PROJECT DESIGN PHASE-I
PROPOSED SOLUTION TEMPLATE

Date	19 September 2022
Team ID	PNT2022TMID06905
Project Name	Project - DEEP LEARNING FUNDUS IMAGE ANALYSIS FOR EARLY DETECTION OF DIABETIC RETINOPATHY
Maximum Marks	2 Marks

PROPOSED SOLUTION TEMPLATE:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Diabetic retinopathy is one of the most threatening complications of diabetes that leads to permanent blindness if left untreated. One of the essential challenges is early detection, which is very important for treatment success. Unfortunately, the exact identification of the diabetic retinopathy stage is notoriously tricky and requires expert human interpretation of fundus images. Simplification of the detection step is crucial and can help millions of people. Convolutional neural networks (CNN) have been successfully applied in many adjacent subjects, and for diagnosis of diabetic retinopathy itself. However, the high cost of big labeled datasets, as well as inconsistency between different doctors, impede the performance of these methods. In this paper, we propose an automatic deep-learning-based method for stage detection of diabetic retinopathy by single photography of the human fundus. Additionally, we propose the multistage approach to transfer learning, which makes use of similar datasets with different labeling. The presented method can be used as a screening method for early detection of diabetic retinopathy with sensitivity.
2.	Idea / Solution description	Our aim is to identify retinopathy using five different diabetic retinopathy. Moreover, we present what pre-processing and regularization steps to the images needs to be done for the good functionality of the deep learning system and investigate systematically how the size with much smaller number of images used in training affects its performance.

3.	Novelty / Uniqueness	We will be using transfer learning. This 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.
4.	Social Impact / Customer Satisfaction	Using this system, we can easily detect the stages early, the doctors can able to treat the patient effectively and also reduce the complications. Therefore, this review identifies the need for improved outcome measures to provide valid, meaningful measurement of the social and emotional impact of diabetic retinopathy and discusses potential directions for future research such as item banking and computer adaptive testing.
5.	Business Model (Revenue Model)	This system would be used by both the doctors as well as the patients. It would reduce the time for the doctors to detect the stages. Demand for diabetic retinopathy is increasing with the complication related eye which is likely to treat with various eye injections and laser treatment for the disease are anticipated to increase the diabetic retinopathy market share in the forecast period from 2022 to 2032".The systems will be valuable in improving both screening of individuals with diabetes and communication and discussion among individuals caring for these patients.
6.	Scalability of the Solution	The system, being dynamically and modularly developed, allows for much modification and large scalable operations. More data when made available can be processed and produce efficient results. This system is easily and efficiently scalable.