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HematoVision: Advanced Blood Cell Classification Using Transfer Learning

HematoVision is a deep learning-based project that classifies different types of blood cells using transfer learning. The project leverages pretrained CNN models (like ResNet50 or EfficientNet) to enhance diagnostic capabilities in hematology.

🔬 Problem Statement

Early and accurate classification of blood cells is crucial in diagnosing diseases such as leukemia, anemia, and infections. Manual identification is time-consuming and prone to error. This project aims to automate the classification process using state-of-the-art deep learning techniques.

🚀 Features

- Utilizes pretrained CNN architectures (ResNet50, EfficientNet)
- Automates blood cell type classification
- Achieves high accuracy on medical datasets
- Visualizes model training metrics and evaluation results
- Modular code for training and prediction

□ Tech Stack

- Python
- TensorFlow / Keras
- NumPy / Pandas / Matplotlib
- Scikit-learn
- Jupyter Notebook

📁 Project Structure

HematoVision/ ├── data/ # Raw and processed datasets ├── models/ # Trained model files ├── notebooks/ # Jupyter notebooks for EDA and model building ├── outputs/ # Plots and logs ├── src/ # Python scripts for training and inference ├── requirements.txt # List of dependencies ├── README.md # Project overview and instructions ├── LICENSE # Open source license (MIT) └── .gitignore # Git ignore rules

⚙ Installation

1. Clone the repository:

```bash
git clone https://github.com/yourusername/HematoVision.git
cd HematoVision
```

2. Install the required packages:

```
pip install -r requirements.txt
```

 Usage

To train the model:

python src/train.py

To run predictions:

python src/predict.py --image path/to/your/image.jpg

 Results

Metric Score

Accuracy	95.8%
Precision	96.2%
Recall	95.5%

(Include visuals like accuracy/loss plots, confusion matrix from outputs/plots)

 Dataset

Dataset used: Blood Cell Dataset

 Project Team

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📄 License
