

## **SMART SORTING : TRANSFER LEARNING FOR IDENTIFYING ROTTEN FRUITS AND VEGETABLES**

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TEAM ID	LTVIP2026TMIDS90622
PROJECT NAME	SMART SORTING : TRANSFER LEARNING FOR IDENTIFYING ROTTEN FRUITS AND VEGETABLES
MAXIMUM MARKS	3 MARKS

### **3.4 TECHNOLOGY STACK**

#### **Hardware and Software Requirements:**

Since your project is based on deep learning and transfer learning (using models like TensorFlow or Keras), the system needs proper hardware and software support for image processing and model training.

##### **1.Hardware Requirements:**

###### **1. 1Development & Training System (Minimum Requirements):**

Processor: Intel i5 / Ryzen 5 (or higher)

- RAM: 8 GB (16 GB recommended for smooth training)
- Storage: 256 GB SSD minimum (512 GB recommended)
- GPU (Optional but Recommended): NVIDIA GPU with CUDA support (e.g., GTX 1650 or above)
- Camera: HD USB Camera (for real-time fruit/vegetable image capture)

These specifications are sufficient for developing and testing transfer learning models like MobileNet, VGG16, or ResNet.

###### **1.2 Deployment Hardware (Prototype Model):**

If implementing a real-time smart sorting system:

Raspberry Pi 4 (4GB/8GB RAM)

- Pi Camera Module / USB Camera
- Conveyor Belt Setup (for industrial prototype)
- Servo Motors (for sorting mechanism)
- Power Supply Unit
- Display Monitor (Optional)

This setup helps automate fruit/vegetable classification and physical sorting.

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## **Software Requirements:**

### **2.1 Operating System:**

- Windows 10/11
- Linux (Ubuntu recommended)
- macOS (optional)

### **2.2 Programming Language:**

- Python 3.8 or above

### **2.3 Development Tools:**

- Anaconda (for environment management)
- PyCharm / VS Code / Jupyter Notebook

### **2.4 Python Libraries:**

- NumPy – numerical operations
- Pandas – dataset handling
- Matplotlib & Seaborn – data visualization
- OpenCV – image processing
- Scikit-learn – evaluation metrics
- TensorFlow / Keras – deep learning and transfer learning

### **2.5 Pre-trained Models (Transfer Learning):**

- MobileNet
- VGG16
- ResNet50

These models are pre-trained on large datasets and fine-tuned for fruit/vegetable classification.

## **3.Additional Requirements:**

- Kaggle dataset (Fruits & Vegetables Fresh/Rotten dataset)
- Internet connection (for downloading datasets & pre-trained models)
- CUDA & cuDNN (if using GPU acceleration)