

Enchanted Wings: Marvels of Butterfly Species

Team ID:

LTVIP2025TMID35553

Team Members:

1. BUSAM SASI KIRAN
2. BEZAWADA YAMUNA
3. BHANU PRAKASH REDDY PALLERLA
4. BHUVANA KRUTHI THOTA

Phase 1: Understanding Butterfly Diversity

Problem statement: Many people lack access to accurate, engaging, and scientifically reliable information about butterfly species. This results in missed opportunities for environmental education, conservation awareness, and ecological appreciation. There's a need for an interactive and visually rich system to explore and identify butterfly species.

Proposed Solution: We propose an educational web application called "Enchanted Wings" that uses a structured database and intuitive design to showcase various butterfly species. Users can explore species by habitat, color, size, and location, with detailed descriptions and high-quality images to enhance learning and engagement.

Target Users: Students, nature enthusiasts, researchers, educators, eco-tourists, and wildlife conservationists.

Expected Outcome: An informative and user-friendly platform that enhances awareness about butterfly species, promotes conservation, and supports education through engaging content and visuals.

Phase 2: Requirements Analysis

Technical Requirements:

- React.js (Frontend)
- Node.js + Express.js (Backend)
- MongoDB (Database)
- Cloudinary or local image storage for species pictures

Functional Requirements:

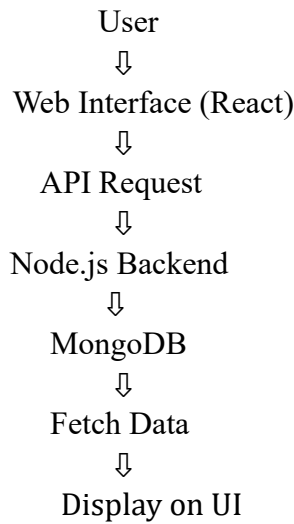
- Browse butterfly species
- Search and filter by criteria (e.g., color, region, size)
- View detailed species profiles (image, description, habitat, range)
- Submit sightings or feedback

Constraints & Challenges:

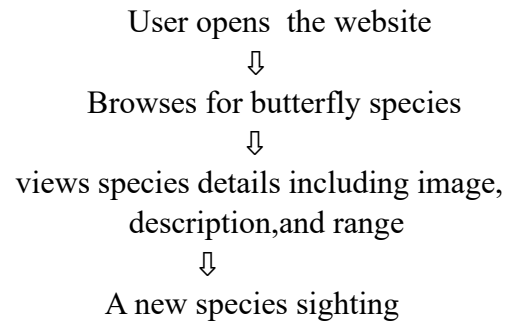
- Quality image sourcing
- Accurate scientific classification
- Ensuring fast load times for image-rich content

Phase 3: Project Design

- **System Architecture Diagram& user flow:**



User journey:



UI/UX Considerations:

- Clean, nature-inspired theme
- Responsive and mobile-friendly layout
- Intuitive navigation by species categories
- Interactive image gallery and map view

Phase 4: Project Planning (Agile Methodologies)

- **Sprint Planning:**

- ✓ Week 1: Collect species data and images
- ✓ Week 2: Backend development & database integration
- ✓ Week 3: Frontend development
- ✓ Week 4: Testing, documentation, and deployment

- **Task Allocation:**

- ✓ Member A: Database & species data collection
- ✓ Member B: Backend API development
- ✓ Member C: Frontend UI/UX
- ✓ Member D: Testing & final documentation

- **Timeline & Milestones:**

- ✓ Milestone 1: Dataset ready (week 1)
- ✓ Milestone 2: Model trained (week 2)
- ✓ Milestone 3: Web integration (week 3)
- ✓ Milestone 4: Testing + Report (week 4)

Phase 5: Project Development

- **Technology stack used:**

- React.js
- Node.js + Express.js
- MongoDB
- Cloudinary (for image hosting)

- **Development Process:**

- ❖ Designed species schema for MongoDB
- ❖ Built REST API endpoints to fetch butterfly data
- ❖ Developed frontend with dynamic search and filters
- ❖ Integrated image gallery and species detail pages

- **Challenges & Fixes:**

- ❖ Improved contrast, font sizes, and added ARIA labels.
- ❖ Added input validation, CAPTCHA, and admin moderation.
- ❖ Configured environment variables and used MongoDB Atlas.

Phase 6: Functional & Performance testing

- **Test cases Executed:**

- ❖ Verified API responses for all endpoints
- ❖ Checked image display and responsiveness
- ❖ Tested search and filter accuracy

- **BUG Fixes & improvements:**

- ❖ Resolved UI layout shifts on mobile
- ❖ Fixed species data loading delays
- ❖ Improved image loading with lazy loading

- **Final Validation:**

- ❖ The platform successfully presents butterfly species in an engaging, informative way
- ❖ Meets educational, environmental, and user experience goals