Project Guide: Pollen's Profiling - Automated Classification of Pollen Grains

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1. Project Overview

This project automates the classification of pollen grain images using deep learning and image processing. It is useful for environmental monitoring, allergy diagnosis, and agricultural research.

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2. Folder Structure

```
Pollen_Classification_Project/
├── dataset/
│   ├── class1/
│   ├── class2/
│   └── ...
├── preprocess.py
├── model.py
├── train.py
├── app.py
├── templates/
│   └── index.html
├── pollen_model.h5 (after training)
└── README.txt
```

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3. Setup Instructions

Install Required Libraries:

```
pip install tensorflow flask opencv-python matplotlib seaborn
```

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4. Step-by-Step Execution

Step 1: Load and Preprocess Images

- Edit `preprocess.py` to match your dataset path.
- This script loads, resizes, and normalizes images.

Step 2: Build Model

- `model.py` contains the CNN architecture.

• Customize the layers as needed.

Step 3: Train the Model

• Run `train.py` to train and save the model.

```
python train.py
```

• Output: `pollen_model.h5`

Step 4: Launch the Web App

• `app.py` creates a Flask server to upload images and return predictions.

```
python app.py
```
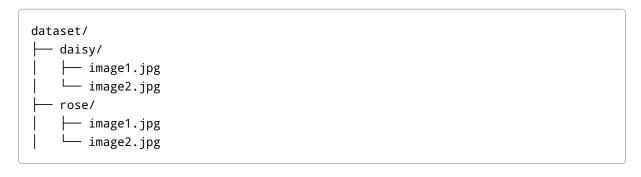
• Open browser: `http://127.0.0.1:5000`

Step 5: Use the UI

• Upload a pollen grain image.
• Get the predicted class instantly.

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5. Notes

• Ensure your dataset has enough images per class.
• Use GPU (if available) for faster training.
• Update `label_map` in `app.py` based on actual class names.

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6. Example Dataset Structure

```
dataset/
├── daisy/
│   ├── image1.jpg
│   └── image2.jpg
├── rose/
│   ├── image1.jpg
│   └── image2.jpg
```

End of Guide