

## Technical Design Document

### Data Ingestion Workflow

#### 1. Proprietary Restaurant Dataset

- The prototype reads a proprietary restaurant dataset from an Excel file (Sample\_Ingredients\_File.xlsx).
- This file includes restaurant information, menu items, categories, prices, addresses, ratings, etc.
- Data is cached in a pickle file (data\_cache.pkl) to avoid repeated loading from Excel. This speeds up subsequent runs.

#### 2. Unstructured External Documents

- **Wikipedia Connector:** Fetches summaries from Wikipedia by calling the Wikipedia API.
- **Google Search Connector:** Uses the googlesearch library to retrieve URLs and then scrapes content from those URLs using requests and BeautifulSoup.
- For each external source, large text blocks are chunked into 500-character segments. This ensures that only relevant excerpts are passed to the LLM and prevents excessively large context blocks.

### Vectorization and Indexing

#### 1. Embedding Model

- A SentenceTransformer model (all-MiniLM-L6-v2) encodes each piece of text (both from the proprietary dataset and external sources if we choose to index them) into high-dimensional embeddings.

#### 2. Vector Database (FAISS)

- The embeddings are stored in a FAISS index (faiss\_index.index).
- A separate NumPy array file (embeddings.npy) stores the raw embeddings on disk.

#### 3. BM25 for Complementary Retrieval

- In addition to vector retrieval, BM25Okapi is used to ensure that classic lexical matching complements the vector-based similarity. This is known as **hybrid search**, combining semantic similarity with token-based ranking.

### Retrieval Pipeline

#### 1. Query Embedding & Vector Similarity

- When a user makes a query, the system encodes the query into an embedding and searches the FAISS index for the top-k candidates.

- The same query is also tokenized and used to compute BM25 scores on the entire corpus.
- The top results from both methods are combined and deduplicated, ensuring the final top-k results are a balanced mix of semantic and lexical matches.

## 2. External Content Fetch & Chunking

- The pipeline concurrently fetches external sources (Wikipedia, Google-search-based web content).
- These external texts are chunked into 500-character pieces. Each chunk is stored with the metadata of its source, URL, and title. This makes the final “retrieval set” more fine-grained.

## 3. Factual Consistency

- The system merges:
  1. Internal data from the restaurant dataset.
  2. External data from Wikipedia or other websites.
- A final “prompt” is built by concatenating these different blocks of text. The user query is appended, along with instructions on how to reference sources.

## LLM Integration & Prompt Engineering

### 1. System/Instruction Prompt

- The code builds a prompt that includes each chunk of text labelled with a bracketed reference.
- The user query is added afterward, along with guidelines:
  - Cite sources with reference numbers.
  - Distinguish facts from opinions.
  - Compare prices to category averages.
  - Include relevant menu items from the dataset and external context.
  - Handle conflicting information gracefully.

### 2. Chain-of-Thought vs. Final Output

- Although minimal chain-of-thought is shown, the code constructs a single prompt that provides the relevant context to the LLM.
- The LLM sees enough textual context to produce a factual, well-grounded answer, citing references.
- If the external or internal data is lacking or contradictory, the LLM’s final instructions prompt it to offer disclaimers or clarifications rather than guess.

## References & Source Tracking

### 1. Internal References

- For proprietary data, references include item\_id and relevant textual snippets so the user can see which row of the dataset the LLM used.

### 2. External References

- For each external chunk, the system keeps track of the source (Wikipedia, web), the URL, and any metadata like title.
- In the final response, the user can optionally view the references to see where the LLM got its information.

## Scalability & Future Extensions

### 1. Larger Datasets

- The code uses FAISS for vector search, which easily scales to millions of documents.
- The BM25 approach can also handle large corpora with efficient inverted indices.

### 2. Real-Time Ingestion

- New data can be vectorized and added to the FAISS index incrementally (FAISS supports adding vectors to an IndexFlatL2, although for very large scale, advanced indexing structures might be needed).
- For external real-time news or websites, a queue-based approach with periodic re-indexing can be adopted.

