DIABETIC RETINOPATHY DETECTION USING DEEP LEARNING TECHNIQUES

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Abstract— Diabetic retinopathy is referred as diabetic eye disease. It causes damage to the retina of the light sensitive tissues at the rear portion of the eye. It mainly affects the working age population in the developing country. Right now, recognizing DR is a tedious and manual interaction that requires a prepared clinician to analyze and assess advanced shading fundus photos of the retina. The rate of diabetes is more in local populations and the detection of diabetic retinopathy is needed but there is a shortage of equipment because there are expensive. With persistent advancement of deep learning models we hope to increase the accuracy of the technique and extend it to glaucoma diagnostics. In Early days convolutional neural network were used it takes more time and gives the low accuracy rate. In this paper Regional convolutional neural network and resnet were used to increase the accuracy rate and reduce the time consumption. Convolutional neural network takes image as an input and process it in different ways and assigns important to that images and produces the output by the images. In convolutional neural network there are many layers mainly input layer, hidden layer and output layer. If this technique is implemented. Diabetic retinopathy can be detected at the early stage and we can reduce the number of blindness and increase the accuracy rate and time consumption.

Keyword - Diabetic retinopathy, Fundus photography, Deep learning and Data set

I. INTRODUCTION

Diabetic retinopathy (DR) is a common complication of diabetes associated with retinal vascular damage caused by long standing diabetes. Furthermore, the diagnosis of DR mostly depends on the observation and evaluation to fundus photographs of which procedure can be time-consuming even for experienced experts. Therefore computer aided automated diagnosis approaches have great potential in clinical to accurately detect DR in a short time which can further help to improve the screening rate of DR and reduce the number of blindness. For a deep learning model, the most important parts that should be focused on are data set, network architecture and training method. Before being used to train our model, fundus images data set obtained from public resources is pre-processed and augmented. The model accepts two fundus images corresponding to the left eye and right eye as inputs and then transmits them into the Siamese like blocks. The information from two eyes is gathered into the fully connected layer and finally the model will output the diagnosis result of each eye respectively.

II. EXISTING SYSTEM

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Besides a binocular model for the five class DR detection task is also trained and evaluated to further prove the effectiveness of the binocular design. The result shows that, on a 10% validation set, the binocular model achieves a kappa score of 0.829 which is higher than that of existing non ensemble model. Finally the comparison between confusion matrices obtained through models with paired and unpaired inputs is performed and it demonstrates that the binocular architecture does improve the classification performance.

Result

III.PROPOSED SYSTEM

For a deep learning model, the most important parts that should be focused on are data set, network architecture and training method. Before being used to train our model, fundus images data set obtained from public resources is pre-processed and augmented. The model accepts two fundus images corresponding to the left eye and right eye as inputs and then transmits them into the Siamese-like blocks. The information from two eyes is gathered into the fully-connected layer and finally the model will output the diagnosis result of each eye respectively.

❖ Collecting the normal and affected eye images through OCT scan (Optical Coherence Tomograpahy)

❖ This model accepts two funds images corresponding to the left eye and right eye as inputs

❖ Involving the preprocessing step we have to convert the RGB images to grey scale and resize the image from the collected image.

