Project Report Format

1. **INTRODUCTION**
   - 1.1 Project Overview

     Pollen profiling is a critical process in the fields of botany, ecology, and allergy diagnostics. Traditionally, classifying pollen grains has been a manual, time-consuming task prone to human error. This project presents a Flask-based web application integrated with a Convolutional Neural Network (CNN) model capable of accurately classifying pollen grain images. The system provides an intuitive interface for uploading images and instantly receiving classification results powered by deep learning.

   - 1.2 Purpose

     The main purpose of this project is to automate the classification of pollen grains using machine learning. By combining a trained CNN with a user-friendly web interface, the application aims to:

     Reduce manual workload and subjectivity in identification.

     Provide quick and reliable predictions for researchers and students.

     Demonstrate how deep learning can be effectively integrated into real-world tools.

2. **IDEATION PHASE**
   - 2.1 Problem Statement
   - 2.2 Empathy Map Canvas
   - 2.3 Brainstorming
3. **REQUIREMENT ANALYSIS**
   - 3.1 Customer Journey map
   - 3.2 Solution Requirement
   - 3.3 Data Flow Diagram
   - 3.4 Technology Stack
4. **PROJECT DESIGN**
   - 4.1 Problem Solution Fit
   - 4.2 Proposed Solution
   - 4.3 Solution Architecture
5. **PROJECT PLANNING & SCHEDULING**
   - 5.1 Project Planning
6. **FUNCTIONAL AND PERFORMANCE TESTING**
   - 6.1 Performance Testing

7. RESULTS

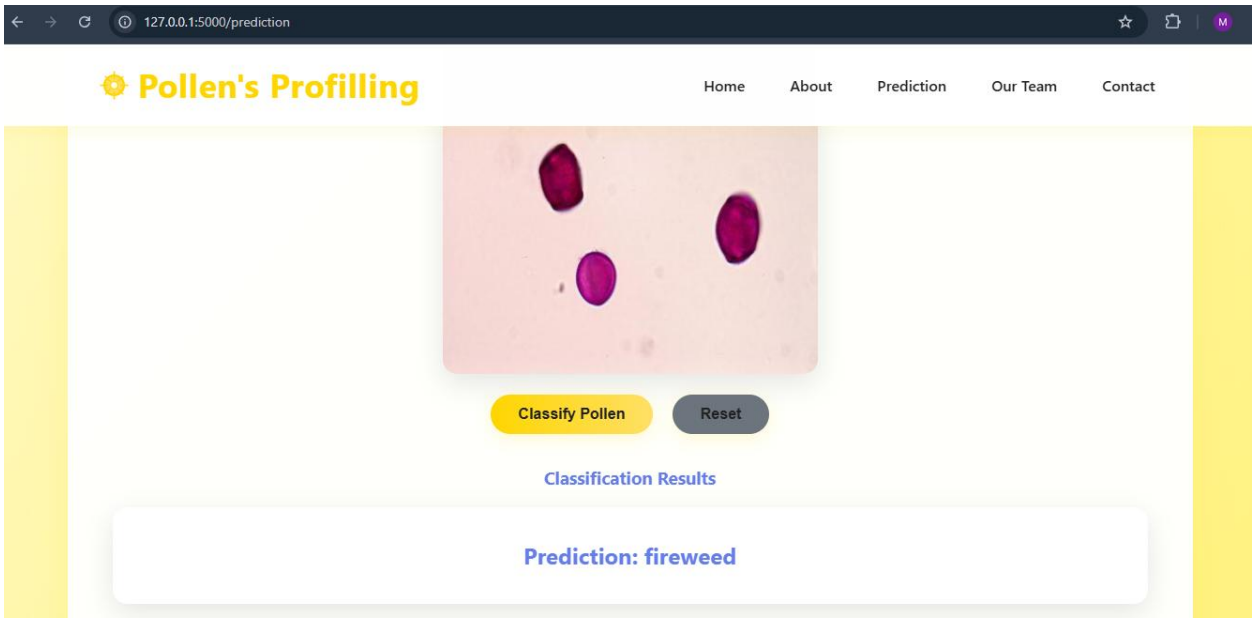
7.1 Output Screenshots

```
True label: hill_mustard | Image: --
Predicted class index: 9
Predicted class label: hill_mustard

True label: fireweed | Image: ------
Predicted class index: 6
Predicted class label: fireweed

True label: plantain | Image: 108_jp
Predicted class index: 17
Predicted class label: plantain

True label: linden | Image: 61_jpg.r
Predicted class index: 10
Predicted class label: linden
```



8. ADVANTAGES & DISADVANTAGES

✔ Advantages:

- Saves time
- Accurate predictions
- Easy to use

✔ **Disadvantages:**

- Depends on dataset quality
- Needs internet if deployed online
- Misclassification if image quality is poor

9. **CONCLUSION**

Pollen's Profiling is a deep learning-based project that automatically identifies and classifies pollen grains from images. It replaces manual identification, which is slow and requires expert knowledge. The system uses a CNN model to predict the type of pollen quickly and accurately. It also includes a simple web interface where users can upload images and get instant results. This solution saves time, improves accuracy, and helps researchers, students, and farmers in their work.

10. **FUTURE SCOPE**

- Add more pollen types
- Convert to a mobile app
- Use advanced AI models
- Deploy globally with cloud hosting

11. **11. APPENDIX**

Source Code(if any)

Dataset Link

https://www.kaggle.com/datasets/nataliakhanzhina/pollen20ldet?utm_source=chatgpt.com

GitHub & Project Demo Link

https://github.com/mvnsuseelkumar/Pollen-s-Profiling-Automated-Classification-of-Pollen-Grains.git