### 3. Caching Embeddings & Connectors

- The code already includes caching for embeddings and data with local pickle and NumPy files.
- Future updates could incorporate more advanced caching or versioning strategies for frequently updated datasets.

# Outputs:

This is LA not in our dataset

Ask about restaurants, menus, or food trends:

Which restaurants in Los Angeles offer dishes with Impossible Meat?

Expert Analysis

Based on the provided sources, several restaurants in Los Angeles offer dishes with Impossible Meat. One example is Tony's Darts Away, where they serve an Impossible Burger on a veggie bun. Another example is PDT's Crossroads, where they offer Impossible Meat in the form of cigars (Source: [Web: These LA restaurants are taking Impossible Meat dishes to the next ... (https://www.eater.com/story/los-angeles-impossible-meat-restaurants/12345678)]. In addition, the Yelp search for top 10 best impossible meat near Los Angeles, California did not provide a definitive list due to the need to enable JavaScript and disable any ad blockers. Lastly, it's worth mentioning that while these dishes are primarily marketed towards vegetarians and vegans, they are also appealing to 'flexitarians' looking to decrease their meat consumption.

Source References

Menu Items

ID 25649296: Restaurant: cafe la taza | Category: specialty sandwiches | Item: cheeseburger | Description: all-natural beef patty on a burger bun, aioli, lettuce, tomatoes, onion, pickles, with potato chips, fries...

ID 24394226: Restaurant: fort point valencia | Category: main | Item: impossible cheeseburger | Description: impossible vegetarian burger patty, sharp cheddar "american" cheese, lettuce, tomato, pickle, special sauce...

ID 25655564: Restaurant: la taqueria | Category: salads | Item: carne asada salad | Description: grilled perfection meets fresh greens | Ingredients: steak | Address: 2889 Mission St, San Francisco | Price: \$\$ | Rating: 4.5

ID 25655578: Restaurant: la taqueria | Category: salads | Item: ground beef salad | Description: savory, satisfying, and packed with protein | Ingredients: cheese | Address: 2889 Mission St, San Francisco | Price: \$ | Rating: 4.5

This is San Francisco, note that SF is also recognised

Ask about restaurants, menus, or food trends:

Which restaurants in SF offer dishes with Impossible Meat?

Expert Analysis

Based on the verified sources provided, here are some restaurants in San Francisco that offer dishes with Impossible Meat:

- Adam's Grub Shack (1136 Valencia St) offers a vegetarian dish called "Groot" (Menu Item 24391518). The dish consists of an Impossible patty topped with sharp American cheese, lettuce, tomato, and pickles on a bun.
- Fort Point Valencia (address unavailable in provided source) offers an item called "Impossible Cheeseburger" (Menu Item 24394226). The description states that it includes an Impossible patty, sharp cheddar cheese, lettuce, tomato, pickle, and special sauce.
- Precita Park Cafe (500 Precita Ave) offers a vegan burger made with Impossible meat, which can be paired with fries, fruit, or other sides (Menu Item 24396813). The dish is rated 4.5 stars.

It's worth noting that there are many other restaurants in San Francisco that offer plant-based or faux-meat dishes, as indicated by the Reddit post you provided. However, the specific information about Impossible Meat is limited to the sources provided.

When comparing prices, it's important to note that prices for dishes with Impossible meat appear to be similar to other vegetarian and vegan dishes at these restaurants. The average price for a burger with Impossible meat is around \$12-\$14.

As for conflicting information, it's worth mentioning that the Yelp review of Impossible Foods in San Francisco indicates that the restaurant itself does not serve food, but rather provides a space for customers to prepare their own Impossible Meat dishes.

Overall, the restaurants mentioned above offer dishes with Impossible Meat and are rated favorably by customers. However, it's always a good idea to check the individual restaurant's website or call ahead to confirm the availability of these dishes.

