

## Project Design Phase Solution Architecture

Date	14 January 2025
Team ID	LTVIP2026TMIDS74869
Project Name	Transfer Learning for Identifying Rotten Fruits and Vegetables
Maximum Marks	4 Marks

### Project Overview (Paragraph)

**NutriGaze** is an AI-based Fruit and Vegetable Freshness Detection System designed to automatically classify produce as Healthy or Rotten using image classification techniques. The system leverages Deep Learning models to analyze uploaded images and provide real-time predictions with confidence scores. It aims to reduce food wastage, improve quality control, and enhance customer trust by replacing manual inspection with an accurate, automated, and scalable web-based solution.

### Key Goals (5 Points)

1. Develop an accurate Deep Learning model for binary classification (Healthy vs Rotten).
2. Enable real-time image-based freshness prediction.
3. Reduce food wastage through early rotten detection.
4. Improve operational efficiency in supermarkets and retail stores.
5. Provide a simple and user-friendly web interface for easy access.

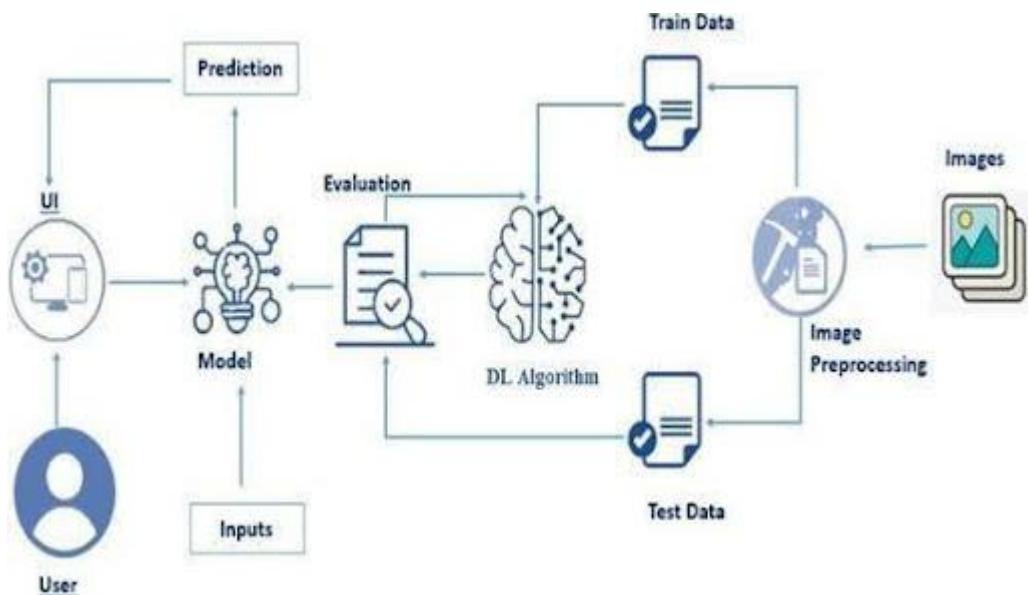
### Architecture Components

- User Interface (HTML, CSS, Flask Templates)
- Image Upload Module
- Preprocessing Layer (Resizing, Normalization)
- Deep Learning Model (.h5 / .keras model)
- Prediction Engine
- Result Display Module
- Optional Storage/Logging System

## Data Flow

1. User uploads an image through the web interface.
2. The image is stored temporarily in the uploads folder.
3. The preprocessing module resizes and normalizes the image.
4. The processed image is passed to the trained Deep Learning model.
5. The model predicts whether the image is Healthy or Rotten.
6. The prediction result with confidence score is sent back to the web application.
7. The result is displayed to the user along with the uploaded image.

## Architecture diagram



## Non-Functional Considerations

- **Performance:** Prediction response time should be less than 1 second.
- **Scalability:** System should handle multiple image uploads efficiently.
- **Reliability:** Model should maintain consistent accuracy across different inputs.
- **Usability:** Simple and intuitive user interface for non-technical users.
- **Security:** Validate file types and prevent malicious uploads.
- **Maintainability:** Model retraining capability for improved future performance.