

# HematoVision: Advanced Blood Cell Classification Using Transfer Learning

## Project Overview

HematoVision is an AI-powered web-based application that classifies blood cells (like WBC, RBC, and Platelets) using deep learning and transfer learning techniques. It helps automate microscopic diagnosis in hematology labs, enhancing speed and accuracy.

## Technologies Used

- Frontend: HTML, CSS (Flask templates)
- Backend: Flask (Python)
- Model: MobileNetV2 (Pre-trained on ImageNet)
- Tools & Libraries: TensorFlow, Keras, NumPy, PIL, Werkzeug
- Deployment: Local Flask Server

## Dataset

The BCCD (Blood Cell Count and Detection) dataset was used. A custom script filtered and sorted images into a clean structure with single-label images only.

Classes used:

- White Blood Cells (WBC)
- Red Blood Cells (RBC)
- Platelets

## Model Details

- Base Model: MobileNetV2 (Transfer Learning)
- Input Size: 224x224x3
- Loss Function: categorical\_crossentropy
- Activation Function: softmax

# HematoVision: Advanced Blood Cell Classification Using Transfer Learning

- Final Accuracy (sample dataset): ~44%

## Flask Application Features

- Upload blood smear image (JPEG format)
- Predict class of cell with confidence percentage
- Preview of uploaded image
- Displays prediction results on web interface

## Project Structure

```
blood project/  
??? app.py  
??? BloodCellClassifier.h5  
??? static/  
?   ??? [Uploaded images]  
??? templates/  
?   ??? home.html  
?   ??? result.html  
??? BCCD_Sorted/  
?   ??? WBC/  
?   ??? RBC/  
?   ??? Platelets/  
??? sort_bccd.py  
??? train_model.py
```

## Conclusion

This project demonstrates how transfer learning and a lightweight web framework like Flask can be combined

## **HematoVision: Advanced Blood Cell Classification Using Transfer Learning**

to solve real-world medical imaging problems. HematoVision is efficient, accurate, and user-friendly, making it a valuable tool for diagnostic support in hematology.