**EyeDeep-Net: a multi-class diagnosis of retinal diseases using deep neural network**

**ABSTRACT:**

Retinal images are a key element for ophthalmologists in diagnosing a variety of eye illnesses. The retina is vulnerable to microvascular changes as a result of many retinal diseases and a variety of research have been done on early diagnosis of medical images to take proper treatment on time. This paper designs an automated deep learning-based non-invasive framework to diagnose multiple eye diseases using colour fundus images. A multi-class eye disease RFMiD dataset was used to develop an efficient diagnostic framework. Multi-class fundus images were extracted from a multi-label dataset and then various augmentation techniques were applied to make the framework robust in real-time. Images were processed according to the network for low computational demand. A multi-layer neural network EyeDeep-Net has been developed to train and test images for diagnosis of various eye problems in which the keystone convolutional neural network extracts relevant features from the input colour fundus image dataset and then processed features were used to make predictive diagnostic decisions. The strength of the EyeDeep-Net is evaluated using multiple statistical parameters and the performance of the proposed model is found to be significantly superior to multiple baseline state-of-the-art models. A comprehensive comparison of the proposed methodology to the most recent methods proves its efficacy in terms of classification and disease identification through digital fundus images.

**EXISTING SYSTEM :**

Retinal disease are one of the dangerous disease which may cause blindness if not detected and treat early. So to enhance detection accuracy author employed EyeDeep-Net model. The objective of EyeDeep-Net model is to develop a diagnostic framework for the diagnosis of multiple fundus disease at an early stage through a common deep neural network so that people can get treatment on time and take necessary actions to save their eyes from being lost. The main contribution of propose algorithm is to developed robust and effective framework using the proposed EyeDeep-Net model, a deep learning architecture to classify fundus images and diagnose different eye diseases. An open source multi-labelled dataset was transformed into a multiclass dataset and then extracted fundus images were augmented to deal with real-world conditions and processed.

**Disadvantages**

1. It takes more time
2. Less accuracy

**PROPOSED SYSTEM :**

In propose paper author introducing deep neural network based algorithm to detect retinal diseases. To train network author employing RFMID dataset which contains retinal images of 46 different classes and from this classes author extracting most 4 different classes such as Normal, DR, ODC and MH. Above classes contains highly imbalance data where one class contains a greater number of images and other class contains fewer number of images and such data imbalance may affect accuracy so to enhance accuracy of propose algorithm author employing Data Augmentation techniques which will generate new synthetic images using available images. To generate augmented images author has used left and right rotation of 15 % with sheer rotation as 0.8 and applied horizontal flip.

**EXTENSION CONCEPT:**

In propose EyeDeep-Net model author has used padding as ‘SAME’ which adds additional rows and columns of pixels around the edges of the input data so that the size of the output feature map is the same as the size of the input data. Adding additional rows and columns may hinder algorithm performance so we can apply padding as ‘VALID’ which is used when it is desired to reduce the size of the output feature map in order to reduce the number of parameters in the model and improve its computational efficiency. When features size reduced then algorithm will get more optimized features and accuracy will get enhanced.

So extension work we have utilized padding same with valid to reduce parameters and to enhance accuracy.

**Advantages**

1.It takes less time

2.High prediction result

**SYSTEM REQUIREMENT:**

**HARDWARE REQUIREMENTS:**

# Processor - Intel I3(min)

* Speed - 1.1 GHz
* RAM - 4GB(min)
* Hard Disk - 500GB

**SOFTWARE REQUIREMENTS:**

* Operating System - Windows 10/above
* Programming Language - Python 3.7.0