



## Problem statement

Each year, households waste **billions** of dollars due to forgotten groceries expiring. In the U.S. alone, **30-40%** of the food supply is wasted, costing around **\$161 billion** annually. This not only strains household budgets but also contributes to environmental issues, like increased **greenhouse gas emissions** and **resource depletion**.

The challenge is to help people track food expiration, reducing waste and promoting sustainable habits.

### FOOD WASTE IN THE U.S. IS...

#### EXCESSIVE

**40%**

OF ALL FOOD PRODUCED  
IN THE U.S. IS WASTED



**133** BILLION  
POUNDS

Food wasted per year.  
That represents 1,249  
calories per person, per day.

#### EXPENSIVE



**\$161** BILLION

Uneaten food at retailers,  
restaurants, and homes  
costs \$161 billion annually



**\$1,500**

Per capita, this amounts  
to over \$1,500 for a  
family of four

#### ENVIRONMENTALLY HARMFUL



Food makes up 20%  
of landfill weight—the  
single largest municipal  
waste source



The methane  
released by food  
is a greenhouse  
gas 21 times more  
powerful than  
carbon dioxide

#### AN OPPORTUNITY



Diverting 15% of the food  
that currently goes to  
waste would be enough  
to cut the number of food  
insecure Americans in half



Food waste can  
be composted into  
sustainable soil  
additives or be used  
to generate electricity



Encouraging institutions  
to purchase so-called  
"ugly" produce would help  
farmers find new markets  
for healthy products that  
currently go to waste

\*All statistics from U.S. Department of Agriculture and Environmental Protection Agency.  
[www.pangloss-house.com/foodwaste](http://www.pangloss-house.com/foodwaste)



## Project Description

Our application streamlines grocery management by utilizing advanced tracking algorithms to monitor item expiration dates, providing **real-time notifications** as products approach their expiry. By integrating **generative AI**, the system dynamically curates personalized recipe suggestions based on inventory data and user-specific preferences, offering an intuitive, step-by-step guide for meal preparation. This solution optimizes food resource utilization, significantly reducing waste while enhancing user convenience in **meal planning** and **culinary execution**.



## Benefits of using ShelfLife

**Reduce Food Waste:** ShelfLife helps users track expiration dates, minimizing spoiled food and contributing to a more sustainable lifestyle.



**Save Money:** By notifying users before groceries expire, the app ensures better food utilization, preventing unnecessary spending on replacements.



**Convenient Meal Planning:** With personalized recipe suggestions based on available ingredients, ShelfLife simplifies meal planning and preparation, saving time and effort.



## How its works (overview)

**Frontend (React)** : Users interact with the app, add groceries, capture images (react-webcam), and request recipes. React Router manages navigation, and Fetch API communicates with the backend.

**Backend (FastAPI)** : Handles grocery data and processes image recognition using PIL. Routes include grocery management (/groceries), image recognition (/identify), and recipe generation (/generate).

**Google Gemini AI** : Identifies grocery items from images and generates recipes based on user preferences and available ingredients.

**Rendering** : Recognized items and AI-generated recipes are rendered using React Markdown for easy user interaction.



