Project Design Phase
Proposed Solution Template

Date	15 February 2026
Team ID	LTVIP2026TMIDS82253
Project Name	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 the proposed solution template.

S.No.	Parameter	Description (Based on Your Project)
1. **1**	**Problem Statement (Problem to be solved)**	Diabetic Retinopathy (DR) is a leading cause of blindness among diabetic patients. Early detection is difficult due to limited access to ophthalmologists, manual screening being time-consuming, expensive, and prone to human error—especially in rural and low-resource areas.
2. **2**	**Idea / Solution Description**	The proposed system uses **deep learning-based fundus image analysis** to automatically detect Diabetic Retinopathy at an early stage. Users upload retinal (fundus) images through a web interface, and a trained **CNN model (Xception / Transfer Learning)** analyzes the image and displays the diagnosis instantly.
3. **3**	**Novelty / Uniqueness**	The system applies **transfer learning using pre-trained CNN models** to achieve high accuracy with limited medical datasets. It integrates AI directly into a **Flask-based web application**, enabling real-time screening without specialized hardware, making early diagnosis accessible and affordable.
4. **4**	**Social Impact / Customer Satisfaction**	Early detection helps prevent blindness, reduces healthcare costs, and improves patient quality of life. The solution supports doctors by reducing workload and empowers patients in remote areas by enabling faster diagnosis, increasing trust and satisfaction in healthcare services.
5. **5**	**Business Model (Revenue Model)**	The system can follow a **Software-as-a-Service (SaaS)** model for hospitals and clinics, **subscription-based access** for diagnostic centers, or **licensing** for telemedicine platforms. Additional revenue can come from AI screening APIs and medical analytics.
6. **6**	**Scalability of the Solution**	The solution is highly scalable using **cloud deployment** and **containerized services**. It can be expanded to support multi-class DR grading,

		integrate with hospital systems, and handle large volumes of fundus images across regions.