

Enchanted Wings: Marvels of Butterfly Species

This project focuses on creating a robust butterfly image classification model using transfer learning techniques. Leveraging a dataset comprising diverse butterfly species, including 75 classes with a total of 6499 images, the dataset is partitioned into training, validation, and test sets. Transfer learning utilizes pre-trained convolutional neural networks (CNNs) to accelerate model training by extracting relevant features from butterfly images.

Application Scenarios

1. Biodiversity Monitoring:

A butterfly classification system helps conservationists quickly identify species in real-time, aiding in population studies and ecosystem health monitoring.

2. Ecological Research:

Researchers can track migratory patterns and habitat preferences over time using automated classification from cameras in the wild.

3. Citizen Science and Education:

Mobile tools empower enthusiasts and students to identify butterflies and contribute to research, promoting awareness and engagement.

Model Overview

The model is based on transfer learning using VGG16. Images are resized to 150x150 and passed through the convolutional layers of the pre-trained network. A custom dense layer is added for 75-class classification. The model is trained using categorical crossentropy and evaluated on accuracy.

Web App Deployment

A Flask web application allows users to upload butterfly images via a web interface. The app processes the image, predicts the class using the trained model, and displays the result with the species name.