Pollen's Profiling: Automated Classification of Pollen Grains

1. Introduction

**Team ID**: LTVIP2025TMID34966

**Team Size**: 4

**Team Leader**: N D S S Lakshmi Srujana

**Team Members**:

* M Sai Phani Sreeja – Research and Documentation
* M Devika – Image Processing
* Morla Devi Chaitra – Machine Learning Development

2. Project Overview

**Purpose:**

"Pollen's Profiling" is an innovative project that automates the classification of pollen grains using deep learning and image processing techniques. The system aims to assist in environmental monitoring, allergy diagnosis, and agricultural research by identifying pollen grains based on their morphological features

**Features:**

* Automated classification of pollen grains from images
* Integration with a user-friendly interface for data input and results
* Support for environmental, medical, and agricultural use cases
* Visualization of classification results

3. Architecture

**Diagram Description:**

The system follows a workflow where user inputs are processed through a model powered by a deep learning algorithm. Images undergo preprocessing, while text and train data are utilized for training. The model generates predictions, which are evaluated and displayed via a UI.

**Technical Components:**

* **Frontend:** HTML, CSS, JavaScript for an interactive UI
* **Backend:** Python (Flask) for processing and serving data
* **Model:** Deep learning algorithm for classification
* **Database:** SQLite for storing pollen data and results

4. Setup Instructions

**Prerequisites:**

* Python 3.x
* pip
* Required libraries (e.g., TensorFlow, OpenCV)

**Installation:**

git clone https://github.com/your-repo/pollen-profiling.git

cd pollen-profiling

pip install -r requirements.txt

5. Folder Structure

* frontend: Static files (HTML, CSS, JS)
* backend: Flask app and API endpoints
* models: Trained deep learning models
* data: Preprocessed images and text data

6. Running the Application

**Frontend:**  
Open index.html in a browser.

**Backend:**

python app.py

7. UI Features

* Image upload for pollen sample analysis
* Display of classification results
* Filter options by use case (environmental, medical, agricultural)

8. Future Enhancements

* Real-time pollen monitoring
* Integration with mobile devices
* Advanced AI for rare pollen identification