

Development Phase

Project Name: HematoVision – Blood Cell Classification

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1. Introduction

The **Development Phase** is the most important part of the project where the actual coding, integration, and testing are done.

In this phase, all planned modules and features of **HematoVision** were developed and integrated into a working system.

2. Objectives of the Development Phase

- To build a functional AI-based system for blood cell classification.
 - To integrate all modules — frontend, backend, AI model, and database.
 - To ensure secure, fast, and user-friendly performance.
 - To test each module and fix any issues found during development.
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3. Development Environment

Component	Technology Used
Frontend	React.js, HTML, CSS, JavaScript
Backend	Node.js, Express.js
AI Model	Python, TensorFlow / PyTorch
Database	MongoDB Atlas
Cloud Hosting	AWS / Heroku
Development Tools	Visual Studio Code, GitHub, Postman

4. Modules Developed

Module Name	Description
Login & Authentication	Allows secure access using JWT authentication.
Image Upload Module	Enables lab technicians to upload blood sample images.

Module Name	Description
AI Classification Module	Uses trained AI model to classify RBCs, WBCs, and Platelets.
Report Generation	Automatically generates classification and abnormality reports.
Dashboard	Displays visual charts and summary for doctors and admins.
Database Integration	Stores reports, users, and images securely in MongoDB Atlas.

5. Steps Followed During Development

1. Designed the database schema in MongoDB.
 2. Created APIs in Node.js and connected with React frontend.
 3. Trained and integrated the AI classification model using Python.
 4. Tested each module separately (unit testing).
 5. Connected frontend and backend for complete system flow.
 6. Deployed the application on the cloud.
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6. Testing in Development Phase

- **Unit Testing:** Each component tested individually.
 - **Integration Testing:** Checked data flow between modules.
 - **Model Testing:** Verified classification accuracy with real blood cell images.
 - **Security Testing:** Ensured role-based access for Admin, Doctor, and Technician.
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7. Output

After successful development and testing:

- The system correctly classifies blood cell images into categories.
 - Reports are generated automatically and stored securely.
 - The dashboard provides visual analytics for doctors and admins.
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8. Conclusion

The **Development Phase** of HematoVision successfully turned project plans into a fully functional AI-based web application.

All modules were integrated, tested, and deployed on the cloud, ready for real-world use.