Project Design Phase-II

Solution Requirements (Functional & Non-functional)

Date	20 January 2026
Team ID	LTVIP2026TMIDS76912
Project Name	HematoVision: Advanced Blood Cell Classification Using Transfer Learning
Maximum Marks	4 Marks

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 blood cell image (JPG/PNG) Validate file format and size Store uploaded image temporarily
FR-2	Image Preprocessing	Resize image to model input size (e.g., 224x224) Normalize pixel values Convert image to required array format
FR-3	Data Augmentation (Training Phase)	Apply rotation, flipping, zoom Improve dataset diversity Prevent overfitting
FR-4	Blood Cell Classification	Load pre-trained transfer learning model (VGG16/ResNet50) Perform prediction on uploaded image Classify into Eosinophil, Lymphocyte, Monocyte, Neutrophil
	Prediction Display	Display predicted class label Show confidence score Display uploaded image with result

Non-functional Requirements:

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

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The system must provide a simple and intuitive interface for uploading blood cell images and viewing results. Medical professionals and students should be able to use it without technical training. Clear instructions and result visualization must be provided.
NFR-2	**Security**	Uploaded medical images must be securely handled. The system should validate file types, prevent malicious uploads, use secure communication (HTTPS), and restrict unauthorized access to the trained model and stored data.
NFR-3	**Reliability**	The model should consistently produce accurate classifications with stable performance across different blood cell images. The system must handle errors gracefully without crashing.
NFR-4	**Performance**	The system should generate predictions within a few seconds after image upload. Model inference time must be optimized to support real-time or near real-time diagnosis
NFR-5	**Availability**	The application should be accessible whenever required, especially in clinical or academic environments. If deployed on cloud, uptime should be maintained with minimal downtime.
NFR-6	**Scalability**	The system should support increasing numbers of users and larger datasets. Cloud deployment should allow scaling of computational resources (CPU/GPU) when required.