

Project Prerequisites for HematoVision

Technical Prerequisites

Area	Requirements
Programming Language	Python 3.7+
Libraries/Frameworks	TensorFlow or PyTorch, NumPy, Pandas, Matplotlib, Scikit-learn
Image Processing	OpenCV, PIL
Environment	Jupyter Notebook / Google Colab / VS Code
Hardware	GPU support (local or via cloud like Google Colab, Kaggle, AWS, etc.) for faster model training

Knowledge Prerequisites

Area	Understanding Needed
Python Programming	Functions, classes, file I/O, libraries
Deep Learning Basics	CNNs, activation functions, loss functions, backpropagation
Transfer Learning	Fine-tuning pre-trained models like ResNet, EfficientNet, etc.
Image Classification	Preprocessing, data augmentation, evaluation metrics
Model Evaluation	Accuracy, Precision, Recall, F1-score, Confusion Matrix



Software/Tools Required

Tool	Purpose
Anaconda / Python Environment	Managing Python packages
Jupyter Notebook / Colab	Interactive coding and visualization
TensorBoard / Matplotlib / Seaborn	Visualizing training and evaluation metrics
Git	Version control
Google Colab / Kaggle / Local GPU	Training large models with better hardware



Dataset Requirements

- Images of blood cells, properly annotated by type (eosinophil, lymphocyte, monocyte, neutrophil).
- Dataset format: Should be organized into folders or labelled CSV file.
- dataset/
 - ├— eosinophils/
 - ├— lymphocytes/
 - ├— monocytes/
 - └— neutrophils/