Project Design Phase-I
Proposed Solution Template

Date	24 September 2022
Team ID	PNT2022TMID02120
Project Name	Project – Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	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. It's caused by damage to the blood vessels of the light-sensitive tissue at the back of the eye (retina). Diabetic retinopathy might cause no symptoms or only mild vision problems. The condition can develop in anyone who has type 1 or type 2 diabetes. The longer you have diabetes and the less controlled your blood sugar is, the more likely you are to develop this eye complication. 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.
2.	Idea / Solution description	Over the last few years, research into the application of Artificial Intelligence (AI) in the diagnosis of Diabetic Retinopathy (DR) has exploded. CNN (Convolutional Neural Networks) are used for image processing tasks since CNNs, were designed to map image data to an output variable.They have proven so effective that they are the go-to method for any type of prediction problem involving image data as an input. The Fundus image of the dataset will be trained and tested through the CNN model for better detection. Training a whole CNN from scratch is difficult to implement. So, it is common to use a pre-trained model trained on a variety of images in the similar task. So, in order to tackle the above problem, we use transfer learning techniques like Inception V3,Resnet50,Xception V3 in medical image analysis and they are highly effective.
3.	Novelty / Uniqueness	Many deep learning models have emerged and put it in to use but CNN was used for image processing tasks.

		People who train and test in CNN will have large dataset and it really takes time. To tackle these kinds of difficulties, transfer learning uses a pre-trained model which already trained on variety of images that can be transferred to second related problem. The early detection of the DR will help the patients in the early stage itself rather than in the developed stage of the disease. The high accuracy that was attained by using transfer learning techniques and Convolutional Neural Network makes the project more reliable and efficient.
4.	Social Impact / Customer Satisfaction	Patients would be satisfied by detecting the early stage of diabetic retinopathy. Also, the patients would be satisfied if the assurance of quality control of technology implemented is given in order to ensure it works properly. Even if they are late to identify the symptoms, the model would easily detect the problem. The process used before was time taking and the patients expected it to be fast and simple. This problem can be avoided using the proposed method in order to make it easy and less time consuming.
5.	Business Model (Revenue Model)	Awareness of this diabetic retinopathy disease should be spread among the people. To deal with this problem, proposed method will have the web page for the easy use of individuals. Periodic examination of diabetic retinopathy is required so it can be detected early. The users should be able to login to the web page so that they can periodically examine that they are having diabetic retinopathy or not, which allows users to keep the data safe. It is mostly used by the diabetic people. It is one of the easy methods to detect that they are affected or not.
6.	Scalability of the Solution	The website which will take input of the image makes it more ubiquitous for all types of people to use. Real time image can be used and results will be instantaneous to the individuals.