Project Design Phase
Proposed Solution Template

Date	15 February 2026
Team ID	LTVIP2026TMIDS35857
Project Name	Smart Sorting Transfer Learning for Identifying Rotten Fruits and Vegetables
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	**Problem Statement (Problem to be solved)**	Manual inspection of fruits and vegetables to identify whether they are fresh or rotten is time-consuming, inconsistent, and prone to human error. This leads to food wastage, reduced quality control in markets, and economic losses for farmers, vendors, and retailers. There is a need for an automated, accurate, and fast system to detect rotten produce using image analysis.
2.	**Idea / Solution description**	The proposed system uses Deep Learning and Transfer Learning techniques to automatically classify fruits and vegetables as fresh or rotten based on uploaded images. The user uploads an image through a web application, which is processed using image preprocessing techniques. A pretrained Convolutional Neural Network model (such as ResNet18 or MobileNet) analyzes the image and predicts whether the item is fresh or rotten. The result is then displayed to the user instantly through the interface.
3.	**Novelty / Uniqueness**	The system uses Transfer Learning, which improves accuracy even with limited datasets and reduces training time. It provides real-time detection through an easy-to-use web interface. Unlike traditional manual inspection, the system offers automated, consistent, and reliable classification. It can also be integrated into smart agriculture systems, supermarkets, and supply chains for automated quality monitoring.
4.	**Social Impact / Customer Satisfaction**	The solution helps reduce food wastage by enabling early detection of spoiled produce. Farmers and vendors can ensure better quality control, increasing customer trust and satisfaction. Consumers benefit by purchasing fresh products, and food safety standards can be improved. This contributes to sustainable food management and reduces economic losses.
5.	**Business Model (Revenue Model)**	The system can be offered as a subscription-based service for supermarkets, warehouses, and agricultural businesses. It can also be integrated into mobile apps or smart devices for farmers and retailers. Revenue can be generated through SaaS subscriptions, licensing to

		retail chains, and enterprise deployment solutions. Additional income can come from API access for third-party integrations.
6.	**Scalability of the Solution**	The system can be easily scaled by deploying it on cloud platforms such as AWS, GCP, or Azure. It can support multiple users simultaneously and process large volumes of images. The model can also be retrained with more datasets to improve accuracy and support additional fruit and vegetable categories. It can be expanded into mobile applications, IoT devices, and automated sorting systems.