Source References

This is in Chicago

Ask about restaurants, menus, or food trends:

Find restaurants near me that serve gluten-free pizza

Expert Analysis

To find restaurants near you that serve gluten-free pizza, I recommend using the following resources:

1. Download the Find Me Gluten Free app (Source: [Web: Gluten-Free Pizza in Chicago - 2025 \(https://www.findmeglutenfree.com/us/il/chicago/pizza\)](#)), last updated January 2025.

2. Check out the Top 10 Best Gluten Free Pizza options in Chicago, IL according to Yelp as of 2025 (Source: [Web: TOP 10 BEST Gluten Free Pizza in Chicago, IL - Updated 2025 - Yelp](#))

3. Explore gluten-free pizza options on Slice, which offers a list of gluten-free pizza places in Chicago (Source: [Web: Find Gluten Free Pizza Places in Chicago - Slice \(https://sl](#)

- 3737 N Western Ave, Chicago, IL 60618

- 1149 W Diversey Pkwy, Chicago, IL 60614

- 3047 W 111th St, Chicago, IL 60655

- 3349 N Sheffield Ave, Chicago, IL 60657

- 2105 N 95th St, Chicago, IL 60643

- 2477 N Broadway St, Chicago, IL 60657

- 8342 Grand Ave, Chicago, IL 60171

- 5544 N Milwaukee Ave, Chicago, IL 60630

- 5350 N Broadway, Chicago, IL 60640

- 10314 S Halsted St, Chicago, IL 60628

- 5133 S Cicero Ave, Chicago, IL 60632

- 800 N Dearborn St, Chicago, IL 60610

- 6021 S Archer Ave, Chicago, IL 60638

- 1180 W Granville

- 1885 N Harlem Ave, Chicago, IL 60707

It's important to note that while we have provided menu items from two restaurants in San Francisco, the information does not directly apply to Chicago-based gluten-free pizza options.

This is San Francisco

Ask about restaurants, menus, or food trends:

Find restaurants in San Francisco that serve gluten-free pizza

Expert Analysis

There are several restaurants in San Francisco that offer gluten-free pizza options. Here are a few options based on verified sources:

1. 20 spot (ID: 24932121): This restaurant serves a corn pizza with mushrooms, green onions, garlic cream, basil, and gruyere, among other ingredients. The price is \$\$, which is with

2. Beretta Valencia (ID: 24392010): This restaurant serves a calzone with ingredients such as pizza tomato sauce, scarmoza, Italian sausage, kale, caramelized onion, and calabrese o

In addition to these menu items, here are some restaurants that specialize in gluten-free pizza in San Francisco:

1. Marin Pizza Company (ID not provided): This pizzeria has four locations - Mill Valley, San Jose, Lafayette, and Danville - and takes gluten-free eaters seriously by offering a se

2. PizzaHacker (ID not provided): Located in the Outer Sunset neighborhood, this spot offers tons of gluten-free options, including pizza cooked in a brick oven (reference number 4).

It's worth noting that while these crusts are gluten-free, cross-contamination with glutinous ingredients is a risk in many of these kitchens, as mentioned on Eater SF (reference num

Sources:

1. Reddit - Best gluten-free pizza in SF? : r/sanfrancisco - <https://www.reddit.com/r/sf/comments/6z85g4/best\_gluten\_free\_pizza\_in\_sf/>

2. Eater SF - 15 Places For Gluten-Free Pizza in the Bay Area - <https://sf.eater.com/maps/best-gluten-free-pizza-sf-bay-area>

3. Personal observation of menu items at 20 spot and Beretta Valencia.

Source References

Menu Items

ID 24932121: Restaurant: 20 spot | Category: pizza | Item: corn | Description: mushrooms, green onions, garlic cream, basil, gruyere | Ingredients: corn | Address: 2055 20th St, San Francisco | Price: \$\$ | Rating:

Ask about restaurants, menus, or food trends:

Give me a summary of the latest trends around desserts in San Francisco

Expert Analysis

According to the Economist's article "Top 24 Desserts in San Francisco" ([Web: Top 24 Desserts In San Francisco - Economist \(https://cms.gmat.economist.com/top-24-desserts-in-san-fr](#)

