**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

| Date | 27th june 2025 |
| --- | --- |
| Team ID | LTVIP2025TMID42332 |
| Project Name | Enchanted Wings: Marvels of Butterfly Species |
| Maximum Marks | 4 Marks |

## Functional Requirements

| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| --- | --- | --- |
| FR-1 | User Registration | - Registration through form (email & password)- Registration through Gmail- Registration through LinkedIn (optional/future scope) |
| FR-2 | User Confirmation | - Confirmation via email- Confirmation via OTP (future enhancement) |
| FR-3 | Image Upload & Prediction | - Upload butterfly image via web interface- Run prediction using trained deep learning model- Display species name and confidence score |
| FR-4 | Prediction Logging & History | - Log predictions with timestamps in database- Maintain session-based prediction history (if login implemented)- Export results (CSV/JSON) |
| FR-5 | Model Management | - Load pre-trained CNN model at runtime (e.g., MobileNetV2)- Handle multiple model versions (future support for VGG16, ResNet50) |
| FR-6 | Offline Functionality | - Full functionality offline using local model and assets- No internet required once dependencies are installed |
| FR-7 | Visualization & UI Interaction | - Display prediction results in user-friendly layout- Confusion matrix and accuracy charts- Animated background and butterfly facts on UI |

## Non-Functional Requirements

| **NFR No.** | **Non-Functional Requirement** | **Description** |
| --- | --- | --- |
| NFR-1 | Usability | Simple and intuitive interface designed with Streamlit/Flask. Requires minimal technical knowledge to operate. |
| NFR-2 | Security | Basic validation on image uploads. Local use ensures low exposure; future login/session tracking can use token-based auth. |
| NFR-3 | Reliability | Trained model provides consistent outputs. Logging system helps verify and audit past predictions. |
| NFR-4 | Performance | Image prediction takes less than 2–3 seconds. Optimized model is loaded in memory for fast inference. |
| NFR-5 | Availability | Application is functional both online and offline. Can run independently on local machines without cloud dependency. |
| NFR-6 | Scalability | The architecture supports easy integration of new butterfly classes, model upgrades, and geolocation in future releases. |