**Project Design Phase**

**Problem – Solution Fit Template**

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| --- | --- |
| Date | 22 June 2025 |
| Team ID | LTVIP2025TMID35598 |
| Project Name | Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables |
| Maximum Marks | 2 Marks |

**🌱 Problem–Solution Fit Template**

**The Problem–Solution Fit**

We identified a major challenge experienced by growers, wholesalers, and logistics teams:  
the inability to consistently and rapidly screen fruits and vegetables for spoilage.

Current manual inspection methods are inefficient, subjective, and often too slow to keep up with the demands of modern distribution.

Our project offers a deep learning-powered visual inspection system that leverages transfer learning with ResNet to automate defect detection, minimize human error, and improve overall product quality and profitability.

**🎯 Purpose**

**✅**Enable producers and supply chain operators to detect and separate defective produce with speed and confidence using an intuitive AI solution integrated into their regular workflows.

✅ Promote widespread use by ensuring the system works on low-cost devices like standard Android smartphones and does not require constant internet access, making it practical for both urban and rural environments.

✅ Enhance engagement and trust by crafting clear, relatable messaging around reducing waste, protecting revenue, and assuring freshness, connecting with users’ priorities and concerns.

✅ Deepen loyalty and adoption by directly addressing common issues such as unreliable visual checks, labor-intensive sorting processes, and avoidable spoilage losses, while delivering a simple and effective alternative.

**Template:**

### 6. CUSTOMER CONSTRAINTS

* Limited access to high-quality imaging equipment
* Seasonal income fluctuations affecting purchasing decisions
* Resistance to adopting unfamiliar technology

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**What limits their ability to take action?**

* Low budget or cash flow issues
* Lack of digital literacy or AI knowledge
* Poor internet connectivity in rural areas

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**5. AVAILABLE SOLUTIONS**

* Visual checks performed by supervisors or quality controllers
* Mechanical graders that separate produce by size or shape
* Handheld devices for spot-checking freshness (often costly)

### 1. CUSTOMER SEGMENT(S):

### Mid-sized commercial growers

### Fresh produce distributors and packhouses

### Export companies handling perishable goods

9. PROBLEM ROOT CAUSE:

* Limited availability of cost-effective and easy-to-use quality inspection technologies
* Overreliance on manual labor, often lacking specialized training or expertise
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**.4. JOBS-TO-BE-DONE / PROBLEMS:**

* Minimize the time and effort required for quality inspection of produce
* Lower overall labor expenses associated with manual sorting

**7. BEHAVIOUR**

* Conduct visual inspection and manual sorting of each fruit or vegetable
* Hire temporary workers during peak harvest periods to manage increased workload

### 8.CHANNELS OF BEHAVIOUR

* 1. **ONLINE**
  2. Explore agricultural tips and tutorials on platforms like YouTube
  3. **8.2 OFFLINE**
  4. Join local farmer gatherings, agricultural fairs (Krishi melas), and workshops
  5. Connect with cooperative societies and agricultural input suppliers

**BEHAVIOUR**

**8.1 ONLINE**

* **Explore agricultural tips and tutorials on platforms like YouTube**
* **View demonstration videos on smart farming technologies and AI tools**
* **Participate in online forums and social media groups for farmers**

**8.2 OFFLINE**

* **Join local farmer gatherings, agricultural fairs (Krishi melas), and workshops**
* **Connect with cooperative societies and agricultural input suppliers**

**8.2 OFFLINE**

* Attend farmer meetups, Krishi melas (**8.2 OFFLINE**
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* Visit cooperative societies or agri-dealers
* Government training centers
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### ****3. TRIGGERS****

High product returns due to poor quality

Customer complaints or health concerns

**4.EMOTIONS:BEFORE/AFTER:**

| **Stage** | **Emotion** |
| --- | --- |
| **Before** | **Anxious, fatigued, frustrated, uncertain, fearful of losses** |
| **After** | **Empowered, calm, assured, satisfied, confident in technology** |

**10. YOUR SOLUTION**

**Smart Sorting: AI-Powered Freshness Detection for Fruits & Vegetables**

* Leverage transfer learning with MobileNetV2 to accurately identify early signs of spoilage
* Integrate with mobile and web applications for real-time camera-based scanning