

Project Design Phase – II

Solution Requirements (Functional & Non-functional)

Date:	02 Feb 2026
Team ID:	LTVIP2026TMIDS75194
Project Name:	Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy
Maximum Marks:	5 Marks

Functional Requirements

The following are the functional requirements of the proposed solution. These requirements define **what the system should do** and describe the core functionalities of the diabetic retinopathy detection system.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Confirmation for Contacting	<ul style="list-style-type: none">- Confirmation message displayed after contact form submission- Optional email acknowledgement to the user
FR-2	Prediction Interface	<ul style="list-style-type: none">- Form to upload retinal fundus image- Validate image format and size- Submit image to backend prediction API- Display diabetic retinopathy prediction result (Detected / Not Detected)
FR-3	Contact Form	<ul style="list-style-type: none">- Collect user name, email, subject, and message- Send user query to admin via email service
FR-4	Model Management	<ul style="list-style-type: none">- Load trained deep learning (CNN) model at API startup- Preprocess uploaded fundus image (resize, normalize)- Generate predictions using the serialized model
FR-5	Admin Notification	<ul style="list-style-type: none">- Admin receives user contact details and queries via email
FR-6	API Endpoints	<ul style="list-style-type: none">- <code>/api/predict</code>: For diabetic retinopathy prediction- <code>/api/contact</code>: For contact form submission- <code>/</code>: Status or health-check route

Explanation of Functional Requirements

- **FR-1** ensures that users receive confirmation after submitting queries, improving trust and transparency.
 - **FR-2** represents the core diagnostic functionality, enabling image-based prediction of diabetic retinopathy.
 - **FR-3** allows users to communicate with system administrators for support or feedback.
 - **FR-4** ensures proper handling of the trained deep learning model for reliable inference.
 - **FR-5** guarantees that all user communications reach the administrator without data loss.
 - **FR-6** defines standardized REST API endpoints for seamless frontend–backend interaction.
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Non-functional Requirements

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	The user interface should be simple, intuitive, responsive, and accessible for both technical and non-technical users
NFR-2	Security	User inputs and uploaded images must be validated and sanitized; backend APIs should be protected from unauthorized access
NFR-3	Reliability	The system and deep learning model must consistently provide accurate and valid prediction results
NFR-4	Performance	Prediction results should be generated and returned within 2 seconds for each API request
NFR-5	Availability	The system should be available 24/7 with minimal downtime

NFR-6	Scalability	The system should scale to support a large number of users through cloud-based infrastructure
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The following are the non-functional requirements of the proposed solution. These requirements define **how the system should perform** and ensure quality, reliability, and usability.

Explanation of Non-functional Requirements

- **Usability** ensures the application can be easily used by patients and healthcare professionals.
- **Security** protects sensitive medical data and prevents misuse of system resources.
- **Reliability** ensures consistent diagnostic output for all valid inputs.
- **Performance** guarantees fast predictions, which is critical in healthcare scenarios.
- **Availability** ensures uninterrupted access to the system.
- **Scalability** enables the application to handle increased user load without degradation.

Summary

The defined functional and non-functional requirements ensure that the proposed diabetic retinopathy detection system is **accurate, secure, reliable, and user-friendly**. By following this structured requirement specification, the system meets both technical and healthcare application standards while remaining scalable for real-world deployment.