Proposed Solution Template:

S.No.	Parameter	Description
1	**Problem Statement**	Manual identification of pollen grains is timeconsuming, error-prone, and requires expert knowledge; there is a need for an automated, scalable solution for accurate classification.
2	**Idea / Solution Description**	A CNN-powered image classification system deployed via a Flask web application that allows users to upload pollen images and instantly receive species identification among 23 classes.
3	**Novelty / Uniqueness**	Leverages data augmentation and transfer learning on a specialized Brazilian Savannah Pollen Dataset to achieve high accuracy with limited samples; offers real-time inference on edge devices.
4	**Social Impact / Customer Satisfaction**	Accelerates environmental and agricultural research, aids allergists in pollen allergy diagnosis, and educates users on local pollen distributions—improving both scientific outcomes and public health.
5	**Business Model Revenue Model)**	Subscription-based SaaS for research institutions and allergy clinics; licensable API for agricultural companies; freemium web portal for educational use by students and hobbyists.

6	**Scalability of the Solution**	Easily extensible to new pollen classes via fine-tuning; containerized Flask deployment supports cloud, on-

Pollen’s Profiling

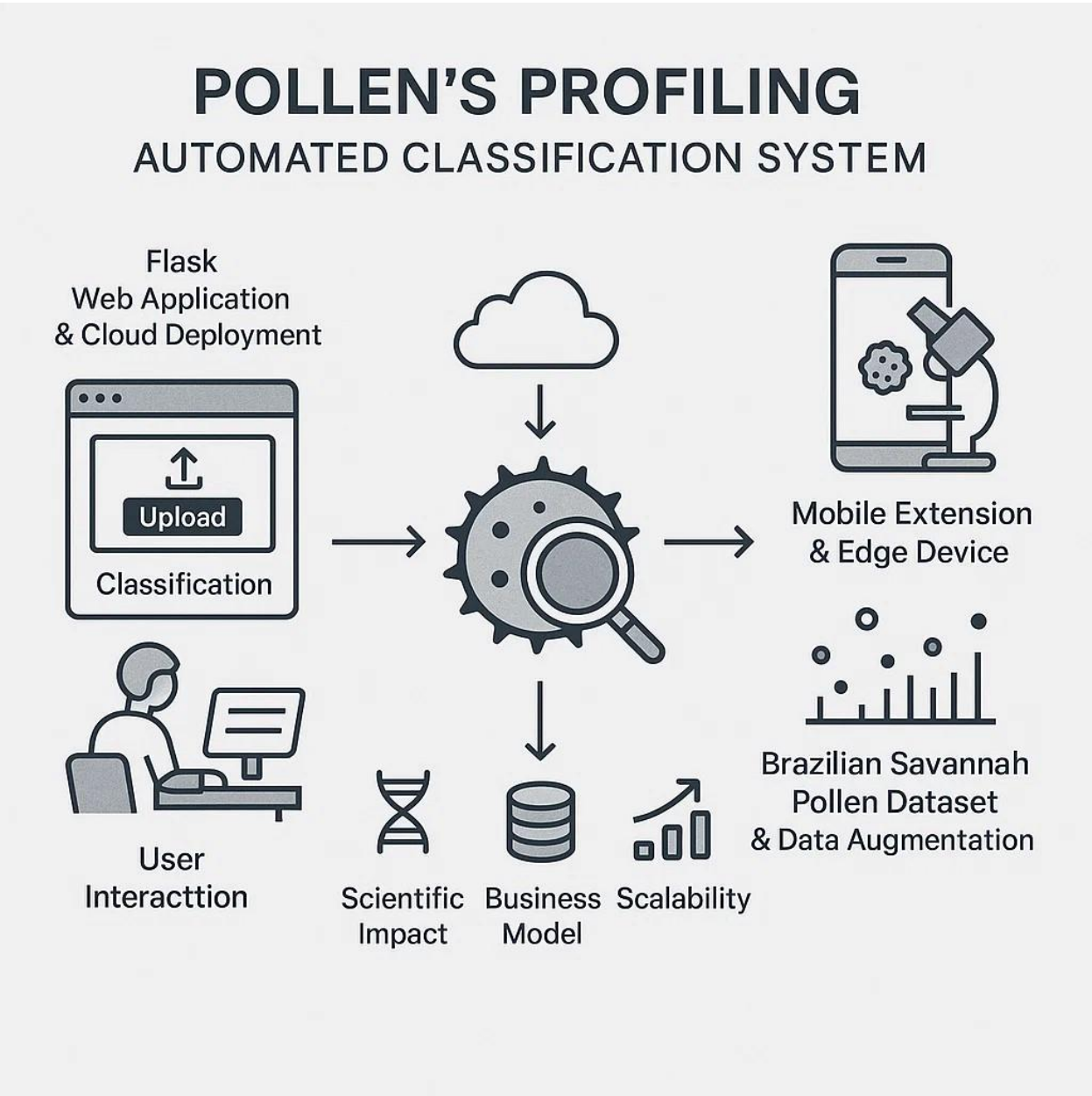
Date	**20 July 2025**
Team ID	**LTVIP2025TMID36397**
Project Name	*Pollen’s Profiling: Automated Classification of Pollen Grains*
Maximum Marks	**2 Marks**

Proposed Solution Details

S.No.	Parameter	Description
		prem, and offline edge deployment for field researchers and remote labs.

Reference

Title	Details
Reference Paper	*Deep learning for accurate classification of conifer pollen grains: enhancing species identification in palynology*
Description	Discusses the application of deep learning and transfer learning for conifer pollen classification, highlighting challenges and accuracy improvements in palynology research.
Link	https://www.frontiersin.org/journals/bigdata/articles/10.3389/fdata.2025.1507036/full


POLLEN'S PROFILING
AUTOMATED CLASSIFICATION SYSTEM
Flask
Web Application
& Cloud Deployment
Upload
Classification
Mobile Extension
& Edge Device
Brazilian Savannah
Pollen Dataset
& Data Augmentation
User
Interacttion
Scientific
Impact
Business
Model
Scalability