

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

1. INTRODUCTION

1.1 Project Overview

PoultryDetect is a deep learning-based image classification web application built using transfer learning (ResNet50). It helps identify poultry diseases by analyzing uploaded images, offering fast and reliable results to aid farmers and veterinarians.

1.2 Purpose

To reduce poultry health risks and economic losses by enabling early detection of diseases using AI-powered classification models.

2. IDEATION PHASE

2.1 Problem Statement

Poultry farmers face difficulties in identifying diseases in chickens early, which can lead to large-scale infections and economic losses.

2.2 Empathy Map Canvas

- Think & Feel: Concerned about flock health and income
- See: Other farms affected by preventable diseases
- Say & Do: Ask for expert help, spend on treatment
- Hear: Industry discussions, expert recommendations
- Pain: Late diagnosis, high mortality
- Gain: Reliable early detection tool

2.3 Brainstorming

Explored image-based classification, traditional machine learning vs. CNN, and finally selected ResNet50 for its transfer learning efficiency and accuracy.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. User visits the web application
2. Uploads poultry image
3. Model processes and predicts disease
4. User receives diagnosis

3.2 Solution Requirement

Functional Requirements:

- Image upload
- Disease prediction
- Result display

Technical Requirements:

- Python, Flask
- TensorFlow/Keras
- HTML, CSS, ResNet50 model

3.3 Data Flow Diagram

User → Web UI → Flask Backend → ResNet50 Model → Prediction → Display Result

3.4 Technology Stack

- Python
- Flask
- TensorFlow/Keras
- ResNet50
- HTML/CSS
- VS Code

4. PROJECT DESIGN

4.1 Problem Solution Fit

This solution directly addresses the pain point of late disease detection in poultry by providing an intuitive, fast, and accurate disease classification system.

4.2 Proposed Solution

AI-based web application using transfer learning for classifying poultry diseases from images with a simple upload and predict interface.

4.3 Solution Architecture

User → Upload Image → Flask Backend → ResNet50 Model → Prediction → Result Display

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

- Week 1: Dataset collection and preprocessing
- Week 2: Model training and tuning
- Week 3: Backend (Flask) integration
- Week 4: Frontend + testing + documentation

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

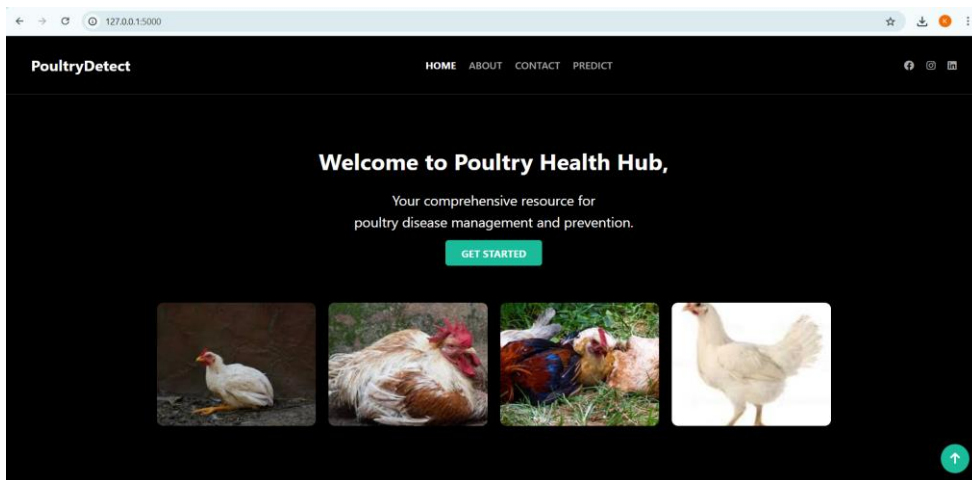
- Tested valid/invalid image formats
- Verified model predictions on known samples
- UI tested for responsiveness
- Final accuracy and validation metrics recorded

