Project Report: Smart Sorting Transfer Learning for Identifying Rotten Fruits and Vegetables

1. INTRODUCTION

Project Title:

Smart Sorting Transfer Learning for Identifying Rotten Fruits and Vegetables

Team Members:

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Team member: chandana rani .G

Team member: Ismail

2. PROJECT OVERVIEW

Purpose:

This project aims to reduce food waste and improve quality assurance in agricultural supply chains by using AI to automatically detect rotten fruits and vegetables.

Features:

Image upload feature

AI model for freshness classification

Web-based user interface

Real-time prediction and result display

3. ARCHITECTURE

Frontend:

Developed using HTML, CSS, and JavaScript (served from static folder) for a responsive UI. HTML templates are stored in the templates folder and rendered using Flask.

Backend:
Built with Python using Flask. Handles routing, model inference, and image processing. Core logic resides in app.py, and the CNN model logic is encapsulated in cnn.py.

Database:

Currently, no persistent database is used. Optionally, a lightweight database like SQLite or MongoDB can be integrated for logging predictions.

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4. SETUP INSTRUCTIONS

Prerequisites:

Python 3.x

Flask

TensorFlow/Keras

Installation:

Clone the repository: git clone https://github.com/your-repo.git

Navigate to the project directory: cd your-repo

Install dependencies: pip install -r requirements.txt

Place your model file as model.h5 in the project root

Ensure folders media, static, and templates are properly populated

Run the app: python app.py

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5. FOLDER STRUCTURE

media/ – contains uploaded images

static/ – contains CSS and JavaScript files

templates/ – contains HTML files rendered by Flask

app.py – main Flask application file

cnn.py – defines the model loading and prediction logic model.h5 – pre-trained CNN model

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6. RUNNING THE APPLICATION

Flask Backend (also serves frontend):
Run the following command:

```
python app.py
```

Navigate to http://127.0.0.1:5000 in your browser to use the app.

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7. API DOCUMENTATION

POST /predict

Response:

```
{
  "status": "success",
  "prediction": "Fresh"
}
```

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8. AUTHENTICATION

Currently, this project does not use authentication. It is planned as a future enhancement.

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9. USER INTERFACE

Upload Image Page

Prediction Result Display

It should be and image with a bar to select images once you selectd an another press predict and you will see results

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10. TESTING

Strategy:

Manual testing of UI interactions

Unit testing using unittest for model functions

Accuracy testing using test datasets

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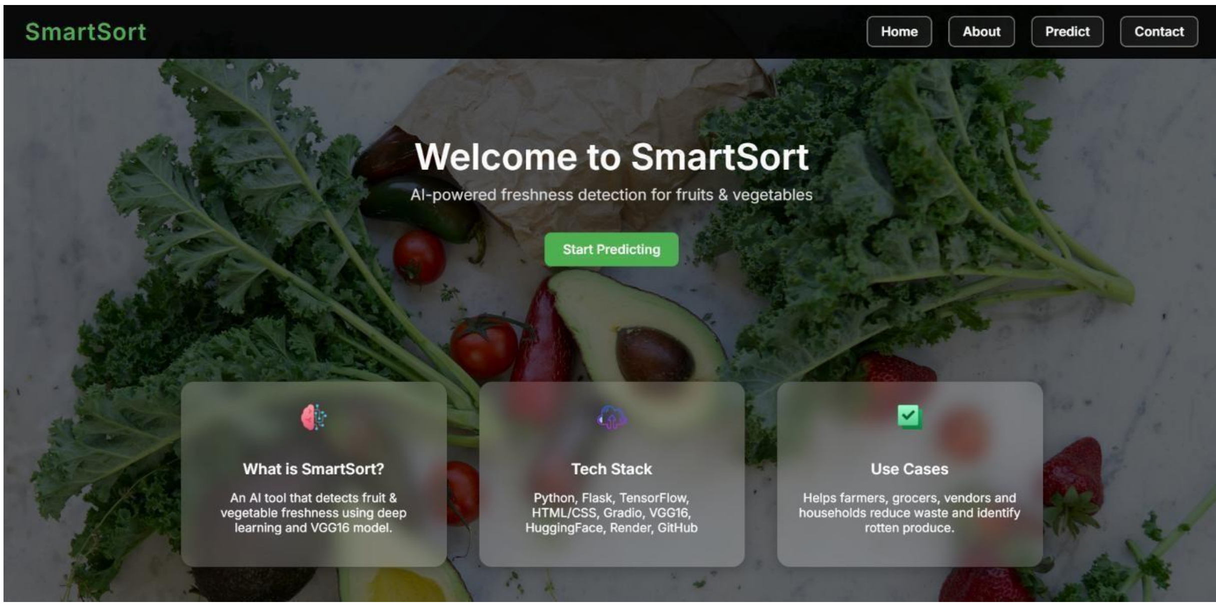
11. SCREENSHOTS OR DEMO