In terms of menu items, Belmar - La Gallinita Meat Market offers tacos ([Menu Item 24391965](#)) filled with ingredients such as beef, cheese, lettuce, onion, and salsa at an average |

Regarding the broader dessert trend in San Francisco, the Economist's article emphasizes the city's passion for confectionery artistry and its melting pot of flavors and culinary tra

It is worth noting that Belmar - La Gallinita Meat Market, while offering a Mexican dish that could be considered a dessert-like item, is not primarily known for its desserts. San Fr

In conclusion, the latest trends around desserts in San Francisco showcase a wide array of sweet offerings that cater to both traditional and innovative palates. While Belmar - La G

Source References

Menu Items

ID 24391965: Restaurant: belmar - la gallinita meat market | Category: main | Item: tacos | Description: mexican dish composed of a tortilla folded around a filling. | Ingredients: beef | Address: 2909 24th St, Sa...

ID 24391965: Restaurant: belmar - la gallinita meat market | Category: main | Item: tacos | Description: mexican dish composed of a tortilla folded around a filling. | Ingredients: cheese | Address: 2909 24th St, ...

ID 24391965: Restaurant: belmar - la gallinita meat market | Category: main | Item: tacos | Description: mexican dish composed of a tortilla folded around a filling. | Ingredients: lettuce | Address: 2909 24th St, ...

Ask about restaurants, menus, or food trends:

What is the history of sushi, and which restaurants in SF are known for it?

### Expert Analysis

The history of sushi can be traced back to Japan, where it originated as a method of preserving fish using fermented rice. However, the introduction of sushi to the United States is fast forward to modern times, San Francisco is home to several restaurants known for their sushi offerings. One such establishment is cha-ya san francisco. On their menu, they offer While cha-ya san francisco is a standout in San Francisco's sushi scene, it's important to acknowledge that conflicting information exists regarding the history of sushi in the U.S.

#### Source References

##### Menu Items

ID 24392519: Restaurant: cha-ya san francisco | Category: sushi | Item: medium sized rolls (6 pcs) | Description: vegan. | Ingredients: carrots | Address: 762 Valencia St, San Francisco | Price: \$\$ | Rating: 4.0 | ID: 24392519: Restaurant: cha-ya san francisco | Category: sushi | Item: medium sized rolls (6 pcs) | Description: vegan. | Ingredients: nori | Address: 762 Valencia St, San Francisco | Price: \$\$ | Rating: 4.0 | ID: 24392519: Restaurant: cha-ya san francisco | Category: sushi | Item: medium sized rolls (6 pcs) | Description: vegan. | Ingredients: rice | Address: 762 Valencia St, San Francisco | Price: \$\$ | Rating: 4.0 | ID: 24392525: Restaurant: cha-ya san francisco | Category: sushi | Item: small rolls (6 pcs) | Description: vegan. | Ingredients: carrot | Address: 762 Valencia St, San Francisco | Price: \$\$ | Rating: 4.0 | ID: 24392525: Restaurant: cha-ya san francisco | Category: sushi | Item: small rolls (6 pcs) | Description: vegan. | Ingredients: nori | Address: 762 Valencia St, San Francisco | Price: \$\$ | Rating: 4.0 | ID: 24392...

##### External Sources

## Restaurant Intelligent Assitant

Ask about restaurants, menus, or food trends:

Compare the average menu price of vegan restaurants in San Francisco vs. Mexican restaurants

### Expert Analysis

To answer your query, I will compare the average menu price of vegan restaurants in San Francisco vs. Mexican restaurants based on the provided sources and additional research.

First, let's look at El Jacal Mexican Grill, which offers a soup of the day (item 24393788). Since the prices are not specified for this item, we cannot use it for comparison purposes.

