Performance Testing

Performance testing was a critical component in validating the efficacy of the developed system. The primary goal was to assess the reliability, accuracy, and responsiveness of the pollen classification model under varied conditions. The evaluation metrics included:

* **Classification Accuracy**: Assessed using a labeled dataset with diverse pollen grain types. The best model achieved an accuracy exceeding 92%.
* **Precision, Recall, and F1-Score**: To ensure robustness across all classes, especially for less frequent pollen types.
* **Confusion Matrix Analysis**: Provided insight into misclassifications, helping refine the model's performance further.
* **Model Inference Time**: Measured to validate suitability for near real-time applications. Average prediction time per image was under 1.5 seconds.
* **Stress Testing**: Conducted using batch processing and multiple concurrent requests to ensure stability under load.

This phase confirmed the system's reliability in both controlled and practical scenarios, making it suitable for deployment in labs or research environments.