HematoVision: Blood Cell Classification

1. Introduction

• Project Title: HematoVision – Blood Cell Classification

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2. Project Overview

• Purpose
The purpose of this project is to automatically classify blood cell images using deep learning. Microscopic blood cell analysis is essential in diagnosing diseases such as anemia, infections, and leukemia. Manual classification is time■consuming and requires expert knowledge. HematoVision provides an AI■based solution to assist in fast and accurate blood cell identification.

• Features
* Image Upload & Classification
* Transfer Learning using MobileNetV2
* Automated Prediction of Blood Cell Type
* Web■based User Interface
* Real■time Inference using Trained Model

3. Setup Instructions

• Prerequisites
Software Requirements:
* Python 3.8 or above
* pip (Python package manager)
* VS Code / Anaconda / Any Python IDE

• Required Python Libraries
tensorflow – Deep learning framework
keras – Model architecture and training
flask – Web framework
numpy – Numerical operations
pillow – Image processing

Installation Commands:
pip install -r requirements.txt

4. Folder Structure

HematoVision/
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■■■ app.py – Flask application
■■■ model.py – Model loading logic
■■■ predict.py – Prediction pipeline
■■■ templates/
■ ■■■ index.html – Web UI

■■■ static/ – Uploaded images
■■■ model/ – Trained model file
■■■ requirements.txt
■■■ README.md

5. Screenshots or Demo

Demo Link:
GitHub Repository: https://github.com/Renuka0555/Hematovision

6. Known Issues

* Model trained on limited dataset
* Accuracy depends on image quality
* Supports limited blood cell classes
* Local deployment only

7. Future Enhancements

* Train with larger medical datasets
* Add more blood cell categories
* Deploy on cloud platform
* Add confidence score & visualization
* Mobile■friendly interface

8. Conclusion

HematoVision demonstrates how deep learning and transfer learning can be applied to medical image classification. The system provides an accessible web interface for blood cell prediction and can support educational and preliminary diagnostic applications.

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