



Nagarro | Crack-a-Code 3.0

2nd Round

Foresight Foods : AI-Powered Kitchen, Predicting Food Demand Smartly

Team Name = Solis , Member Name = Diwakar Sehgal

Problem Statement

Kitchens struggle to balance supply and demand—often ending up with spoilage or stockouts. Our AI-powered system leverages historical consumption and footfall patterns, factors in event types and audience profiles, and continuously learns from predicted vs. actual usage to deliver accurate, waste-reducing forecasts.

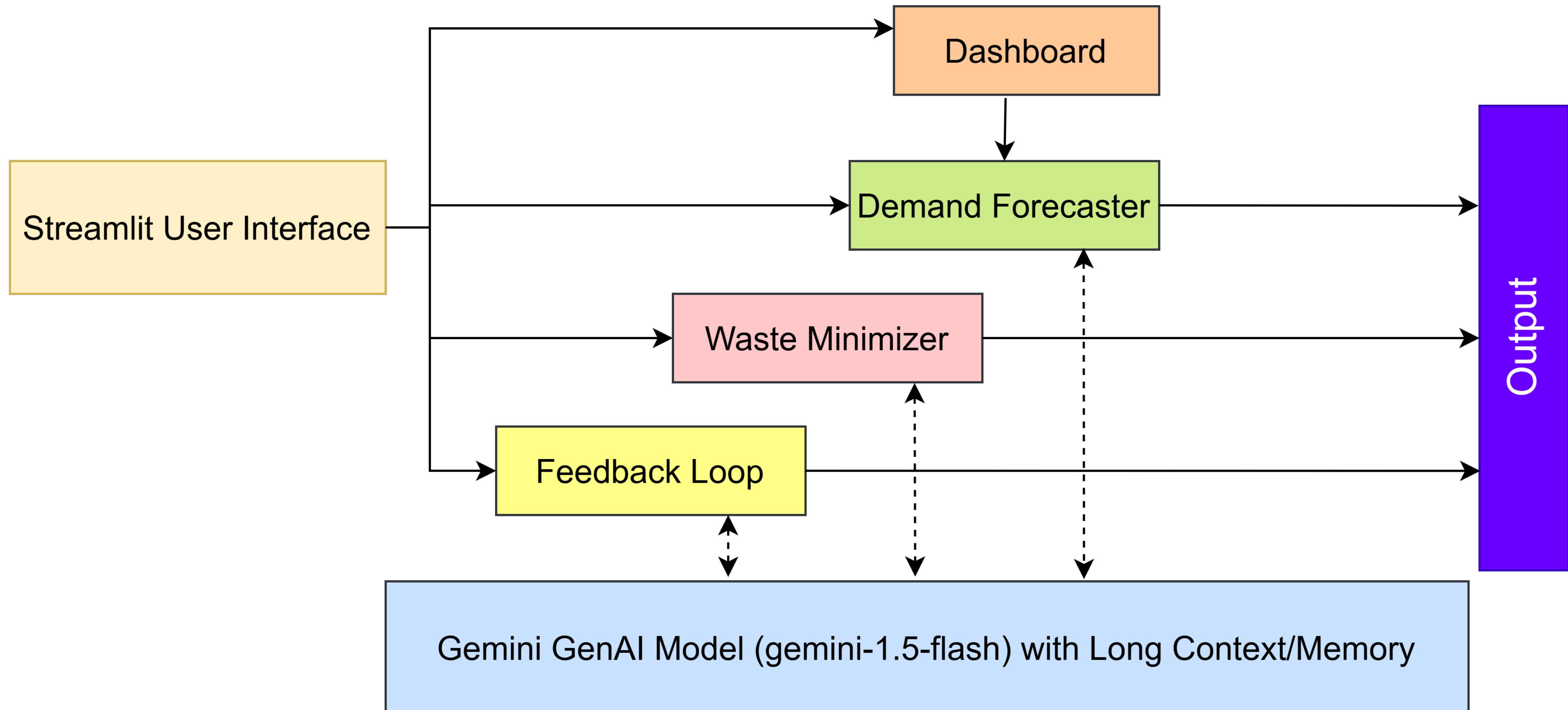


Proposed Solution

This solution introduces "Foresight Foods," an AI-driven system built with Streamlit and Google's Gemini GenAI model (gemini-1.5-flash) to revolutionize kitchen operations by minimizing waste and optimizing food preparation.

1. Streamlit User Interface: A user-friendly front-end for seamless interaction with the AI system.
2. Dashboard: Provides a real-time, at-a-glance overview of food consumption, waste, and predicted demand, enabling immediate insights.
3. Demand Forecaster: Utilizes historical data, event schedules, weather, and local events to accurately predict future food demand, reducing over-preparation.
4. Waste Minimizer: Generates optimized food preparation reports based on forecasted demand, current inventory, and menu ingredients, directly translating predictions into actionable kitchen plans.
5. Feedback Loop: Captures actual usage data (predicted vs. actual consumption/waste), allowing the Gemini GenAI model to continuously learn and refine its forecasting and optimization algorithms, ensuring ongoing accuracy improvements.
6. Gemini GenAI Model (gemini-1.5-flash) with Long Context/Memory: The core AI engine, capable of processing extensive datasets and complex contextual information to deliver highly accurate predictions and intelligent recommendations.

