansen1, Henrik Bengtsson2, Marco Fraccaro1, Morten Mørup 978-1-5090-2809-2/17/$31.00 ©2017 IEEE	A novel adherence detection algorithm using Deep Learning (DL) approaches was developed for type 2 diabetes (T2D) patients, based on simulated Continuous Glucose Monitoring (CGM) signals.
2.	Fully-Automated Segmentation of Fluid/Cyst Regions in Optical Coherence Tomography Images with Diabetic Macular Edema using Neutrosophic Sets and Graph Algorithms	Abdolreza Rashno, Dara D. Koozekanani, Paul M. Drayna, Behzad Nazari, Saeed Sadri, Hossein Rabbani, Keshab K. Parhi 0018-9294 (c) 2017 IEEE	presents a fully-automated algorithm to segment fluid-associated (fluid-filled) and cyst regions in optical coherence tomography (OCT) retina images of subjects with diabetic macular edema (DME).
3.	Detecting Diabetes Mellitus and Non-Proliferative Diabetic Retinopathy using Tongue Color, Texture, and Geometry Features	Bob Zhang, Member, IEEE, B.V.K. Vijaya Kumar, Fellow, IEEE, and David Zhang, Fellow, IEEE 2013	A non-invasive capture device with image correction first captures the tongue images. A tongue color gamut is established with 12 colors representing the tongue color features.
4.	Assessing the Need for Referral in Automatic Diabetic Retinopathy Detection	Ramon Pires, Member, Herbert F. Jelinek, Jacques Wainer, Siome Goldenstein, Eduardo Valle IEEE 2013.	Explores image recognition for the screening of diabetic retinopathy, a complication of diabetes that can lead to blindness if not discovered in its initial stages.

IV. EXISTING SYSTEM

Accurate diagnosis has attained in medical procedure by identifying the symptoms using emerging imaging modalities. The present modalities of medical imaging are invasive and painful for patients as well. Diabetic eye disease is a chronic disease affects various organs of human body including the eye.

V. PROPOSED SYSTEM

The proposed system uses supervised machine learning techniques to classify the thermal images of an eye into Normal or Diabetic Diseased Eye.The color conversion model is very important to extract the required features. In this work, two conversion such as RGB to Gray and RGB to HSI are done and RGB, Gray and HSI color model are used as an input images for feature extraction module. Feature Extraction is the most important step in the analysis of images. It is a process of gathering distinguishable information from the image itself from an object or group of objects.

VI. ALGORITHM

CNN Algorithm Steps

CNN Convolution neural networks

A CNN consists of an input and an output layer, as well as multiple hidden layers.

The hidden layers of a CNN typically consist of convolutional layers, pooling layers, fully connected layers and normalization layers.

A CNN consists of an input and an output layer, as well as multiple hidden layers as:

1. Convolutional layer
2. Pooling layer
3. Activation Function layer
4. Fully connected layer
5. Loss layer.

Modules:

- Image Preprocessing
- Apply Algorithm
- Detection of Diabetes

A. BLOCK DEIAGRAM OF SYSTEM

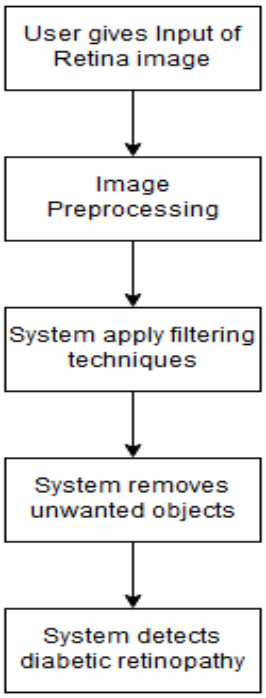

Figure 1. Block diagram of Identity based

VII. ADVANTAGES

- User Friendly
- Helps to detect diabetic retinopathy

VIII. CONCLUSION

Extracting blood vessels from retinal images help in early diagnosis of eye diseases. We are proposing automated system for extracting blood vessels from retinal images. System uses advanced image processing techniques including classification of image pixels into vessels or non-vessels and classification of retinal images into normal or abnormal. This helps in diagnosis of different types of eye disease.

IX. ACKNOWLEDGMENT

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X. REFERENCES

[1]. J. Shan and L. Li, "A Deep Learning Method for Microaneurysm Detection in Fundus Images," in IEEE 1st International Conference on Connected Health: Applications, Systems and Engineering Technologies, CHASE 2016, 2016.

[2]. M. Usman Akram et al., "Detection and classification of retinal lesions for grading of diabetic retinopathy," Comput. Biol. Med., vol. 45, no. 1, pp. 161–171, 2014.

[3]. J. Shlens, "A Tutorial on Principal Component Analysis," ArXiv, pp. 1–13, 2014.

[4]. Q. V Le, W. Y. Zou, S. Y. Yeung, and A. Y. Ng, "Learning hierarchical invariant spatio-temporal features for action recognition with independent subspace analysis," in Computer Vision and Pattern Recognition, pp. 3361–3368, 2011.

[5]. C.-C. Chang and C.-J. Lin, "Libsvm," ACM Trans. Intell. Syst. Technol., vol. 2, no. 3, pp. 1–27, Apr. 2011.

[6]. K. Ram, G. D. Joshi, and J. Sivaswamy, "A successive clutter-rejectionbased approach for early detection of diabetic retinopathy," IEEE Trans. Biomed. Eng., vol. 58, no. 3, pp. 664–673, 2011.

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