**Project Design Phase-II**

**Solution Requirements (Functional & Non-functional)**

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| Date | 16 June 2025 |
| Team ID | LTVIP2025TMID41917 |
| Project Name | Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables |
| Maximum Marks | 4 Marks |

**Functional Requirements:**

Following are the functional requirements of the proposed solution.

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| **FR No.** | **Functional Requirement (Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | User Registration | Registration through Form  Registration through Gmail  Registration through LinkedIN |
| FR-2 | User Confirmation | Confirmation via Email  Confirmation via OTP |
| FR-3 | Image Upload & Preprocessing | Upload single or multiple images  Resize and normalize Images  Remove background noise |
| FR-4 | Rottenness Detection | Detect fruit or vegetable class  Identify rotten vs fresh  Visualize heatmap of affected regions |
| FR-5 | Model Training & Transfer Learning | Load pre-trained CNN model  Apply transfer learning  Train on labeled dataset |
| FR-6 | Sorting and Categorization | Group based on freshness level  Assign quality. Grade  Log sorting decisions |
| FR-7 | Result Feedback & Correction | Allow user to correct misclassification  Collect feedback for model improvement |
| FR-8 | Data Storage and Management | Store uploaded images  Maintain user profiles  Log predictions and outcomes |

**Non-functional Requirements:**

Following are the non-functional requirements of the proposed solution.

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| **FR No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | **Usability** | The interface should be intuitive and user-friendly to accommodate users with limited technical skills, such as farmers or vendors.. |
| NFR-2 | **Security** | Ensure secure login, encrypted data transfer, and role-based access control to protect user data and system integrity. |
| NFR-3 | **Reliability** | The system must consistently and correctly detect and classify fruits and vegetables with a high degree of accuracy. |
| NFR-4 | **Performance** | The detection and classification process should occur within a few seconds, even for high-resolution images. |
| NFR-5 | **Availability** | The application should be available 99.9% of the time with minimal downtime to support real-time sorting requirements. |
| NFR-6 | **Scalability** | The system should be capable of handling increased users. and data volume, such as large-scale sorting operations or Integration with smart farms. |