Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	06/02/2026
Team ID	LTVIP2026TMIDS83275
Project Name	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks	4 Marks

1. Introduction

This document describes the functional and non-functional requirements of the Deep Learning-based Diabetic Retinopathy Detection System.

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Image Upload	Upload retinal fundus image through web form
		Support image formats (JPG, PNG, JPEG)
		Display uploaded image preview
FR-2	Image Validation	Validate file type before processing
		Reject invalid file formats
		Show error message for corrupted files
FR-3	Image Preprocessing	Resize image to required input size (224x224)
		Normalize pixel values
		Convert image to array format
FR-4	Model Loading	Load trained deep learning model at runtime
		Ensure model loads without errors
FR-5	Prediction	Pass processed image to CNN model
		Classify image into DR severity levels
		Generate probability scores for each class
FR-6	Result Display	Display predicted DR stage on webpage
		Show clear classification label
		Allow user to upload another image

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-7	Error Handling	Handle prediction failure gracefully
		Show user-friendly error messages
FR-8	System Deployment	Run Flask server successfully
		Bind to correct server port
		Ensure application is accessible online

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

NFR No.	Non-Functional Requirement	Description
NFR-1	Performance	Prediction response time should be less than 3 seconds
		System should handle multiple image uploads without crashing
		Model loading time should be optimized during startup
NFR-2	Accuracy	Model accuracy should be above 85%
		Prediction confidence scores should be reliable
		Model should generalize well on unseen test images
NFR-3	Usability	User interface should be simple and easy to navigate
		Upload and prediction process should require minimal steps
		Error messages should be clear and understandable
NFR-4	Reliability	System should not crash during image processing
		Application should recover gracefully from runtime errors
NFR-5	Scalability	Application should support deployment on cloud platform
		System should allow model upgrades without full redesign
NFR-6	Security	Uploaded images should not be permanently stored
		No personal patient data should be collected
		Secure handling of image data during processing

NFR No.	Non-Functional Requirement	Description
NFR-7	Compatibility	Application should work on major web browsers
		System should run on CPU-based cloud servers
NFR-8	Maintainability	Code should be modular and well-structured
		Model file should be replaceable without changing core code