

# Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables

## Team Name:

“The Innovators”

## Team Members:

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## Phase 1: Brainstorming & Ideation

**Problem Statement:** Usually, the classification of fresh and rotten fruits is carried by humans is not effectual for the fruit farmers. Human beings will become tired after doing the same task multiple times,

**Proposed Solution:** the project proposes an approach to reduce human efforts, reduce the cost and time for production by identifying the defects in the fruits in the agricultural industry

**.Target Users:** Agricultural farmers and agricultural researchers.

**Expected Outcome:** The project aims to automate the classification of fruits and vegetables into fresh or rotten categories using deep learning.

## Phase 2: Requirement Analysis

### Technical Requirements:

- Python
- TensorFlow & Keras
- Transfer Learning
- Google Colab
- Flask
- HTML/CSS
- Google Drive

### Functional Requirements:

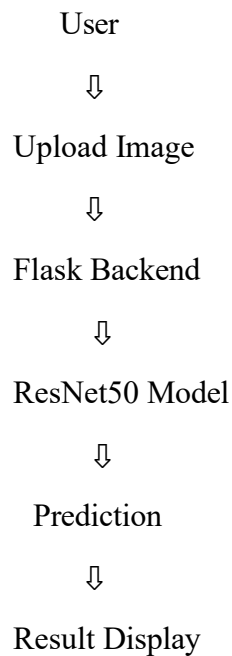
- Upload image
- Integrated the trained model to predict uploaded images.
- Display result

### Constraints & Challenges:

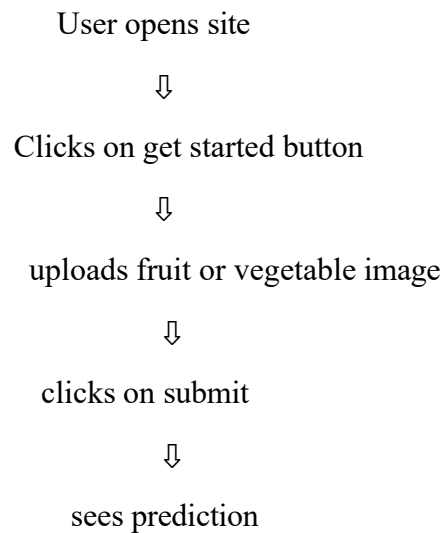
- Model accuracy depends on dataset quality

### **Phase 3: Project Design**

#### **System Architecture Diagram:**



#### **User Flow:**



#### **UI/UX Considerations:**

- Upload an image of a fruit or vegetable
- Instantly see if it is fresh or rotten
- Easy-to-use frontend with clean UI

### **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, HTML/CSS, Chatgpt

**Development Process:**

- Trained ResNet50 on 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 provide a simple yet powerful tool for food quality analysis
- Easy for non-technical users