Project Design Phase

Solution Architecture

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

Solution Architecture – HematoVision

- **Business Problem:** Manual blood cell classification is time-consuming, error-prone, and dependent on expertise.

- **Technology Solution:** Use transfer learning with a pre-trained CNN (e.g., VGG16/ResNet) for accurate and efficient multi-class blood cell classification.

- **System Structure:**

    o Data preprocessing and augmentation

    o Train-test data splitting

    o Model training, evaluation, and saving

    o Integration with Flask web application

    o HTML-based user interface for image upload and result display

- **Key Features:**

    o Automated image classification

    o Real-time prediction

    o Confidence score display

    o User-friendly interface

- **Development Phases:**

    o Dataset collection and preparation

    o Model building and optimization

    o Model evaluation

    o Deployment using Flask

- **Specifications & Management:**

    o Defined input format (blood smear images)

    o Defined output (cell class + probability)

    o Scalable, maintainable, and healthcare-focused solution design.

HematoVision – Solution Architecture

CNN Model (VGG16 Transfer Learning)

image for prediction / cell type + confidence

Healthcare User → upload / view → HematoVision Web UI (HTML/CSS/JS) → HTTP request → Flask API Server → store result → Results Storage (Database / Files)

training data

Blood Cell Image Dataset