**8.Advantages & Disadvantages**

* **Advantages**
* Reduced training time and data needs: Since you're leveraging pre-trained models, you don’t need massive datasets or long hours of training from scratch.
* Improved accuracy: Transfer learning models often perform better, especially when data for specific tasks (like detecting spoilage) is limited or expensive to label.
* Cost-effective solution: Fewer computational resources required mean lower energy costs and faster development.
* Adaptability: Models can be fine-tuned for different fruits or vegetables, lighting conditions, or levels of spoilage.
* Scalable automation: Enables integration into sorting systems or conveyor belts for real-time, high-throughput screening.
* **Disadvantages**
* Domain mismatch: If the source and target tasks differ too much (e.g., general object recognition vs. fruit spoilage), performance may suffer.
* Annotation challenges: Even with transfer learning, you still need a clean, high-quality dataset of rotten vs. fresh items to fine-tune properly.
* Overfitting risk: On small datasets, the model may latch onto noise or superficial features that don't generalize well.
* Hardware requirements: While less demanding than training from scratch, some transfer learning models (e.g., deep CNNs) still need decent processing power for inference.
* Explainability issues: Deep learning models can be black boxes—making it tough to understand why the model made a particular classification.