










# Define the Problem Statements

Field	Details
 <b>Date</b>	31 January 2025
 <b>Team ID</b>	LTVIP2025TMID36397
 <b>Project Name</b>	Pollen's Profiling: Automated Classification of Pollen Grains
 <b>Max Marks</b>	2 Marks

## Customer Problem Statement Template

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love.

A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to empathize with your customers, which helps you better understand how they perceive your product or service.  **References**


-  Dataset: <https://www.kaggle.com/datasets/andrewmvd/brazilian-pollendataset>
-  CNN  Sequential API  <https://keras.io/api/models/sequential/>
-  Flask Web Framework: <https://flask.palletsprojects.com>
-  Image Augmentation  (Keras): <https://keras.io/api/preprocessing/image/>

## Customer Problem Statement

Manual classification of pollen grains is slow, error-prone, and dependent on trained specialists. This makes large-scale studies inefficient in the fields of environmental monitoring, allergy diagnostics, and agriculture.

Stakeholders such as ecologists, healthcare professionals, and agronomists require an automated solution to classify pollen samples quickly and accurately from microscopic images.



## Proposed Solution

- Design and train a **Convolutional Neural Network (CNN)** model to classify pollen types from images.
  - Use the **Brazilian Savannah Pollen Dataset** containing 790 images across 23 classes.  
 [Kaggle Dataset](#)
  - Perform preprocessing: normalization, resizing to 128x128, label encoding.
  - Train the model with:
    - Image augmentation
    - Class weighting
    - EarlyStopping callbacks
  - Build a **Flask-based web application**
    - Interface to upload pollen images.
    - Real-time classification and result display.
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## Target Users

-  Environmental Researchers
  -  Healthcare Professionals (Allergists)
  -  Agricultural Scientists
  -  Students & Academic Institutions
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## Expected Outcome

- A deep learning model trained to identify 23 pollen grain classes.  
 CNN Guide: [https://keras.io/guides/sequential\\_model/](https://keras.io/guides/sequential_model/) • A  
Flask web application offering real-time predictions.  
 Deployment: <https://flask.palletsprojects.com/en/2.3.x/deploying/>
- Time-saving and scalable solution for ecological, agricultural, and clinical use cases.

# CUSTOMER PROBLEM STATEMENT TEMPLATE

Target Users	I'm trying to	But	Because	Which makes me feel
Environmental Researchers	classify pollen grains from microscopic images	it takes expert knowledge and manual analysis	morphology-based classification is slow and inconsistent	frustrated by the slow and error-prone process
Healthcare Professionals (Allergists)				
Agricultural Scientists & Students			limited access to scalable automated tools	concerned about the impact on allergy diagnosis