Now let's consider the pricing at vegetarian restaurants in general, as discussed on Reddit (reference number: 1). It was noted that some people feel it's unfair when vegetarian options are priced higher than non-vegetarian options. For comparison purposes, let's look at average prices for vegan restaurants in San Francisco. Unfortunately, specific price data was not available for the sources provided; however, in conclusion, based on the provided sources and additional research, it appears that:

1. Vegan Mexican dishes at El Jacal Mexican Grill may have a similar price range as their non-vegan counterparts (reference number: 2). However, without specific prices, we cannot compare.
2. Vegetarian pricing at restaurants can be a contentious issue, with some feeling that vegetarian options should be priced lower when ingredients are removed without adding anything.
3. The average cost of a meal at vegan restaurants in San Francisco can range from \$18 - \$25 (unreferenced, based on VeganEasy data).

It's important to note that the pricing at individual restaurants may vary, and this comparison only provides a general idea of the cost differences between vegan and Mexican restaurants.

#### Source References

##### Menu Items

## Restaurant Intelligent Assitant

Ask about restaurants, menus, or food trends:

How has the use of saffron in desserts changed over the last year, according to restaurant menus or news articles?

### Expert Analysis

Based on the provided information, it appears that there has been an increase in the use of saffron in desserts over the last year due to various factors such as changes in restaurant menus and external context.

1. Menu Items: We have seen an increase in the number of desserts that incorporate saffron on various restaurant menus. For instance, one example is the "Kesar Pista," a traditional Indian dessert.
2. External Context: Articles from Nation's Restaurant News highlight that chefs are finding new ways to use saffron in sweet foods due to its increasing popularity (Web 2). However, the cost of saffron remains a challenge.
3. Comparing Prices: Without specific pricing information for these particular desserts or the average cost of desserts, we cannot directly compare the price increases resulting from the use of saffron.
4. Acknowledging Conflicting Information: The sources provided acknowledge that opinions on the quality and origin of saffron can vary among chefs, but they also share a common interest in using it in desserts.
5. Inclusion: The answer includes both menu items found in restaurant menus as well as external context from news articles discussing the use of saffron in desserts and the challenges associated with it.

#### Source References

##### Menu Items

ID 24391561: Restaurant: antigua guatemala restaurant | Category: postres / desserts | Item: plátano en mole / banana in mole | Description: este postre tiene sus orígenes a mediados del siglo xvi fue entonces cuando se comenzó a utilizar el saffron en los postres. ID 24391561: Restaurant: antigua guatemala restaurant | Category: postres / desserts | Item: plátano en mole / banana in mole | Description: este postre tiene sus orígenes a mediados del siglo xvi fue entonces cuando se comenzó a utilizar el saffron en los postres.



# Restaurant Intelligent Assitant

Ask about restaurants, menus, or food trends:

Restaurants that use saffron in the bay area

## Expert Analysis

Restaurants in the Bay Area that use saffron as an ingredient in their dishes include:

1. Blue Plate (ID: 26085136) - This restaurant, located at 3218 Mission St, San Francisco, offers a pan roasted rockfish entree with soupy rice in tomato-saffron broth, green garlic,
2. Deccan House (ID: 24393265) - This restaurant located at 1142 Valencia St, San Francisco serves a Deccan special biryani in a large tray suitable for 16-20 guests. The dish is se
3. Espertento (ID: 26083625) - This restaurant at 3295 22nd St, San Francisco offers albondigas, a meatball stew with saffron. Additionally, they have a paella de carnes y mariscos,
4. External Context - There are other restaurants in the Bay Area that also use saffron, but the provided sources did not provide specific information about their menu items and pric

It's important to note that prices may vary depending on the specific dish, portion size, and restaurant location within the Bay Area. Additionally, while saffron is a key ingredient  
In terms of opinions, the ratings provided by Yelp users offer insight into customers' experiences with these restaurants and their dishes containing saffron. However, it is essenti

Source References

Menu Items

ID: 26085136: Restaurant: blue plate | Category: entrees | Item: pan roasted rockfish | Description: soupy rice in tomato-saffron broth, green garlic, fava beans, escarole, black olive vinaigrette | Ingredient: ...