Diagrams/Architecture



Dashboard with some Dummy Data

Enter Gemini API Key ?

Foresight Foods

Navigate

- Dashboard
- Demand Forecaster
- Waste Minimizer
- Feedback Loop

This app uses Gemini AI for forecasting and reporting. Ensure your API key is configured.

Dashboard

Real-time overview of food service operations.

Today's Food Consumption 1,234 units <small>↑ +5% from yesterday</small>	Today's Food Waste 87 units <small>↓ -2% from yesterday</small>	Predicted Demand (Next 24h) ~1,500 units <small>↑ Stable</small>
---	--	---

Food Consumption Trend (Last 7 days)

Day	Consumption (Units)
Fri	220
Mon	180
Sat	210
Sun	195
Thu	215
Tue	190
Wed	205

Deploy ⋮

Demand Forecaster

The screenshot shows the Demand Forecaster application interface. On the left is a sidebar with a dark background, featuring a header "Foresight Foods" and a navigation menu with four items: "Dashboard", "Demand Forecaster" (which is selected, indicated by a red dot), "Waste Minimizer", and "Feedback Loop". Below the menu is a note: "This app uses Gemini AI for forecasting and reporting. Ensure your API key is configured." At the top of the main content area is a "Deploy" button and a three-dot menu icon. The main content area has a white background and contains the following sections:

- Demand Forecaster**: A title card with the subtitle "Predict food demand using AI based on various factors."
- Input Data for Forecasting**: A section with the instruction "Provide the necessary information for the AI to generate a demand forecast." It includes a "Historical Consumption Data (JSON)" input field with placeholder text: "e.g., [{"date": "2024-05-20", "item": "Caesar Salad", "sold": 50}, ...]".
- Event Schedules & Audience Profiles**: A section with the placeholder text "e.g., Upcoming conferences, sports events, expected attendance numbers and types...".
- Weather Forecast**: A section with the placeholder text "e.g., Next 7 days: Sunny, average 25°C. Weekend: Possible rain...".
- Local Events Impacting Demand**: A section at the bottom.

Waste Minimizer

Enter Gemini API Key (?) ?

?

Foresight Foods

Navigate

- Dashboard
- Demand Forecaster
- Waste Minimizer
- Feedback Loop

This app uses Gemini AI for forecasting and reporting. Ensure your API key is configured.

Deploy ⋮

Waste Minimizer

Generate AI-powered food preparation reports to optimize stock and reduce waste.

Input Data for Preparation Report

Provide details for the AI to generate an optimized food prep report.

Predicted Demand (JSON or Text)

e.g., Output from Demand Forecaster, or {"item": "Burger", "predicted_units": 100}, ...

Historical Data (Consumption, Waste, Stock - JSON)

e.g., [{"date": "2024-05-20", "item": "Salad", "consumed": 45, "wasted": 5, "stock_start": 60, "stock_end": 10}, ...]

Current Menu & Ingredients per Item

e.g., Caesar Salad: Lettuce, Croutons, Dressing, Chicken. Burger: Bun, Patty, Cheese, Lettuce, Tomato. List ingredients per item.

Feedback Loop

The screenshot shows a dark-themed web application for "Foresight Foods". At the top left is a red header bar. On the right side of the header are "Deploy" and three-dot menu icons. Below the header is a dark sidebar on the left containing a "Gemini API Key" input field with an eye icon for visibility, and a "Navigate" section with radio buttons for "Dashboard", "Demand Forecaster", "Waste Minimizer", and "Feedback Loop", where "Feedback Loop" is selected. A blue callout message in the sidebar says: "This app uses Gemini AI for forecasting and reporting. Ensure your API key is configured." The main content area has a white background. It features a large title "Feedback Loop" and a subtitle "Help improve AI accuracy by providing actual usage data." Below this is a form titled "Submit Usage Feedback" with fields for "Menu Item Name" (placeholder "e.g., Caesar Salad, Beef Tacos"), "Predicted Amount (units)" (value "0" with minus and plus buttons), "Actual Amount Used (units)" (value "0" with minus and plus buttons), and "Notes (Optional)" (placeholder "e.g., Unexpectedly popular, ingredients ran low..."). A "Submit Feedback" button is at the bottom of the form.

Enter Gemini API Key ?

eye

Foresight Foods

Navigate

Dashboard

Demand Forecaster

Waste Minimizer

Feedback Loop

This app uses Gemini AI for forecasting and reporting. Ensure your API key is configured.

Feedback Loop

Help improve AI accuracy by providing actual usage data.

Submit Usage Feedback

Menu Item Name

e.g., Caesar Salad, Beef Tacos

Predicted Amount (units)

0 - +

Actual Amount Used (units)

0 - +

Notes (Optional)

e.g., Unexpectedly popular, ingredients ran low...

Submit Feedback

Deploy ⋮

Future Enhancements

Vector & Time-Series DB:

- 1. Migrate embeddings (e.g. event/audience vectors) into a vector store (Pinecone/Weaviate) for rapid similarity searches**
- 2. Store time-series consumption & forecast data in a TS-DB (InfluxDB/TimescaleDB) for efficient trend analysis**

Live Dashboard:

- 1. Replace static dummy charts with real-time streaming widgets (e.g. via WebSockets or Streamlit's experimental data streaming)**
- 2. Auto-refresh metrics and charts as new consumption or footfall data arrives**

Thank You