

Enchanted Wings: Marvels Of Butterfly Species

A Butterfly Image Classification Project using Deep Learning

Abstract

This project presents a deep learning-based butterfly species classification model named 'Enchanted Wings'. Using EfficientNetB0 and a dataset of 6500+ butterfly images across 75 species, we built a transfer learning model to predict species from images. The final application includes a web interface using Streamlit to allow users to upload images and receive real-time predictions.

Tools & Technologies

- Python
- TensorFlow / Keras
- EfficientNetB0
- Streamlit
- Matplotlib / Seaborn
- scikit-learn

Dataset

The dataset consists of more than 6500 labeled butterfly images spread across 75 species. Each species has its own folder under the 'data/butterflies/' directory. Images are resized to 224x224 and augmented for better training performance.

Model Architecture

We use EfficientNetB0 as the backbone for feature extraction. A global average pooling layer is followed by dropout and a dense layer with softmax activation to output probabilities for each species class. The base model is frozen during training.

Streamlit Web App

We developed a user-friendly interface using Streamlit, where users can upload butterfly images.

The model predicts the species and displays the uploaded image along with the prediction result.

Results & Evaluation

The model achieved a validation accuracy of over 90%. Evaluation metrics include a classification report and a confusion matrix to visualize performance across all species.

Sample Image Output (Placeholder)

[Insert butterfly image and prediction here]

Conclusion

This project demonstrates how deep learning can effectively classify butterfly species. The combination of EfficientNetB0, image augmentation, and a clean web interface makes it a complete AI solution for biodiversity and research purposes.