Welcome to SmartSort

AI-powered freshness detection for fruits & vegetables

What is SmartSort?

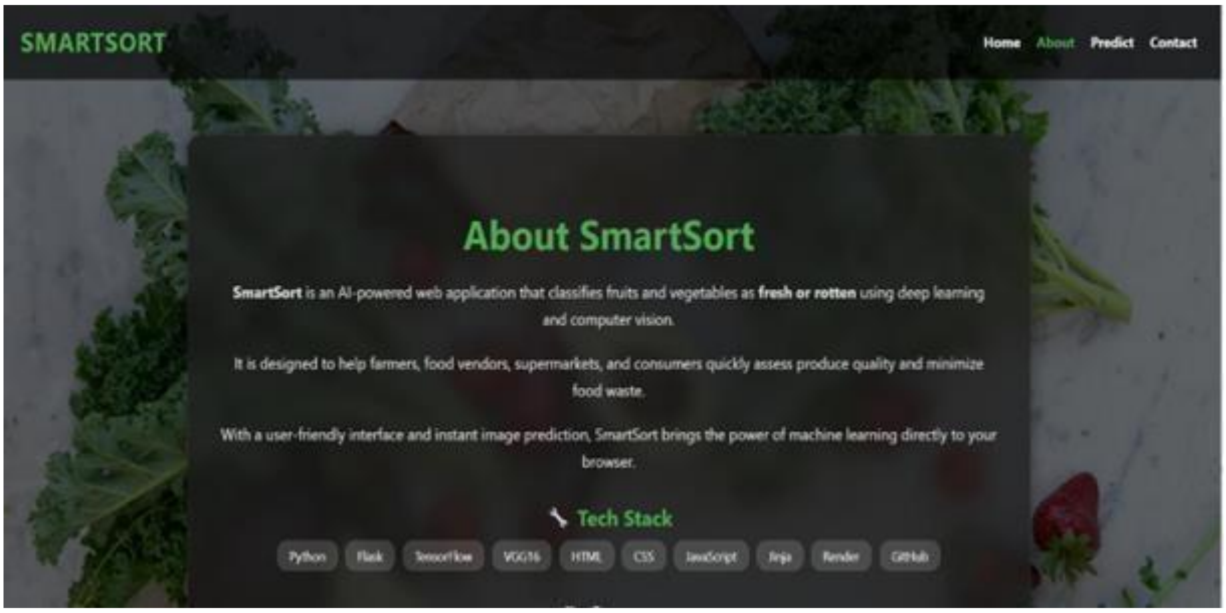
An AI tool that detects fruit & vegetable freshness using deep learning and VGG16 model.

Tech Stack

Python, Flask, TensorFlow, HTML/CSS, Gradio, VGG16, HuggingFace, Render, GitHub

Use Cases

Helps farmers, grocers, vendors and households reduce waste and identify rotten produce.



