**Literature Survey**

The purpose of literature survey review is to gain an understanding of the existing research and debates relevant to a particular topic or area of study and to present that knowledge in the form of a written report. Conducting a literature review helps you to build your knowledge in your field.

1. **Classifying Diabetic Retinopathy using Deep Learning Architecture[JUN2 2016]**

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**Overview:**

A supervised classification is based on classifying the test image dataset from the training data with a labeled class. In general, classification is done by extracting the features from the images followed by identifying the categorized classes based on the trained data with labeled classes.

**Merits:**

* The fundus images are obtained from the different datasets are taken under different camera with varying field of view, non-clarity, blurring, contrast and sizes of images different.By doing this the machine can be efficiently trained

**Demerits:**

* Additional augmentation is needed for images taken from different camera with different field of view
* Network is bit complex requires high level graphics processing unit

1. **Classification of Diabetic Retinopathy Images by Using Deep Learning Models[NOVEMBER 2018]**

**Authors:**

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**Overview:**

The problem with the other models is mainly preprocessing of the images and model building patterns. Most of the studied literature lacks the image pre-processing steps which might lead to erroneous results. This study is considered on preprocessing of images through various filter mechanisms which enhances the features of the image.

**Merits:**

* Fuzzy C-means clustering (FCM) has been used, the idea behind using FCM is to find out cluster levels of the training data that leads to better training accuracy
* Both images and statistical data are trained with all neural network models, to justify the difference of using statistical methods and Image processing methods.

**Demerits:**

* The model can be trained with a GPU system, with more number of processed data for getting higher accuracy results.
* the proposed model can be integrated with existing NPDR screening algorithms in for enhanced prioritization and resourcefulness of the present day eye-care delivery

**3. Detection of diabetic retinopathy using deep learning methodology [DECEMBER 2020].**

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**Overview:**

This present work considers a deep learning methodology, specifically a Densely Connected Convolutional Network DenseNet-169 , which is applied for the early detection of diabetic retinopathy. It classifies the fundus images based on its severity levels as No DR, Mild , Moderate ,Servere and Proliferative DR. The datasets that are taken into consideration are Diabetic Retinopathy Detection 2015 and Aptos 2019 Blindness Detection which are both obtained from Kaggle.

**Merits:**

* It can be executed using Python language , where a wide variety of libraries were employed for processing of images and to get acquainted with the system for creating convolutional neural networks like DenseNet-169.
* It makes use of GPU enabled devices for earlier and faster processing.

**Demerits:**

* The images in the datasetcontain a lot of noise , like some images may be out of focus ,some may be a lot of exposure **,** some may have extra lighting presence in the background.
* Traditional method for detection of DR is prolonged , challenging and costly.

**4. Early detection of diabetic retinopathy based on deep learning and ultra-wide-field fundus images [ 21 JANUARY 2021].**

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**Overview:**

In this study, we present a diabetic retinopathy detection system based on ultra-wide-field fundus photography and deep learning. In experiments, we show that the use of early treatment diabetic retinopathy study 7-standard field image extracted from ultra-wide-field fundus photography outperforms that of the optic disc and macula centered image in a statistical sense.

**Merits:**

* In the study, they trained their model using approximately 0.13 million training
* It is used to develop and investigate a DR detection system based on ETDRS 7SF, which is the most significant region of UWF fundus photography.

**Demerits**

* the ETDRS 7SF segmentation highly relies on the previous landmarks detection results, failure in the optic disc and macula detection stage results in subsequent unavailability of the DR detection

**5. Deep Learning Techniques for Diabetic Retinopathy Classification [March 8, 2022].**

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**Overview:**

Diabetic Retinopathy (DR) is a degenerative disease that impacts the eyes and is a consequence of Diabetes mellitus, where high blood glucose levels induce lesions on the eye retina. Diabetic Retinopathy is regarded as the leading cause of blindness for diabetic patients, especially the working-age population in developing nations.Moreover, the paper discusses the available retinal fundus datasets for Diabetic Retinopathy that are used for tasks such as detection, classification, and segmentation. The paper also assesses research gaps in the area of DR detection/classification and addresses various challenges that need further study and investigation.

**Merits:**

* The idea is to compare and discuss the top performing methods and explore their scalability and generalizability to some extent.
* Screening systems being developed today could incorporate these DL based approaches to enhance and classify the DR stage using lesion detection techniques across multiple fundus images.

**Demerits:**

* The main issue addressed in the reviewed studies is the manual diagnosis that has to occur after screening.
* DR is crucial, but understanding the various causes can also be a valid research opportunity.

**6. Diabetic Retinopathy Classification Using Hybrid Deep Learning Approach[JULY 2022]**

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**Overview:**

As per our objective and motivations, this study is associated with some background ideas and research efforts as shown in Fig. 1. Briefy, especially using deep learning for diagnosis of diabetic retinopathy and supporting it with image processing have been remarkable ideas to follow. In general, classification and diagnosis approaches performed with deep CNN method and two VGGNet models (VGG16 and VGG19) have been widely followed for diabetic retinopathy.

**Merits:**

* easy-to-design image pre-processing and hybrid deep learning approach for diagnosing diabetic retinopathy
* The classification was made by using deep convolutional neural network (CNN) methods and two VGG NETWORK models .

**Demerits:**

* the quality and balance of the datasets used to build a DR screening system are very critical
* We believe the classification accuracy will be further increased.