Proposed Solution Template

Project Name: HematoVision – Blood Cell Classification
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1. Solution Overview

Problem Addressed:

- Manual blood cell classification is slow and error-prone.

- Delay in diagnosis due to manual reporting.

- Difficulty detecting rare/abnormal cells.

- Limited access to labs in remote areas.

Proposed Solution:

- An **AI-powered blood cell classification system** that automatically identifies RBCs, WBCs, and Platelets.

- Cloud-based reporting system for instant access by doctors.

- Abnormality detection module to flag rare or abnormal cells.

- Mobile/web app to expand access for remote clinics.

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2. Features & Benefits

Feature	Description	Benefit
AI Blood Cell Classification	Automatically classifies blood cells from uploaded images	Saves time, reduces errors
Abnormality Detection	Flags abnormal or rare cells	Reduces misdiagnosis
Cloud-based Reports	Generates and shares reports instantly	Faster diagnosis, accessible remotely
User Authentication	Secure login for lab technicians, hematologists, and doctors	Ensures data privacy and security
Mobile App for Remote Clinics	Upload blood samples from rural areas	Expands accessibility

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3. Technical Approach

Component	Technology / Tool	Purpose
Frontend	React.js, HTML5, CSS3, JavaScript	User interface for uploading samples & viewing reports
Backend	Node.js, Express.js, Python (Flask/FastAPI)	API services and AI integration
AI Model	TensorFlow / PyTorch, OpenCV	Blood cell classification & image preprocessing
Database	MongoDB Atlas, Mongoose	Store patient data, reports, and images
Cloud Hosting	AWS / Heroku	Deploy web application and AI services

4. Implementation Steps

1. **Image Upload Module:** Allow users to upload blood smear images.
2. **AI Classification Module:** Use AI to classify cells and detect abnormalities.
3. **Report Generation Module:** Generate detailed reports with counts, abnormalities, and charts.
4. **Cloud Integration:** Store reports and provide secure access to doctors.
5. **Mobile Access:** Enable remote clinics to upload and access reports.

5. Expected Outcomes

- Faster blood cell classification (under 30 seconds per sample).
- Reduced human error in diagnosis.
- Easy access to reports for doctors and patients.
- Expanded service to remote areas.
- Scalable platform for future AI modules.