

**Project Design Phase-I**  
**Proposed Solution Template**

Date	21 OCTOBER 2022
Team ID	PNT2022TMID00519
Project Name	Project - Deep Learning Fundus Image Analysis For Early Detection Of Diabetic Retinopathy
Project Members	Dharsini,Kayanat,Karthika,Kavya
Project Mentors	Industry Mentors-Shivam Shivare, Indra Prakash Faculty Mentors- Dr. Malathy

**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)	<p>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. DR early detection and treatment can significantly reduce the risk of vision loss.</p> <p>An ophthalmologist needs a way to automate the diagnosis process because the time, effort and cost is significantly reduced.</p> <p>A patient needs a way to detect Diabetic Retinopathy as early as possible because the treatment can reduce the risk of vision loss.</p> <p>A hospital management needs a way to have a count on the number of patients having Diabetic Retinopathy because they consider them for further evaluations.</p>
2.	Idea / Solution description	<p>In this project, we intend to build a Deep Learning Fundus Image Analysis For Early Detection Of Diabetic Retinopathy using a convolutional neural network (CNN).We plan on creating a web application where the user interacts with the UI (User Interface) to choose the image. The chosen image is analysed by the model which is integrated with flask application. The Xception Model analyses the image, then the prediction is showcased on the Flask UI.</p>
3.	Novelty / Uniqueness	<p>The manual diagnosis process of DR retina fundus images by ophthalmologists is time, effort and cost-consuming and prone to</p>

		<p>misdiagnosis unlike computer-aided diagnosis systems.</p> <p>Many models were developed but extracting the input and predicting the accurate output is till now not that accurate. Our model focuses particularly on this aspect where we not only detect Diabetic Retinopathy but also try to do so with higher accuracy to avoid any false positives to a greater extent that may lead to dangerous results in treatment.</p> <p>This is done by passing the input to the trained model which will compare the fundus image with the training sample and calculate the probability of detection of Diabetic Retinopathy and it will display the results. This model is tested with a large number of samples and it predicts accurately compared to all the previous models that have even been built till now.</p>
4.	Social Impact / Customer Satisfaction	<p>This deep learning model provides the healthcare industry with the ability to analyse data at exceptional speeds without compromising on accuracy.</p> <p>One of the biggest advantages of using this deep learning approach is its ability to execute feature engineering by itself. In this approach, an algorithm scans the data to identify features which correlate and then combine them to promote faster learning without being told to do so explicitly. It provides useful and precise information and guidance for Diabetic Retinopathy prediction, clinical diagnosis, and medical services.</p>
5.	Business Model (Revenue Model)	<p>We intend this project to be a not-for-profit , one that is not driven by profit but by dedication to a given cause. To recover server and hosting charges we intend on monetizing the website using Google AdSense to yield a monthly revenue.</p>
6.	Scalability of the Solution	<p>Initially, this project focuses on a small number of users. Once there is an increase in the number of the users, larger number of samples from users can also act as the input to the training model. Cloud can also be made use for large storage and better performance. With google ads we can add user subscription for a year/month which can generate revenue for the project maintenance.</p>