Project Planning Phase
Project Planning Logic

Team ID	LTVIP2025TMID38181
Project Name	Enchanted Wings :Marvels Of butterfly Species
Maximum Marks	4 Marks

PLANNING LOGIC (DOCUMENT)

Purpose:
Outlines the core logic and rationale behind project decisions such as dataset structure, model selection, and validation techniques.

Use in Project Context:

- **Scenario 1 (Biodiversity Monitoring):**
  - Justifies the selection of **mobile-compatible models** like MobileNetV2 for real-time classification in the field.
  - Provides logic for splitting the dataset to ensure **balanced class representation** and **field-relevant accuracy**.

- **Scenario 2 (Ecological Research):**
  - Details reasoning for long-term monitoring strategies using time-series classification logic or timestamped image logs.
  - Includes contingency handling in model logic (e.g., low-light or blur image preprocessing).

- **Scenario 3 (Citizen Science and Education):**
  - Explains how model confidence thresholds are set to avoid misguiding inexperienced users.
  - Covers logic for feedback mechanisms (e.g., user can suggest corrections to improve accuracy over time).

Step	Description	Tool/Method Used	Justification (Logic)
Data Collection	Dataset of 6499 images from Kaggle	Kaggle API	Automated and reproducible collection; ensures data standardization
Pre-processing	Resize, normalize, clean	Manual + NumPy	Ensures input consistency for CNNs
Data Augmentation	Simulate real-world variability	`Keras ImageData Generator`	Increases model generalizability—important for field classification
Data Splitting	Stratified train-test-validation	`sklearn` / manual	Prevents data leakage; ensures fair evaluation
Model Building	Define CNN structure	`TensorFlow` / `Keras`	Flexibility to test multiple architectures
Transfer Learning	Use VGG16 base	`Keras.applications.VGG16`	Reduces training time; ideal for limited dataset
Training & Testing	Use Adam optimizer + metrics	Adam / SGD, metrics	Ensures fast convergence and model robustness