Project Design Phase
Proposed Solution Template

Date	15 February 2025
Team ID	LTVIP2025TMID42449
Project Name	Butterfly Species Classification System
Maximum Marks	2 Marks

1 Proposed Solution Template

The project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Accurate identification of butterfly species from images is challenging for researchers, ecologists, and citizen scientists due to the diversity of species, manual identification processes, and lack of accessible tools for real-time classification.
2	Idea / Solution Description	The Butterfly Species Classification System is a web-based application using transfer learning with MobileNetV2 to classify 6499 images across 75 butterfly species. It features a Streamlit interface for image uploads, real-time predictions, and educational facts, supporting biodiversity monitoring and research.
3	Novelty / Uniqueness	Combines transfer learning with a lightweight CNN (MobileNetV2) and a user-friendly Streamlit app, integrating classification with educational content for a wide audience, unlike existing tools focused solely on classification.
4	Social Impact / Customer Satisfaction	**Biodiversity Monitoring**: Enables tracking of butterfly populations, aiding conservation efforts. **Ecological Research**: Provides accurate species data for researchers studying ecosystems. **Citizen Science & Education**: Empowers enthusiasts and students with accessible tools and knowledge, fostering engagement with biodiversity.
5	Business Model (Revenue Model)	Freemium model with free basic classification and premium features (e.g., advanced analytics, API access) via subscription. API access offered through a platform like xAI's API service (https://x.ai/api) for enterprise use.
6	Scalability of the Solution	Built on a modular architecture with Flask backend and Streamlit frontend, deployed on Streamlit Cloud or Google Colab. Scalable to handle multiple users with SQLite for lightweight storage and potential cloud database integration.