Poultry Disease Classifier Project Report

Project Title:

Transfer Learning-Based Classification of Poultry Diseases for Enhanced Health Management

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Objective:

To develop an efficient image classification system using **transfer learning** that detects poultry diseases based on poultry droppings or related images. The goal is to help farmers identify diseases early and manage flock health effectively.

Problem Statement:

Poultry diseases like Newcastle Disease, Coccidiosis, and Salmonella cause significant losses in the poultry industry. In rural or resource-limited settings, veterinary assistance is not always readily available. A fast, automated image classification system can help mitigate this by providing immediate disease detection and guidance.

Technologies Used:

- **Python**
- **TensorFlow / Keras**
- **Streamlit (UI)**
- **MobileNetV2 (Transfer Learning)**
- **Pillow (PIL)**
- **NumPy**

Dataset:

Folder Structure:

```
data/
├── train/
│   ├── Healthy/
│   ├── Newcastle Disease/
│   ├── Coccidiosis/
│   └── Salmonella/
```

- Images are placed into respective class folders.
- Dataset was split into training and validation using `validation_split`.

Model Architecture:

- Pre-trained **MobileNetV2** used as the base model (ImageNet weights)
- Added custom layers:
- GlobalAveragePooling2D
- Dense layer (64 units, ReLU)
- Dropout (0.3)
- Output layer with Softmax for multi-class classification

Training Setup:

- **Batch Size:** 16
- **Epochs:** 3
- **Steps per epoch:** 50
- **Validation steps:** 20
- **Optimizer:** Adam
- **Loss Function:** Categorical Crossentropy

This configuration ensures fast training (under 10 minutes) for testing/demo purposes.

Streamlit Web Application:

The web app allows the user to:

- Upload a poultry image (droppings or symptoms)
- View the image preview
- Receive a prediction with confidence score

Features:

- Lightweight UI
- Fast predictions
- Caching for loading models
- Output: Disease Name + Confidence %

Prediction Output Example:

```
🧠 Prediction: Newcastle Disease
👆 Confidence: 96.85%
```

Future Enhancements:

- Increase dataset size for better accuracy
- Add support for video-based detection
- Deploy to mobile using Streamlit Cloud or TFLite
- Provide treatment suggestions with prediction

Conclusion:

This system demonstrates how transfer learning and Streamlit can be combined to create a practical disease diagnosis tool for poultry farms. It offers a low-cost, fast-response solution especially useful in rural and underserved communities.