**Project Design Phase**

**Proposed Solution Template**

|  |  |
| --- | --- |
| Date | 27 June 2025 |
| Team ID | LTVIP2025TMID35598 |
| 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** |
|  | Problem Statement (Problem to be solved) | Manual detection of spoiled fruits and vegetables is slow, inconsistent, and prone to human error. This results in supply chain losses, compromised quality assurance, and higher labor costs. There is a clear need for an automated, affordable, and reliable solution for early spoilage detection. |
|  | Idea / Solution description | This project leverages transfer learning with VGG16 to build a smart sorting system that classifies fruits and vegetables as fresh or rotten using camera images. Designed to run on smartphones and low-end devices, it offers an accessible, real-time solution with confidence scores, helping farmers, vendors, and wholesalers sort produce more accurately and efficiently. |
|  | Novelty / Uniqueness | The solution blends AI and computer vision with affordability and ease of use, making advanced technology accessible in low-resource settings. It operates without the need for costly hardware or constant internet access. Using pre-trained models and transfer learning, it delivers high accuracy with minimal data and infrastructure requirements. |
|  | Social Impact / Customer Satisfaction | The system helps reduce food waste, boost income for farmers and vendors, and ensures higher quality produce for consumers. It empowers rural users with accessible modern tools, enhances supply chain efficiency, and promotes sustainable agricultural practices. Improved sorting accuracy also leads to greater customer satisfaction and trust. |
|  | Business Model (Revenue Model) | The solution can be offered as a freemium mobile or web application, where users have access to basic features at no cost, while premium functionalities—such as advanced analytics, bulk processing, or priority support—are available through a paid subscription. Revenue can also be generated through B2B licensing to warehouses, food processing companies, and government agricultural initiatives. Additionally, optional hardware kits or on-premise deployments can be sold as part of tailored packages for enterprise clients, creating multiple income streams while maintaining accessibility for individual users. |
|  | Scalability of the Solution | The model is highly scalable and can be adapted to different geographic regions by retraining on region-specific datasets. It supports classification across various types of fruits and vegetables and can be extended to detect additional defects such as bruises, cuts, or over-ripeness. Furthermore, the system is designed for seamless integration with existing sorting machines, mobile applications, or cloud-based dashboards, making it suitable for both small-scale users and large enterprises aiming to enhance automation and quality control. |