7. RESULTS

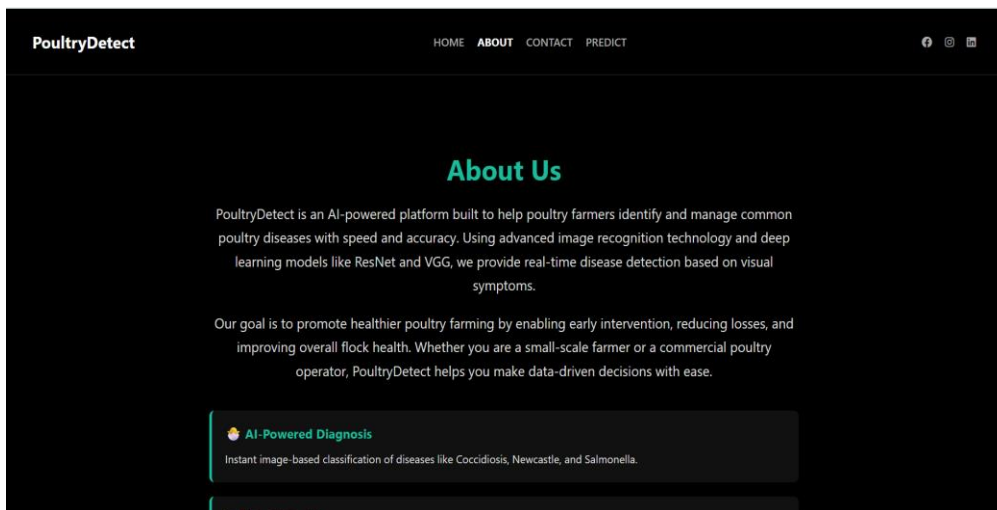
7.1 Output Screenshots

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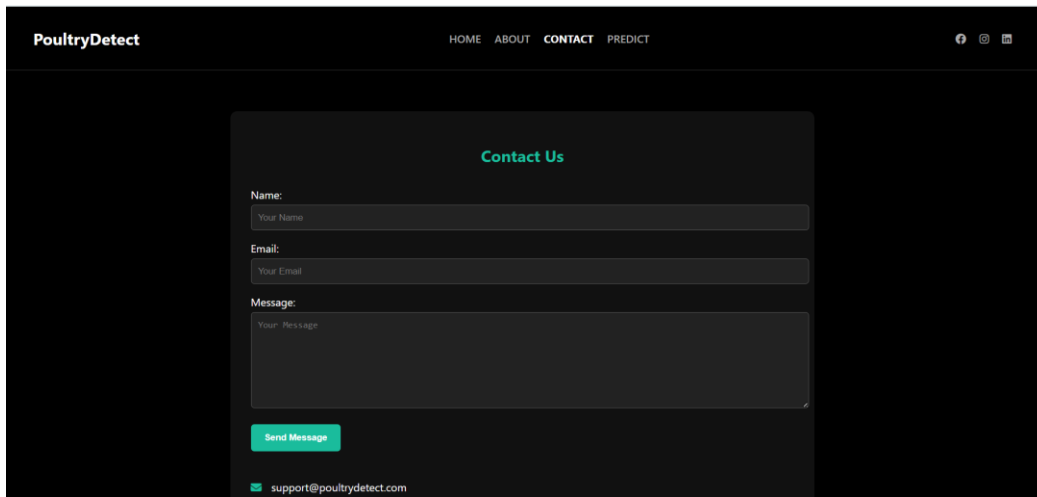
Homepage



