Project Design Phase
Solution Architecture

Date	28 June 2025
Team ID	LTVIP2025TMID41507
Project Name	Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables
Maximum Marks	4 Marks

Solution Architecture:

Our project aims to address the challenge of identifying spoiled fruits and vegetables using machine learning by building a transfer learning-based classification system accessible through a simple web interface. This solution is designed for general consumers, vendors, and small retailers.

The solution includes the following components:

Data Collection & Storage

- Gather a labeled dataset of fresh and rotten fruit/vegetable images from sources like Kaggle and other open datasets. Store it in structured folders for training and testing.

Data Preprocessing & Augmentation

- Resize images, normalize pixel values, apply data augmentation techniques (rotation, flip, etc.) to improve model robustness and generalization.

Transfer Learning Model

- Use a pre-trained CNN (e.g., MobileNetV2, ResNet50) and fine-tune it on the dataset to classify images as "fresh" or "rotten."

Model Saving & Reusability

- Save the trained model using joblib or TensorFlow/Keras .h5 format for deployment and future use.

Web Application (Flask)

- Build a Flask-based web app allowing users to upload images. The backend processes the image and returns a classification result instantly.

User Interface

- Design a clean and intuitive HTML/CSS frontend where users can upload images and view predictions with confidence scores.

Security & Usability

- Ensure that uploaded images are handled securely and deleted after prediction to protect user privacy.

Deployment & Scalability

- Host the application on local servers or deploy to cloud platforms (e.g., Heroku, AWS, or PythonAnywhere) for easy access and broader adoption.

Benefits of This Architecture

- Offers a simple, no-hardware-needed tool to identify rotten fruits and vegetables.
- Reduces food waste and helps vendors/households make quick decisions.
- Low-cost and scalable solution for local markets and households.
- Easily extendable to include more fruit/vegetable types or integrate with other agritech tools.

Example - Solution Architecture Diagram: