Project Design Phase
Proposed Solution Template

Date	27th june 2025
Team ID	LTIVP2025TMID42332
Project Name	Enchanted Wings: Marvel species Butterfly project
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Identifying butterfly species is a challenging task due to the visual similarity among species, variations in natural lighting, and the requirement of expert taxonomic knowledge. Existing solutions are either limited in scope, difficult to use, or unavailable offline, especially for researchers in the field.
2.	Idea / Solution description	The proposed solution is a deep learning-based image classification system that can accurately identify butterfly species from photographs. The solution includes a trained CNN model integrated into a user-friendly web application (via Streamlit/Flask) with offline capabilities. Users can upload butterfly images, and the model will display the species name along with a confidence score. It includes features like prediction history, visual analytics (confusion matrix), and a clean UI.
3.	Novelty / Uniqueness	- Integration of high-accuracy CNN architectures like MobileNetV2/ResNet50 for real-time predictions - Offline functionality for researchers in remote locations - Interactive and animated UI that displays butterfly facts, ideal for education - Logging of prediction history and model version tracking for audit and reproducibility - Can be scaled to include geolocation mapping and rare species detection in future
4.	Social Impact / Customer Satisfaction	- Supports biodiversity and conservation efforts by aiding fast identification of species in the wild - Empowers students, hobbyists, and researchers by making AI accessible - Reduces the reliance on manual taxonomic classification and improves accuracy - Encourages ecological awareness through easy-to-use tools and educational features

5.	Business Model (Revenue Model)	- Freemium model: Core identification tool free for educational/non-commercial use, with premium features for researchers or institutions (e.g., bulk classification, geotagging, API access) - Subscription model for universities and ecological research centers - Partnerships with biodiversity NGOs and wildlife apps for integration - Educational licensing to schools and colleges
6.	Scalability of the Solution	- The model can be scaled to include more species from diverse regions by expanding the dataset - Cloud deployment with containerization (e.g., Docker) allows large-scale accessibility - API endpoints can serve third-party apps or citizen science platforms - Modular structure allows for future integration with mobile apps and geospatial tools