About Page

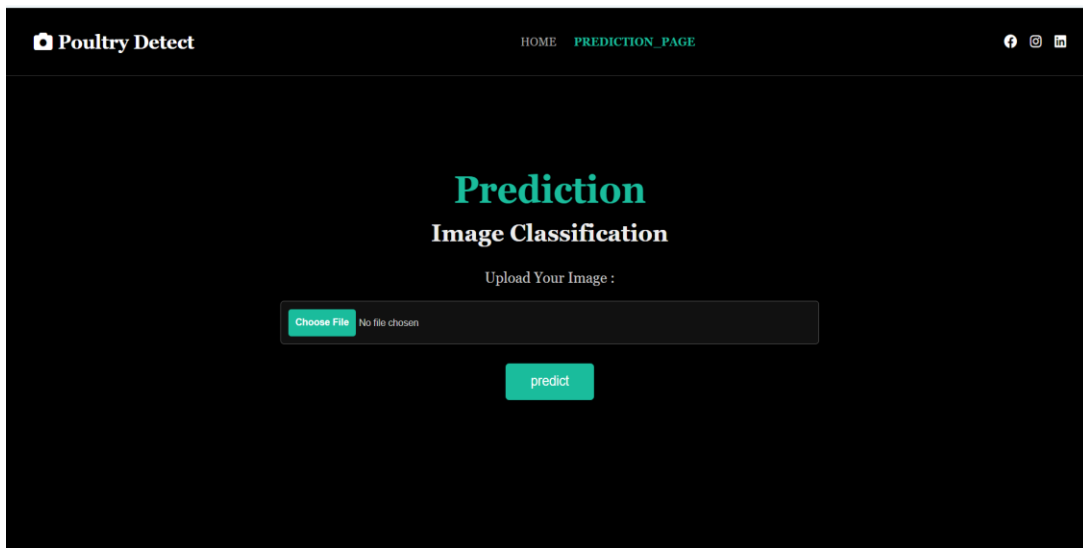


Contact Page



The screenshot shows the 'Contact Us' page of the PoultryDetect website. The page has a dark theme. At the top, the navigation bar includes 'PoultryDetect', 'HOME', 'ABOUT', 'CONTACT', and 'PREDICT'. Social media icons for Facebook, Instagram, and LinkedIn are on the right. The main content area features a 'Contact Us' heading in green. Below it are three input fields: 'Name:' with a placeholder 'Your Name', 'Email:' with a placeholder 'Your Email', and 'Message:' with a placeholder 'Your Message'. A green 'Send Message' button is positioned below the message field. At the bottom left, there is a small icon of an envelope and the email address 'support@poultrydetect.com'.

Prediction And Result Page



The screenshot shows the 'Prediction' page of the PoultryDetect website. The page has a dark theme. At the top, the navigation bar includes 'Poultry Detect' (with a camera icon), 'HOME', and 'PREDICTION_PAGE'. Social media icons for Facebook, Instagram, and LinkedIn are on the right. The main content area features a large green 'Prediction' heading, followed by 'Image Classification' in white. Below this, the text 'Upload Your Image :' is displayed. A file upload area contains a green 'Choose File' button and the text 'No file chosen'. Below the upload area is a green 'predict' button.

8. ADVANTAGES & DISADVANTAGES

Advantages:

- High accuracy with ResNet50
- Easy-to-use web interface
- Quick predictions

Disadvantages:

- Dependent on dataset quality
- Only 4 disease classes currently

9. CONCLUSION

The project demonstrates the use of deep learning in solving real-world agricultural challenges. It empowers poultry farmers with a powerful diagnostic tool.

10. FUTURE SCOPE

- Deploy on cloud (AWS/GCP)
- Expand disease classes
- Create mobile version
- Integrate voice assistance

11. APPENDIX

• Source Code:

- app.py (Flask backend)
- train_model.py (Model training)
- index.html (Frontend)
- main.ipynb (Evaluation)

• **Dataset Link:** <https://www.kaggle.com/datasets/chandrashekarnatesh/poultry-diseases>

• **GitHub Link:** <https://github.com/Jaya1718/Transfer-Learning-Based-Classification-of-Poultry-Diseases-for-Enhanced-Health-Management>