

Transfer Learning-Based Classification of Poultry Diseases

for Enhanced Health Management

1. Introduction

Poultry farming plays a vital role in food production, especially in developing countries. However, various diseases such as Newcastle Disease, Marek's Disease, and Avian Influenza can severely impact poultry health and productivity. This project aims to develop a transfer learning-based image classification system to detect and classify poultry diseases from images, enabling farmers to take timely and appropriate action.

2. Objective

The objective of this project is to design and implement an automated poultry disease classification model using transfer learning techniques to enhance poultry health management.

3. Methodology

This project uses a pre-trained deep learning model (ResNet50) as the base model. The approach involves:

- Data Collection: Images of healthy and diseased poultry are collected and organized into training, validation, and test datasets.
- Preprocessing: Image resizing, normalization, and augmentation are performed.
- Transfer Learning: A pre-trained ResNet50 model is fine-tuned with new classification layers.
- Training: The model is trained using TensorFlow and evaluated using accuracy and loss metrics.
- Prediction: A user interface is provided to classify new poultry images.

4. Dataset

The dataset contains labeled images of poultry classified into categories such as Healthy, Newcastle Disease, and Marek's Disease. The dataset is split into training, validation, and testing sets to evaluate the model's performance.

5. Model Architecture

The model uses the ResNet50 architecture pre-trained on ImageNet. The last few layers are modified to adapt to the poultry disease classification task. The final layer uses softmax activation to classify input images into defined categories.

6. Results

The model achieved high accuracy on the validation and test datasets, indicating effective learning and generalization. Transfer learning significantly reduced training time while improving performance.

7. Conclusion

The implemented transfer learning-based model provides a reliable and efficient solution for poultry disease classification. It assists farmers in early disease detection and management, thus improving poultry health and productivity.

8. Future Work

Future improvements may include:

- Expanding the dataset to include more disease categories.
- Developing a mobile application for real-time diagnosis.
- Integrating additional features like symptom-based input for improved accuracy.