Smart Sorting System Using Flask & VGG16 – Project Report

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1. INTRODUCTION

1.1 Project Overview

This project classifies fruits and vegetables as healthy or rotten using a VGG16-based deep learning model. The model is integrated into a Flask web application for user interaction.

1.2 Purpose

To develop an intelligent classification system that aids in the sorting of produce for agricultural or supply chain industries.

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2. IDEATION PHASE

2.1 Problem Statement

Manual identification of rotten or healthy produce is inefficient and error-prone, especially on a large scale.

2.2 Empathy Map Canvas

Think & Feel: Needs fast, reliable food classification.\ **See:** Inconsistent sorting.\ **Say & Do:** Looks for a tech-based solution.\ **Hear:** Peers facing the same problem.\ **Pain:** Time-consuming, costly.\ **Gain:** Faster, automated sorting system.

2.3 Brainstorming

- Use of machine learning or computer vision
- Mobile or web interface for ease of access
- Use of pre-trained models for better accuracy

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3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

- User accesses the application
- Uploads image
- System predicts label
- Receives feedback/output

3.2 Solution Requirement

- Frontend (HTML)
- Backend (Flask, Python)
- Model (.h5 file)
- Dataset (Kaggle)

3.3 Data Flow Diagram

Input: Image → **Model Prediction** → Output Label

3.4 Technology Stack

- Python, Flask
- TensorFlow, Keras
- HTML/CSS
- GitHub

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4. PROJECT DESIGN

4.1 Problem Solution Fit

The proposed ML system can automatically and accurately classify input images.

4.2 Proposed Solution

Use pre-trained VGG16 model and deploy through a Flask web interface.

4.3 Solution Architecture

- User uploads image → Flask receives input → Model classifies → UI displays result

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5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Phase	Timeline
Data Collection	Week 1
Model Building	Week 2
Testing & Debugging	Week 3
Web Integration	Week 4
Report & Video	Week 5

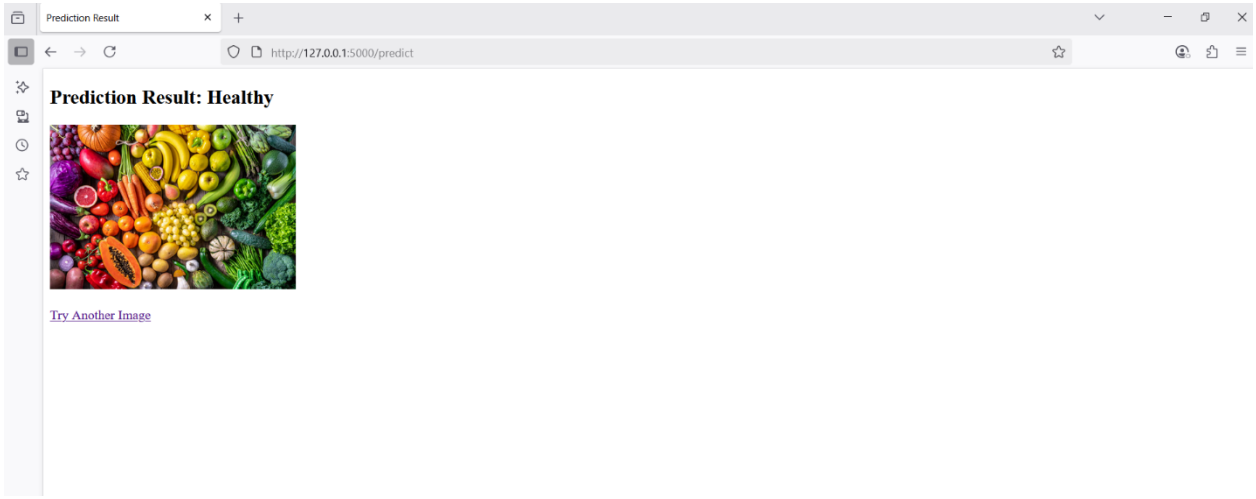
6. FUNCTIONAL AND PERFORMANCE TESTING

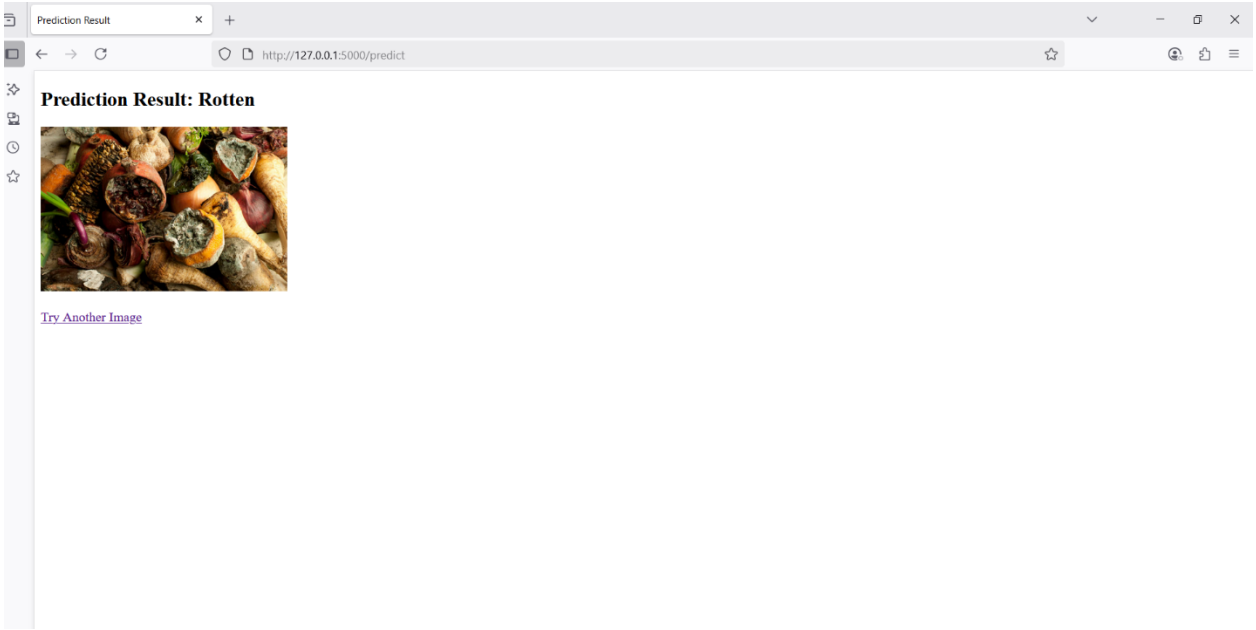
6.1 Performance Testing

- Accuracy on test set
- Time taken per prediction
- UI responsiveness

7. RESULTS

7.1 Output Screenshots





8. ADVANTAGES & DISADVANTAGES

Advantages: - High accuracy - Real-time prediction - Easy to use

Disadvantages: - Needs internet connection for GitHub usage - Dependent on image quality

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9. CONCLUSION

This project successfully applies AI/ML techniques for sorting produce and demonstrates practical deployment using Flask.

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10. FUTURE SCOPE

- Expand dataset
- Add mobile integration
- Introduce multi-language support

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11. APPENDIX

Source Code: Included in GitHub repo

Dataset Link: Kaggle Fruit & Vegetable Dataset

GitHub & Demo Link:
GitHub: https://github.com/jadaamruthalakshmi/Smart-Sorting-Project/tree/main

Demo Video: https://github.com/jadaamruthalakshmi/Smart-Sorting-Project/blob/main/Project%20demonstration%20video/Demo%20video.mp4