

SMART SORTING : TRANSFER LEARNING FOR IDENTIFYING ROTTEN FRUITS AND VEGETABLES

DATE	20-02-2026
TEAM ID	LTVIP2026TMIDS90622
PROJECT NAME	SMART SORTING : TRANSFER LEARNING FOR IDENTIFYING ROTTEN FRUITS AND VEGETABLES
MAXIMUM MARKS	2 MARKS

3.2 SOLUTION REQUIREMENT

The proposed solution requires a combination of hardware, software, and intelligent algorithms to accurately identify rotten and fresh fruits and vegetables in real time. The system must be capable of capturing high-quality images, processing them using deep learning models, and providing reliable output within a few seconds to ensure smooth user interaction.

From a hardware perspective, the system requires a high-resolution camera to capture detailed images of fruits and vegetables. Since rotten detection depends on identifying subtle discoloration, mold spots, and texture changes, image clarity is critical. A weight sensor or load cell is also required to measure the weight for price calculation. A processing unit such as a computer, laptop, or embedded device is necessary to run the trained deep learning model. For automated environments, additional components like a conveyor belt, servo motors, and a display screen are required to enable sorting and user interaction.

From a software perspective, the system must be developed using deep learning frameworks such as TensorFlow or Keras. The model will use transfer learning by fine-tuning pre-trained convolutional neural networks to classify fruits into categories such as fresh, slightly damaged, or rotten. Image preprocessing techniques such as resizing, normalization, and augmentation are required to improve accuracy under different lighting conditions.

The solution also requires a well-structured dataset containing images of both fresh and rotten fruits and vegetables captured under various angles and lighting environments. Data augmentation techniques must be applied to enhance model generalization and prevent overfitting. The system should include a database to store classification results, timestamps, and quality reports for future analysis.

Performance requirements include high classification accuracy, low processing time, and real-time response capability. The system should detect rotten items within seconds and provide a confidence score to ensure transparency. It must also allow manual override in case of incorrect prediction to maintain reliability.

User interface requirements include a simple display that shows the detected item name, freshness status, weight, and price clearly. Instructions should be easy to understand so that customers of all age groups can use the system comfortably.