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

Team Name:

"The Feature Engineers"

Team Members:

1. Chitturi Jayasree
2. Chennakesavula Yuva Ramachandra
3. Chembeti Sravanthi
4. Chikkavarapu Harika

Phase 1: Brainstorming & Ideation

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

Proposed Solution : We propose an AI-based image classification system using Transfer Learning (ResNet50) to detect poultry diseases such as Coccidiosis, Salmonella, and Newcastle Disease, Healthy Diseases from images.

Target Users: Poultry farmers, veterinarians, and agricultural researchers.

Expected Outcome: An easy-to-use web platform where users can upload a poultry image and receive instant disease classification feedback.

Phase 2: Requirement Analysis

Technical Requirements:

- Python, Flask
- TensorFlow / Keras
- HTML, CSS (for frontend)
- ResNet50 model
- VS Code is used for model training and also for creation of web interface

Functional Requirements:

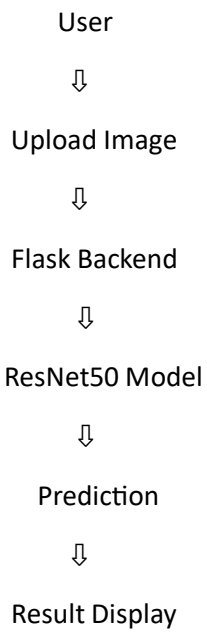
- Upload image
- Predict disease using trained model
- Display result

Constraints & Challenges:

- Model accuracy depends on dataset quality.
- Limited labelled images for some rare diseases.

Phase 3: Project Design

- **System Architecture Diagram:**



User Flow:

User opens site

⇩

Clicks on Get started Button

⇩

uploads poultry image

⇩

clicks submit

⇩

sees disease prediction

UI/UX Considerations:

- Simple upload form with image preview
- Predict button
- Result section with Disease Name

Phase 4: Project Planning (Agile Methodologies)

- **Sprint Planning:**
  - Week 1: Dataset collection & preprocessing
  - Week 2: Model training and tuning
  - Week 3: Flask integration
  - Week 4: Frontend + Testing + Deployment
- **Task Allocation:**
  - Member A: Model training
  - Member B: Flask backend
  - Member C: Frontend UI
  - Member D: Documentation & Testing

- **Timeline & Milestones:**
    - Milestone 1: Dataset ready (Week 1)
    - Milestone 2: Model trained (Week 2)
    - Milestone 3: Web integration (Week 3)
    - Milestone 4: Testing + Report (Week 4)

Phase 5: Project Development

- **Technology Stack Used:**
    - Python
    - Flask
    - TensorFlow/Keras
    - ResNet50(model)
    - HTML/CSS
- **Development Process:**
    - Trained ResNet50 on poultry dataset
    - Created app.py with prediction route
    - HTML templates for UI
    - Uploaded image saved and pre-processed
    - Model predicts and result shown on predict.html

Challenges & Fixes:

- ResNet50 needed image shape fixing → solved with img_to_array & resizing
- File not saving correctly → fixed with os.path.join()
- Styling issues fixed via HTML template updates

Phase 6: Functional & Performance Testing

Test Cases Executed:

- Uploaded valid/invalid image formats
- Checked correct predictions for known test images
- UI responsiveness and error handling

Bug Fixes & Improvements:

- Fixed image upload not found bug
- Added image preview and file name display
- Improved styling for better UX

Final Validation:

- Project meets objectives of classifying poultry disease accurately
- Easy for non-technical users

Conclusion:

This project proves the value of using deep learning and web development together to solve real-world agricultural problems. The model is effective, accurate, and user-friendly.

Future Scope

- Host the application on cloud (AWS/GCP)
- Create a mobile version
- Expand to other livestock diseases and add voice support

Appendix

- **Source Code:**
    - app.py – Flask backend
    - train_model.py – ResNet50 training
    - main.ipynb – Visualizations + performance
    - index.html – Web UI
- **Dataset Link:** https://www.kaggle.com/datasets/chandrashekarnatesh/poultry-diseases