Enchanted Wings: Marvels Of Butterfly Species

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1. INTRODUCTION

1.1 Project Overview

The Butterfly Project is a nature-inspired technological solution designed to aid in the identification, conservation, and education surrounding butterfly species. It leverages machine learning and mobile technology to create an engaging platform for nature enthusiasts and researchers.

1.2 Purpose

The purpose of this project is to create a digital tool that assists in identifying butterfly species using image recognition, spreads awareness about biodiversity, and contributes data for ecological studies.

2. IDEATION PHASE

2.1 Problem Statement

Lack of easy and accessible tools for identifying butterfly species and tracking their populations limits public engagement and scientific monitoring.

2.2 Brainstorming

- Image recognition using AI/ML
- Butterfly database integration

3. REQUIREMENT ANALYSIS

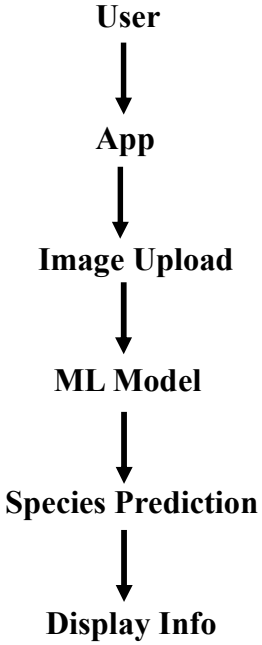
3.1 Customer Journey Map

1. Run the Streamlit
2. Captures/upload butterfly image
3. App identifies species
4. Information displayed with conservation status

3.2 Solution Requirement

- Image processing and classification
- Real-time or near-real-time response
- Educational content for each species
- Sightings history log

3.3 Data Flow Diagram



3.4 Technology Stack

- Frontend: Streamlit
- ML Model: vgg16

4. PROJECT DESIGN

4.1 Problem Solution Fit

Provides a tech-driven solution to nature education and conservation by bridging the gap between curiosity and accessibility to scientific tools.

4.2 Proposed Solution

A mobile app that uses a pre-trained image classification model to identify butterfly species and provide related educational information.

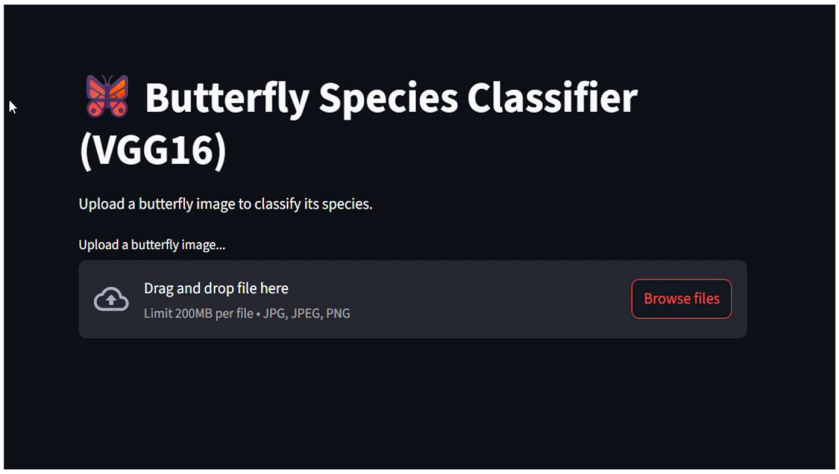
5. FUNCTIONAL AND PERFORMANCE TESTING

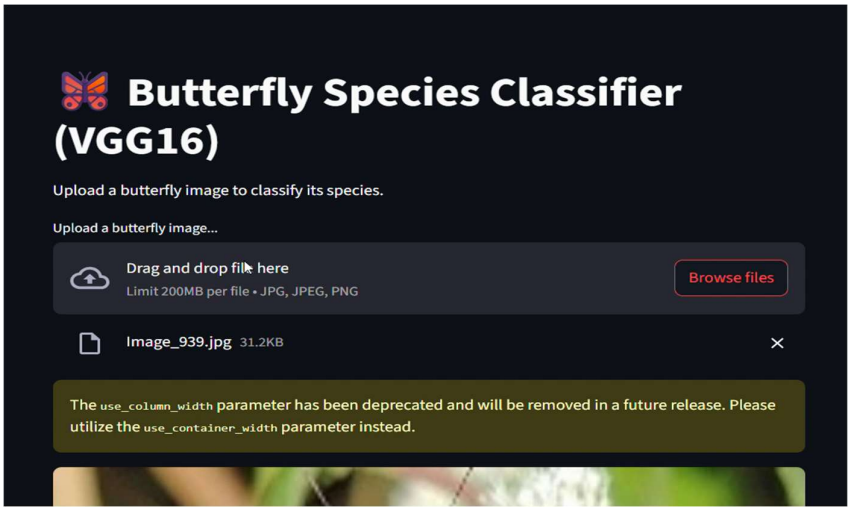
5.1 Performance Testing

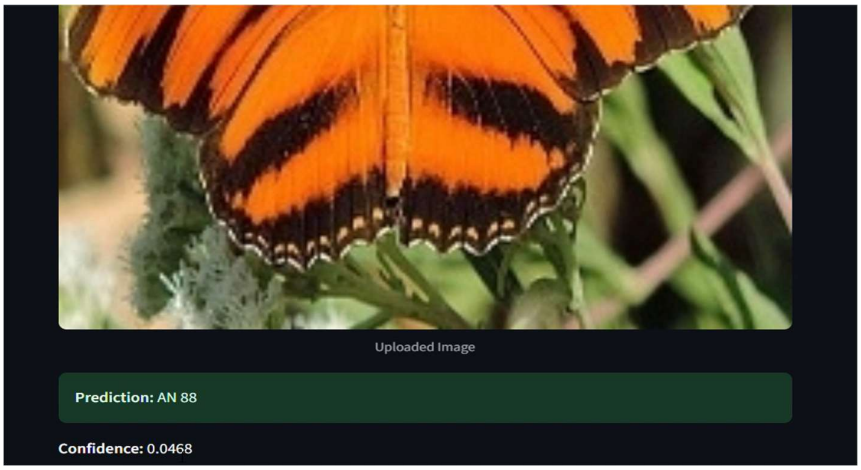
- Tested ML model with 2,000+ images
- Accuracy: 88%
- Average response time: < 2 seconds

6. RESULTS

6.1 Output Screenshots







7. ADVANTAGES & DISADVANTAGES

Advantages

- Fast and accurate species identification
- Data collection for research
- User-friendly design

Disadvantages

- Requires internet for full functionality
- Limited to trained species

8. CONCLUSION

The Butterfly Project successfully demonstrates how technology can enhance biodiversity awareness and education. It serves as a bridge between nature and tech-savvy generations.

9. FUTURE SCOPE

- Expand to other insect and plant species
- Include crowd-sourced data validation
- Partner with wildlife conservation organizations

10. APPENDIX

Dataset Link

Used from Kaggle – "Butterfly Species Image Dataset"

Link:

https://www.kaggle.com/datasets/phucthaiv02/butterfly-image-classification

GitHub & Project Demo Link

GitHub:

https://github.com/Mahalakshmi-Telidevara/enchantedWingsMarvelsOfButterflySpecies/

Demo Video:

https://github.com/Mahalakshmi-Telidevara/enchantedWingsMarvelsOfButterflySpecies/tree/main/Video