## Phase-2: Requirement Analysis

1. Functional Requirements

• Upload blood smear image.  
• Preprocess and feed to model.  
• Predict one of five cell types.  
• Display prediction with image.  
• Navigate pages for background, team, and usage.

2. Non-Functional Requirements

• Security: Restrict to image formats (.jpg/.png).  
• Performance: Real-time prediction (~1 sec).  
• Accuracy: >80% classification accuracy.  
• Usability: Clean, medical-grade UI.  
• Maintainability: Model can be re-trained and replaced.

3. Hardware & Software Requirements

• Hardware: Intel i5+, 8GB RAM, 2GB Disk  
• Software: Python 3.8+, TensorFlow/Keras 2.x, Flask 2.x, Google Colab, HTML/CSS

4. Dataset Requirements

• Name: BCCD Dataset or Blood Cell Dataset from Kaggle  
• Classes: Neutrophils, Lymphocytes, Monocytes, Eosinophils, Basophils  
• Format: JPG/PNG images  
• Split: Train/Val/Test

5. Model Requirements

• Base Model: ResNet50 or VGG16  
• Input: 224x224 RGB  
• Output: 5-class softmax  
• Loss: Categorical Crossentropy  
• Optimizer: Adam

6. Web App Requirements

• Upload form  
• Image preview with label  
• Pages: /, /home, /predict, /portfolio

Outcome of Phase-2

Requirements and technical blueprint were established, ensuring smooth development.

## Phase-3: Project Design

System Architecture

Backend: Model logic with Flask API  
Frontend: HTML/CSS templates via Jinja2

Flow Diagram

User → Upload Image → Preprocess → Predict → Show Result

Folder Structure

/static/upload – Uploaded images  
/templates – HTML templates  
/model – Trained model file  
app.py – Main backend logic

Model Design

Input: (224, 224, 3)  
Base: ResNet50/VGG16  
Dense: 5 neurons, softmax  
Loss: Categorical Crossentropy  
Optimizer: Adam  
Callbacks: EarlyStopping, Checkpoint

UI Design

index.html – Upload & predict  
result.html – Prediction + Image  
home.html – Project overview  
portfolio\_details.html – Team, architecture  
contact.html – Team contact

Outcome of Phase-3

Blueprint complete, system ready for agile development.