Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	27 June 2025
Team ID	LTVIP2025TMID5573
Project Name	Enchanted Wings: Marvels of Butterfly Species
Maximum Marks	4 Marks

Technical Architecture:

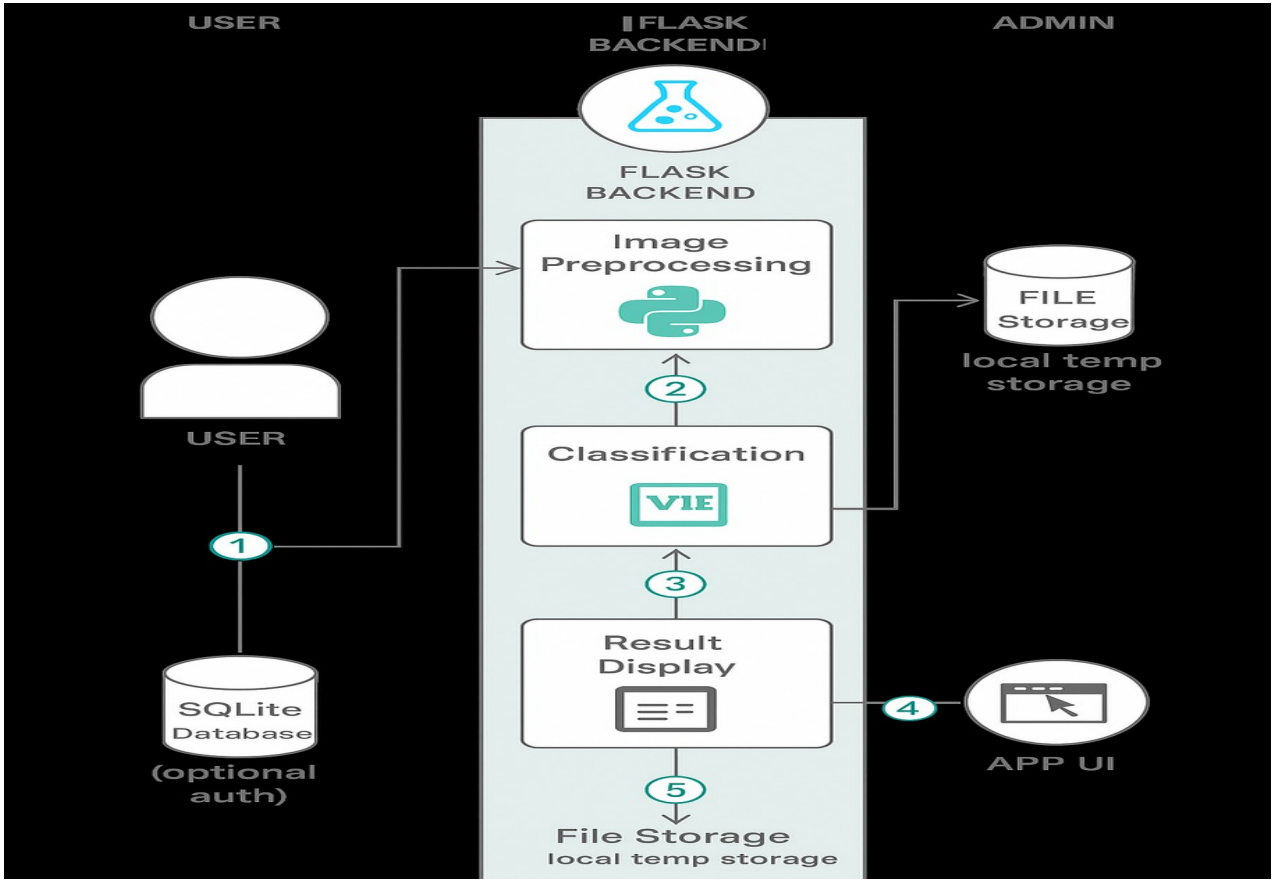

Table-1 : Components & Technologies:

S.No	Component	Description	Technology Used	Technology
1	User Interface	Web UI for user interaction and uploading butterfly images	HTML, CSS, JavaScript, Flask Templates	HTML, CSS, JavaScript / Angular Js / React Js etc.
2	Application Logic-1	Image upload and pre-processing logic	Python	Java / Python
3	Application Logic-2	Butterfly species classification using trained ML model	TensorFlow, VGG16	IBM Watson STT service
4	Application Logic-3	Result display, species info retrieval	Flask Routing, HTML Template Rendering	IBM Watson Assistant
5	Database	Stores user details (auth) and preferences	SQLite	MySQL, NoSQL, etc.
6	Cloud Database	Not used (runs locally)	N/A	IBM DB2, IBM Cloudant etc.
7	File Storage	Stores uploaded images temporarily	Local File System	IBM Block Storage or Other Storage Service or Local Filesystem
8	External API-1	Not applicable	N/A	IBM Weather API, etc.
9	External API-2	Not applicable	N/A	Aadhar API, etc.
10	Machine Learning Model	Butterfly classification model	VGG16 with Transfer Learning	Object Recognition Model, etc.
11	Infrastructure (Server/Cloud)	Local deployment for testing and demonstration	Flask Development Server	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology/Approach
1	Open-Source Frameworks	Web framework and ML libraries used	Flask (Python), TensorFlow, Keras
2	Security Implementations	Basic login authentication (optional)	Password Hashing (Werkzeug), HTTPS (optional)
3	Scalable Architecture	Lightweight Flask-based app, could scale via containerization or microservices	Flask app containerizable using Docker
4	Availability	Single-server setup currently; can be hosted on cloud (AWS, Azure)	Flask app, Localhost or Cloud VM
5	Performance	Handles classification in ~1.4s; optimized by image resizing, efficient model	VGG16 (lightweight), image cache optional