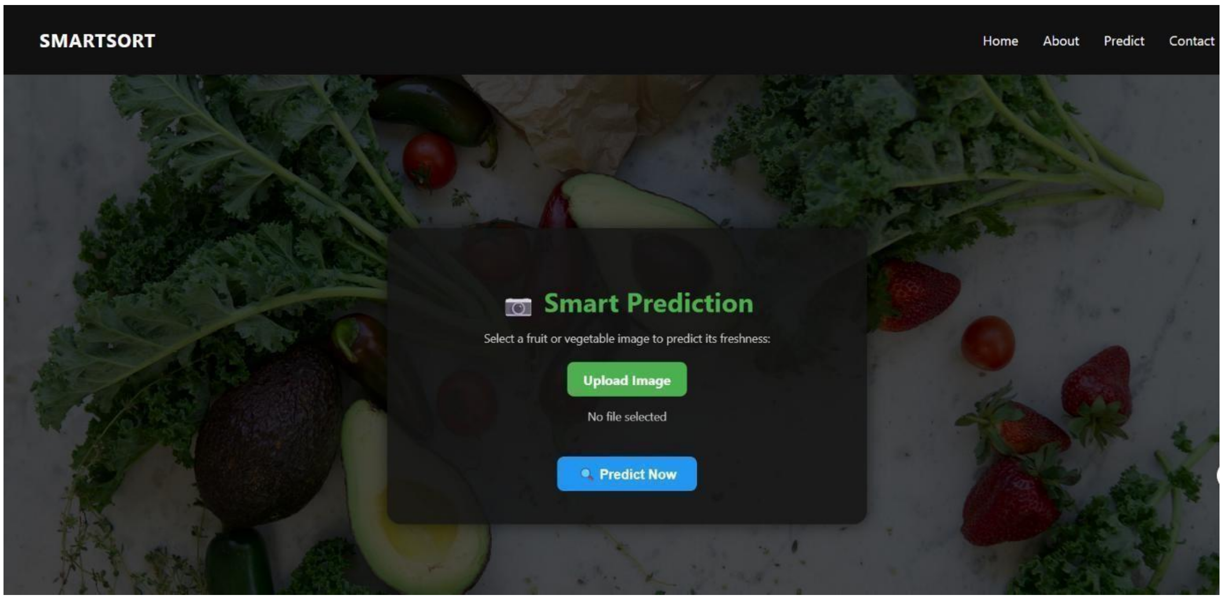
About SmartSort

SmartSort is an AI-powered web application that classifies fruits and vegetables as **fresh or rotten** using deep learning and computer vision.

It is designed to help farmers, food vendors, supermarkets, and consumers quickly assess produce quality and minimize food waste.

With a user-friendly interface and instant image prediction, SmartSort brings the power of machine learning directly to your browser.