❖ Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other

IV.BLOCK DIAGRAM

Input fundus image

Image Pre-Processing

Feature Extraction

Convolution neural network

Right eye & Left eye score
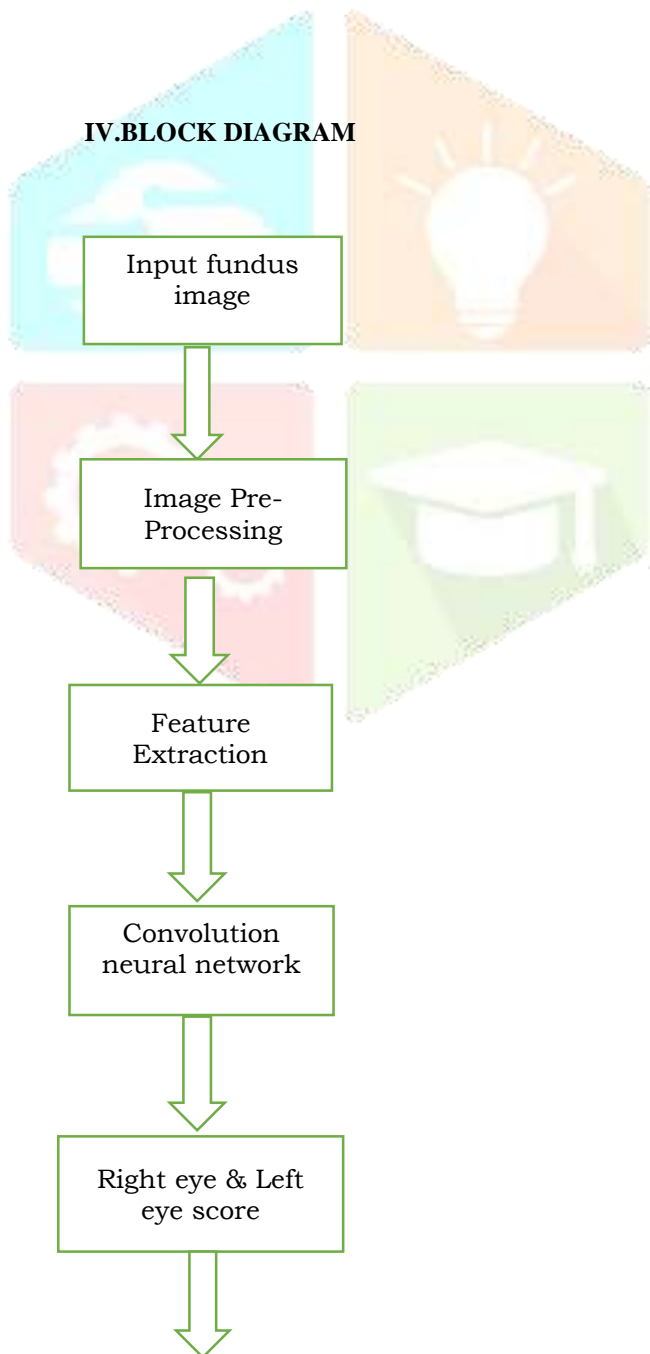
V.IMAGE PRE-PROCESSING:

Dataset is a primary and significant part that needs to be dealt with for a deep learning application. The funds photographs in our dataset have large variation, such as discrepant brightness or resolution, since most of them are obtained with different equipment in different environment. Basically, the model accepts two funds images corresponding to the left eye and right eye as inputs and then transmits them into the Siamese-like blocks.

(a) Original image

(b) Preprocessed image
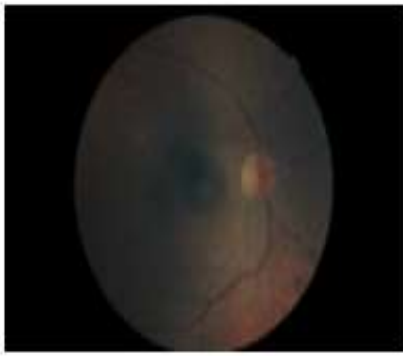
VII MATCHING SCORE:

The confusion matrices of prediction results of left eye, right eye, and both eyes together. The prediction results of the left eye and the right eye have very similar distribution patterns, indicating that the data partition method preserves the original image categories distribution of left eyes and right eyes.

