Transfer Learning-Based Classification of Poultry Diseases

# 1. Introduction

Poultry diseases cause significant economic loss and affect animal health. Traditional detection methods are manual and slow. This project proposes an automated image classification system to detect poultry diseases like FowlPox, Newcastle, and Healthy using deep learning and transfer learning models.

# 2. Objectives

- To classify poultry diseases from chicken images.

- To apply transfer learning using a pre-trained CNN model.

- To deploy the model via a simple web interface for real-time predictions.

# 3. Tools and Technologies

Programming: Python 3

Deep Learning: TensorFlow, Keras

Web Interface: Streamlit / Flask

Dataset Source: Kaggle / Custom Images

Data Handling: Pandas, NumPy

Image Tools: OpenCV, PIL

IDE: VS Code

Deployment: Localhost / GitHub

# 4. Dataset Description

- Total Images: ~XXXX (update with actual count)

- Classes: Healthy, FowlPox, Newcastle

- Folder Structure:

dataset/

├── Healthy/

├── FowlPox/

└── Newcastle/

- Image Size: 224x224 pixels

- Split: 80% training, 20% validation

# 5. Methodology

1. Data Collection: Images sourced from Kaggle and manually categorized.

2. Preprocessing: Resized to 224x224, Normalized pixel values.

3. Model Architecture: Transfer Learning using MobileNetV2 / VGG16, Custom classification head with softmax output.

4. Training: Loss - Categorical Crossentropy, Optimizer - Adam, Epochs - 10–20, Metrics - Accuracy.

5. Model Saving: Final model saved as poultry\_model.h5

# 6. Results

- Training Accuracy: XX.XX%

- Validation Accuracy: XX.XX%

- Model successfully distinguishes between healthy and infected poultry.

# 7. Web Deployment

- Built using Streamlit or Flask

- Uploads poultry image

- Predicts disease class with confidence score

- Displays the result and image

# 8. Conclusion

The project successfully automated poultry disease classification using image data and transfer learning. It can help farmers and veterinary professionals diagnose diseases quickly with minimal expertise.

# 9. Future Enhancements

- Add more classes (e.g., Infectious Bronchitis, Avian Influenza)

- Use real-time camera feed

- Deploy on cloud for accessibility

- Improve dataset size and balance

# 10. References

- Kaggle Dataset

- TensorFlow & Keras Documentation

- Research Papers on Poultry Disease Detection