**1.INTRODUCTION**

**1.1 Project Overveiw:**

The problem statement of this project is a disease that is caused by Diabetics. Diabetic Retinopathy (DR) is a common complication of diabetes mellitus, which causes lesions on the retina that affect vision. If it is not detected early, it can lead to blindness. Unfortunately, DR is not a reversible process, and treatment only sustains vision. Diabetic Retinopathy early detection and treatment can significantly reduce the risk of vision loss. The manual diagnosis process of DR retina fundus images by ophthalmologists is time, effort and cost-consuming and prone to misdiagnosis unlike computer-aided diagnosis systems.The evaluation of diabetic retinopathy is associated with peoples having diabetics.The evaluation will be based on the fundus or retinal images of the diabetic patients eye.In project will be best for the diabetic patients for the earlier detection of diabetic retinopathy. Transfer learning has become one of the most common techniques that has achieved better performance in many areas, especially in medical image analysis and classification.We used Transfer Learning techniques like Inception V3,Resnet50,Xception V3 that are more widely used as a transfer learning method in medical image analysis and they are highly effective.

**1.2 Purpose:**

**T**he main purpose of this project is to help the diabetic patients for the early detection of diabetic retinopathy.

The root cause of the diabetic retinopathy is because of high sugar level in the blood due to the diabetics.One of the main cause of diabetic retinopathy is people fail to notice the illness and that cause the adverse reaction .This project will help them to detect diabetic retinopathy at the earlier stage and it can be treated easily.

As diabetic retinopathy progresses it blocks the tiny blood vessels that nourish the retina and cut off its blood supply.This project will help to detect diabetic retinopathy at the early stage by analysing Fundus images.This will provide the result with better accuracy and saves the time and cost of the patient. This will helps the patient to recover from the diabetic retinopathy in a better way.

Diabetics patients are not aware of the complications of the diabetics so they fail to notice these serious diseases.Diabetic retinopathy doesn’t have any specific symptoms other than blurred vision so many people will fail to notice the illness and the adverse reaction of the diabetic retinopathy.This project will help them for the early detection of Diabetic Retinopathy.

1. **LITERATURE SURVEY**
   1. **Existing problem:**

Diabetic Retinopathy (DB) is a complication of diabetes that influences the eyes. Damage to blood vessels in the tissue of the retina, the back layer of the eye, typically causes it Blurriness, floaters, dark or empty areas in the vision, and difficulty recognizing color blindness are some of the early symptoms. It necessitates constant monitoring, and in the event of complications, it may shorten life expectancy. If it is not diagnosed and treated, it can blind you. The medication

cannot be cured at this time. Diabetic retinopathy can be stopped or slowed down with treatment. Diabetes management may be used carefully to treatmild cases.

The diabetes on a fundus image is identified by the proposed method, which makes use of an Alex net Convolutional Neural Network (CNN).The dataset that was used came from the

MESSIDOR database. It has 1200 images of the fundus and was divided into 580 images of normal and exudates for the project. The dataset has been divided into two parts for the CNN

process: the training dataset and the testing dataset. On 50% of the training dataset, this method achieves accuracy greater than 90%, and the remaining 50% of the dataset is used for

testing. The tests give an accuracy of about 85%. Even though the images received a good accuracy, only 580 were utilized for both training and testing, despite the fact that the dataset was insufficient to train the neural network. Additionally, it had trouble identifying the image's smaller exudates.

In order to categorize diabetic retinopathy in the fundus imagery into five categories—No DR, Mild DR, Moderate DR, Severe DR, and Proliferative DR—the proposed system developed a CNN architecture. They have examined previous efforts to detect DR using CNN, and they have altered the networks in CNN to improve its accuracy and efficiency. They have achieved a 75% accuracy on the dataset of 80000 images. Classification of DR into mild, moderate, and severe forms presents some challenges.

To analyze the fundus image and predict the stage, they used a Deep Convolutional Neural Network (DCNN), which includes No DR, Moderate DR (a combination of mild and moderate Non-Proliferative DR), and Severe DR (severe NPDR and Proliferative DR).Over a period of time, they have almost used 3468 fundus images from various Kaggle clinics.They have achieved an accuracy rate of over 80%. When a model is trained with a small dataset and fails when applied to a new

dataset, an overfitting problem occurs.

The architecture used in the proposed model is DenseNet121.This is unique in that each feature map output from a convolution layer is concatenated with the subsequent layers of the same block. Based on the severity of the disease, it divides DR into five categories: PDR, No DR, Slight DR, Medium DR, and Severe DR. Cross-testing two datasets—Messidor and APTOS—has been used in the proposed method to enable the model to acquire complex features. They used a cross-testing strategy with unbalanced data, so their accuracy is lower than that of current methods. Additionally, the model had trouble categorizing the Slight NDPR class

**References:**

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* 1. **Problem Statement Definition:**

PROBLEM STATEMENT 1: The Physician will examine the medical condition of the eye and try to predict diabetic retinopathy which is manually sternous.

PROBLEM STATEMENT 2: The medical practitioner will determine the diabetic retinopathy and to inspect the medical condition of the patient to measure the extent of diabetic retinopathy.

PROBLEM STATEMENT 3: The Oculist have to suggest the treatment and to measure the level of diabetic retinopathy and provide treatment based on the extent of diabetic retinopathy.

PROBLEM STATEMENT 4: In a serious level the opthamalogist will find the reason for the blurry vision and provide treatment for diabetic retinopathy.

1. IDEATION AND PROPOSED SOLUTION:
   1. Empathy map canvas:

The empathy map will provide the