

Ideation Phase

Brainstorm & Idea Prioritization Template

Date	14 June 2025
Team ID	LTVIP2025TMID32471
Project Name	Enchanted Wings: Marvels of Butterfly Species
Maximum Marks	4 Marks

Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions .

Enchanted Wings: Marvels of Butterfly Species

**Project**  
**Smart**  
Enchanted Wings: Marvels of Butterfly Species

**Problem Statement:**

Manual butterfly ID is slow, expertise-heavy, and limits large-scale biodiversity studies. An automated image-classifier can speed species surveys, reduce human error, and unlock richer ecological insights.

**Team**

- o Palla Bhavana
- o ~~Mundru~~ Udaisai
- o ~~Narasimreddy~~ Chandrakanth
- o Munta ~~Navadeep~~ Venkata Sai Kumar

**Problem Statement**  
~~Developers~~ lose valuable time doing repetitive and  
  
Field biologists spend hours cross-checking photos with guides; mis-IDs skew data and waste resources. Leveraging transfer learning on a 75-species, 6 499-image dataset, we aim for > 90 % top-1 accuracy and near-real-time inference to support conservation at scale.

**Project Goal**  
~~Deliver~~  
  
Deliver a fast, AI-driven tool—deployable on web and Android—that classifies 75 butterfly species in < 1 s per image, integrates offline mode for fieldwork, and supplies instant range maps & conservation status to boost researcher productivity.

**Collaboration Environment**  
  

- ~~Communication~~: Slack, Google Meet
- ~~Version Control~~: Git & GitHub
- ~~Docs & Notes~~: Notion / Google Docs
- ~~Brainstorming Tools~~: Miro, Canva

**Scope of Brainstorming**  
  

- ~~Dataset~~ curation & augmentation
- ~~Model~~ architecture & training pipeline
- ~~Evaluation~~ metrics & error analysis
- ~~Deployment~~ (API, mobile, edge)
- ~~UX~~ / Education layer (species info, badges)

**Target Users**  
  

- ~~Field~~ researchers & ecologists
- ~~Conservation~~ NGOs
- ~~Citizen~~ scientists / naturalists
- ~~Educators~~ & students  
These users need quick, reliable, AI-assisted IDs—often in remote, low-bandwidth habitats.

**Tools & Technologies Used**  
  

- ~~Backend~~: FastAPI (Python)
- ~~Deep Learning~~: ~~PyTorch~~ + ~~TorchVision~~ (ResNet-50, EfficientNet-B3)
- ~~Data Ops~~: Kaggle API, ~~Albumentations~~, Weights & Biases
- ~~Front-end~~: React + Vite (web) / Flutter (mobile)
- ~~Version Control~~: GitHub

# Brainstorm, Idea Listing and Grouping

## Problem Statement:

Manual butterfly ID is slow, expertise-heavy, and limits large-scale biodiversity studies. An automated image-classifier can speed species surveys, reduce human error, and unlock richer ecological insights.

## Objective of Brainstorming:

To explore how AI can assist or automate different phases of SDLC using local models (like Granite via llama-cpp-python), thereby making the process faster, smarter, and more efficient.

## How Might We Questions

Identify innovative ways to use AI to solve SDLC challenges

### Palla Bhavana

- How might we use transfer learning to reduce training time for our model?
- How might we monitor model performance across species during training?
- How might we automate model versioning and rollback if accuracy drops?
- How might we make the classifier lightweight for mobile or offline field use?

### Mundru Uday Sai

- How might we use AI to automatically label butterfly species from image metadata?
- How might we generate synthetic butterfly images to balance rare classes?
- How might we detect poor-quality images before model training?
- How might we automate data splitting (train, val, test) based on species and image quality?

### Narapureddy Chandrakanth Kumar

- How might we design a simple UI for non-experts to upload and identify butterflies?
- How might we show species info and habitat maps after prediction?
- How might we help users give feedback on wrong predictions?
- How might we use the feedback to improve model predictions?

### Munta Navadeep Venkata Sai

- How might we make this tool engaging for school students?
- How might we gamify butterfly tracking for citizen science projects?
- How might we encourage users to submit images from different regions?
- How might we share user-submitted data with researchers securely?