VIII.DIAGRAM
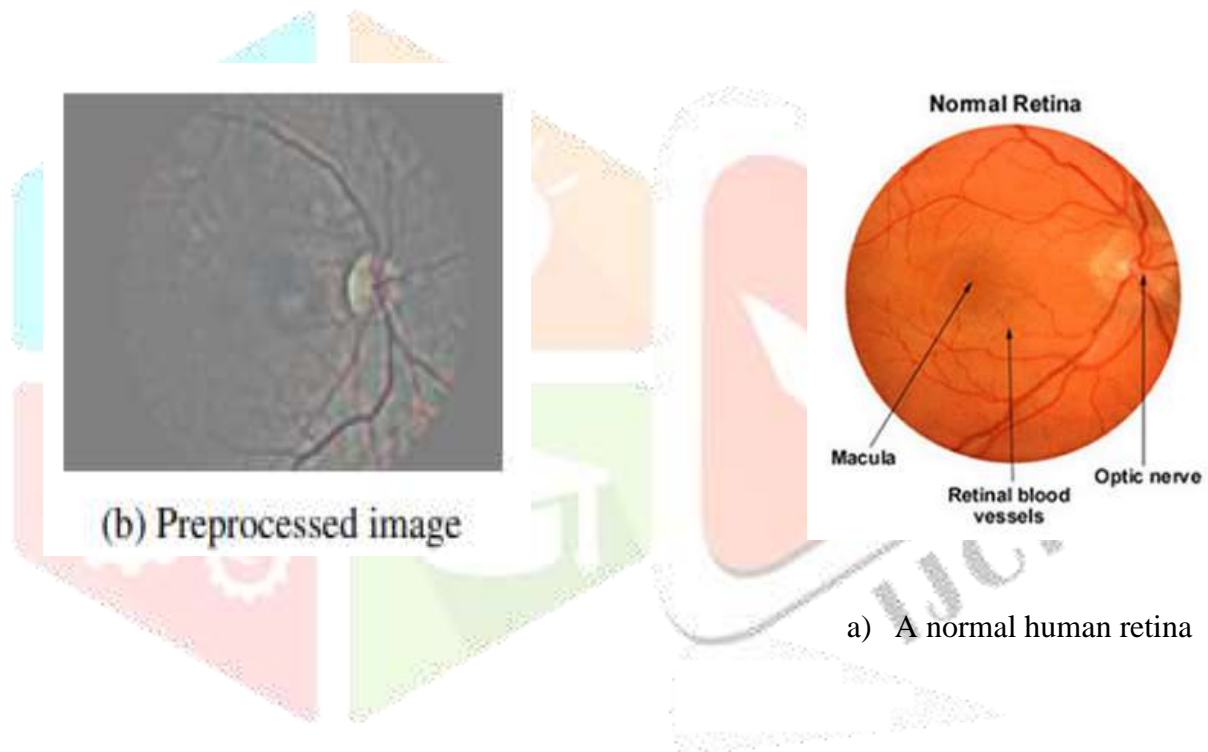
a)   A normal human retina

VI   CONVOLUTION   NEURAL   NETWORK ALGORITHM:

Transfer learning method is a widely used training method of convolution neural network. By loading the weights of Inception blocks pre-trained on Image Net data set, the model will has a better weights initialization before starting the gradient optimization. Moreover, considering the huge difference between the fundus images data set and Image Net dataset, none of layers in weight-sharing Inception blocks are frozen.
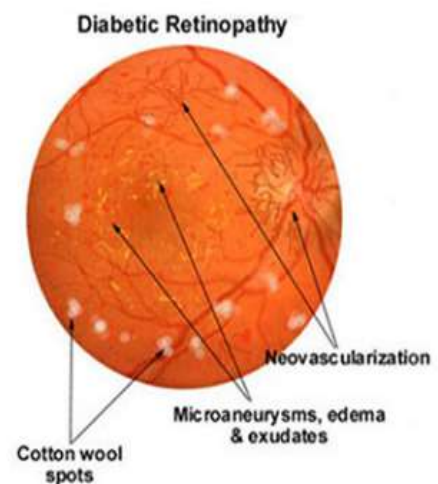
b) Retina which is affected by Diabetic retinopathy

IX.CONCLUSION

In this paper we analysis the limitations of detection of early stages of diabetic retinopathy and accuracy and time consumption. Consequently we propose regional convolutional neural network, resnet with flask web application for diabetic retinopathy detection. Deep learning model are introduced with the motivation of achieving accuracy rate. Further more flask web application is used in this paper it is helpful in detecting the early stages of diabetic retinopathy. In addition the proposed method can gain accuracy ranges between 92.5 to 96 % . Our method can gain early consistent accuracy rate and improvements in early detection. In deep learning model we train our images using convolutional neural network algorithm.

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