

## Project Design Phase

### Problem – Solution Fit Template

Date	19 February 2026
Team ID	LTVIP2026TMIDS89552
Project Name	Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables
Maximum Marks	2 Marks

#### Problem – Solution Fit:

##### Problem Statement

Consumers, retailers, and small-scale vendors often struggle to accurately identify whether fruits and vegetables are fresh or rotten. Visual inspection by humans can be inconsistent and subjective, especially when early signs of spoilage are not clearly visible.

This leads to:

- Food wastage due to incorrect rejection of good produce
- Health risks from consuming spoiled items
- Financial losses for vendors and suppliers
- Lack of standardized quality assessment

There is a need for an automated, fast, and reliable system that can classify fruits and vegetables as **healthy or rotten** using image-based detection.

##### Target Users

- Household consumers
- Grocery shop owners
- Supermarket chains
- Agricultural suppliers
- Food quality inspection teams

##### Customer Pain Points

- Difficulty identifying early-stage spoilage
- No technical tool for quick freshness verification
- Manual inspection is time-consuming
- Inconsistent quality grading
- Increased food waste

##### Proposed Solution

NutriGaze is a web-based application that uses a trained **CNN model (VGG16 transfer learning)** to classify fruits and vegetables as *healthy or rotten* based on uploaded images.

## How the Solution Works:

1. User uploads an image of a fruit or vegetable.
2. The image is preprocessed.
3. The trained deep learning model analyzes visual features.
4. The system outputs predicted class (e.g., Tomato\_\_Rotten, Apple\_\_Healthy)

## Purpose:

- ☐ Solve complex problems in a way that fits the state of your customers.
- ☐ Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- ☐ Sharpen your communication and marketing strategy with the right triggers and messaging.
- ☐ Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.
- ☐ **Understand the existing situation in order to improve it for your target group.**

## Template:

Define CS, fit into CC	<b>1. CUSTOMER SEGMENT(S)</b> Who is your customer? I.e. working parents of 0-5 y.o. kids <b>CS</b>	<b>6. CUSTOMER CONSTRAINTS</b> What constraints prevent your customers from taking action or limit their choices of solutions? I.e. spending power, budget, no cash, network connection, available devices. <b>CC</b>	<b>5. AVAILABLE SOLUTIONS</b> Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? I.e. pen and paper is an alternative to digital notetaking <b>AS</b>	Explore AS, differentiate
	<b>2. JOBS-TO-BE-DONE / PROBLEMS</b> Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one, explore different sides. <b>J&amp;P</b>	<b>9. PROBLEM ROOT CAUSE</b> What is the real reason that this problem exists? What is the back story behind the need to do this job? I.e. customers have to do it because of the change in regulations. <b>RC</b>	<b>7. BEHAVIOUR</b> What does your customer do to address the problem and get the job done? I.e. directly related: find the right solar panel installer, calculate usage and benefits; Indirectly associated: customers spend free time on volunteering work (I.e. Greenpeace) <b>BE</b>	
Focus on J&P, tap into BE, understand RC	<b>3. TRIGGERS</b> What triggers customers to act? I.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. <b>TR</b>	<b>10. YOUR SOLUTION</b> If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. <b>SL</b>	<b>8. CHANNELS of BEHAVIOUR</b> <b>8.1 ONLINE</b> What kind of actions do customers take online? Extract online channels from #7 <b>CH</b>	Extract online & offline CH of BE
	<b>4. EMOTIONS: BEFORE / AFTER</b> How do customers feel when they face a problem or a job and afterwards? I.e. lost, insecure > confident, in control - use it in your communication strategy & design. <b>EM</b>	<b>8.2 OFFLINE</b> What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.		
Identify strong TR & EM				

## References:

1. <https://www.ideahackers.network/problem-solution-fit-canvas/>
2. <https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe>