## Phase-4: Project Planning (Agile Methodology)

1. Agile Approach

4 Sprints:  
• Sprint 1: Setup, dataset, preprocessing  
• Sprint 2: Model development  
• Sprint 3: Flask app integration  
• Sprint 4: Testing & finalization

2. Sprint Planning

Sprint 1:  
• Setup Colab, download dataset  
• Organize folders, augment data

Sprint 2:  
• Train model using transfer learning  
• Evaluate with metrics

Sprint 3:  
• Flask routes & template integration  
• Test predictions

Sprint 4:  
• Bug fixes, UI polishing  
• Finalize documentation

3. Daily Stand-ups & Weekly Reviews

Regular review meetings and task syncs

4. Tools Used

Google Sheets  
GitHub (versioning)  
Google Colab

5. Benefits

• Iterative refinement  
• Rapid prototyping  
• Early user feedback

Outcome of Phase-4

Agile approach ensured steady and flexible progress.

## Phase-5: Project Development

1. Data Preprocessing

Split into Train/Val/Test  
Augmentations: rotate, zoom, flip

2. Model Development

Pretrained VGG16/ResNet50  
Remove FC layers, add custom head  
Fine-tuned on cell dataset

3. Training

Epochs: 20–30 with early stopping  
Final Accuracy: ~85%

4. Evaluation

Confusion matrix  
Classification report  
Common errors between Monocytes & Eosinophils

5. Web App with Flask

Upload, preview, and result display  
Clean medical-style interface

6. Model Integration

Preprocess image (224x224)  
Predict using trained model

7. Deployment Prep

Model saved as hematovision.h5  
Flask project organized for deployment

Outcome of Phase-5

Fully functional blood cell classifier and web interface completed.

## Phase-6: Functional & Performance Testing

1. Functional Testing

Test Cases:  
• Valid image – Pass  
• Unsupported file – Pass  
• No file – Pass  
• Cell-type predictions – Pass  
• Page navigation – Pass

2. Performance Testing

• Avg response time: 1.3s  
• Accuracy: 85%  
• F1 Scores: Neutrophil (0.92), Lymphocyte (0.88), Monocyte (0.83), Eosinophil (0.79), Basophil (0.75)

3. Resource Usage

• CPU inference smooth  
• Memory usage ~500MB

4. Error Handling

Handles invalid input, file issues with alerts

5. Usability Testing

Tested by non-technical users  
Rated intuitive and easy

Outcome of Phase-6

High functionality, good speed, and clinical-grade accuracy confirmed.  
Future enhancements: larger datasets, attention layers.

## OUTPUT:

A ready-to-deploy, AI-powered blood cell classification system with real-time web interface: “HematoVision”.

## THANK YOU