HematoVision

Advanced Blood Cell Classification Using Transfer Learning

Name: Kovuri Udaya Siva Kumar

Register Number: 238X1A4246

College: Kallam Haranadha Reddy Institute of Technology

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1. Introduction

Blood cell classification plays a crucial role in medical diagnostics. Manual classification is time-consuming and error-prone. This project, HematoVision, aims to automate the classification of blood cells using deep learning, specifically Transfer Learning with the MobileNetV2 architecture.

2. Problem Statement

To build an accurate, efficient, and lightweight blood cell classifier that distinguishes between different types of blood cells using pre-trained deep learning models.

3. Dataset Description

The dataset contains labeled images of various blood cell types such as RBCs, WBCs, and Platelets. Images are preprocessed, augmented, and split into training and validation sets to improve model generalization.

4. Methodology & Model

We use the MobileNetV2 model, a lightweight and efficient convolutional neural network, as the base. Transfer learning is applied by re-training the final layers on our blood cell dataset using

TensorFlow and Keras.

5. Implementation Summary

- Dataset loaded using ImageDataGenerator.

- MobileNetV2 imported with pretrained weights (ImageNet).

- Model trained on 80% of the data, validated on 20%.

- Final model exported as .h5 and integrated into a Flask web app for prediction.

6. Results & Accuracy

The model achieved high accuracy on the validation set and successfully classified blood cell images in real-time through the web interface. The system can be used as a clinical support tool.

7. Conclusion

HematoVision demonstrates how AI can assist in medical imaging and diagnostics. By leveraging pre-trained models and Flask, the project shows the feasibility of deploying intelligent blood cell classifiers in real-world environments.

8. References

1. https://www.tensorflow.org/

2. https://keras.io/

3. https://github.com/UDAY4246/HEMATO-VISION