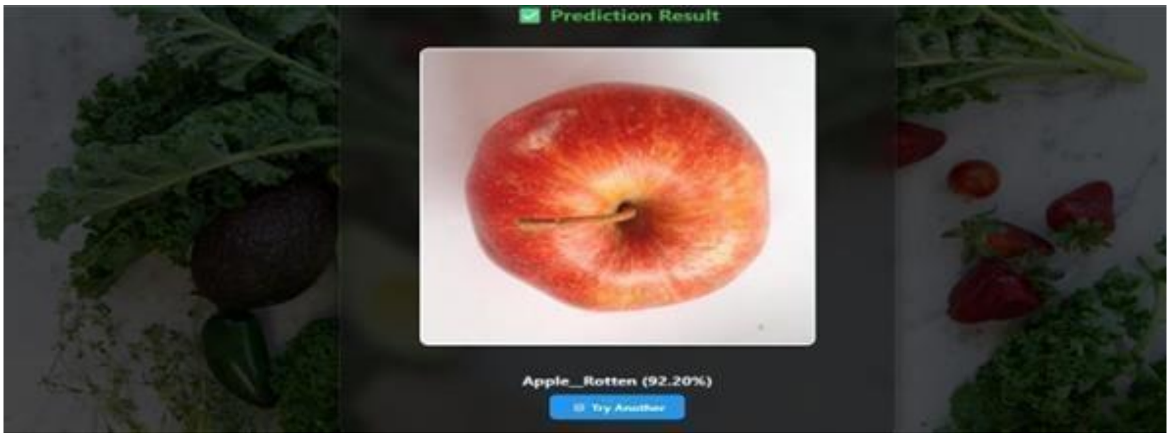
🔧 Tech Stack



📷 Smart Prediction

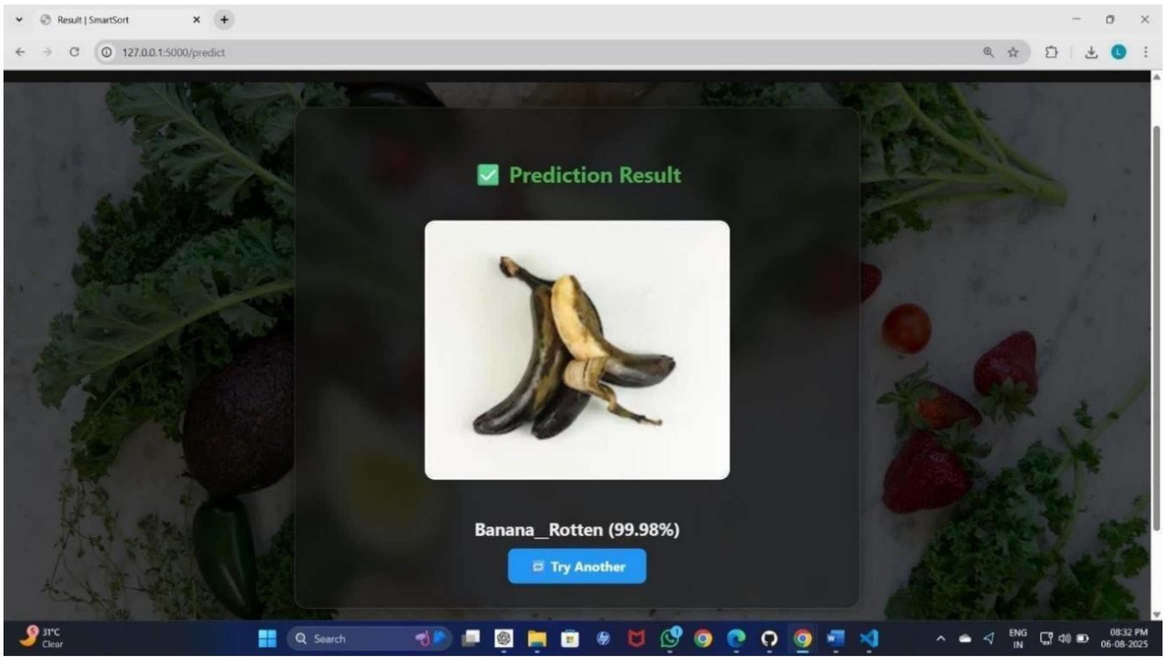
Select a fruit or vegetable image to predict its freshness:

No file selected



✅ Prediction Result

Apple__Rotten (92.20%)



Result | SmartSort
127.0.0.1:5000/predict
✅ Prediction Result
Banana__Rotten (99.98%)
Try Another
31°C Clear
Search
ENG IN
08:32 PM 06-08-2025

12. KNOWN ISSUES

- Image quality affects prediction accuracy
- Limited to trained categories (only trained fruits/vegetables)
- No user login system yet

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13. FUTURE ENHANCEMENTS

- Add user authentication system
- Enable drag-and-drop upload
- Train model on more fruits/vegetables
- Develop mobile app version
