LetsEat

LetsEat: Technical Design

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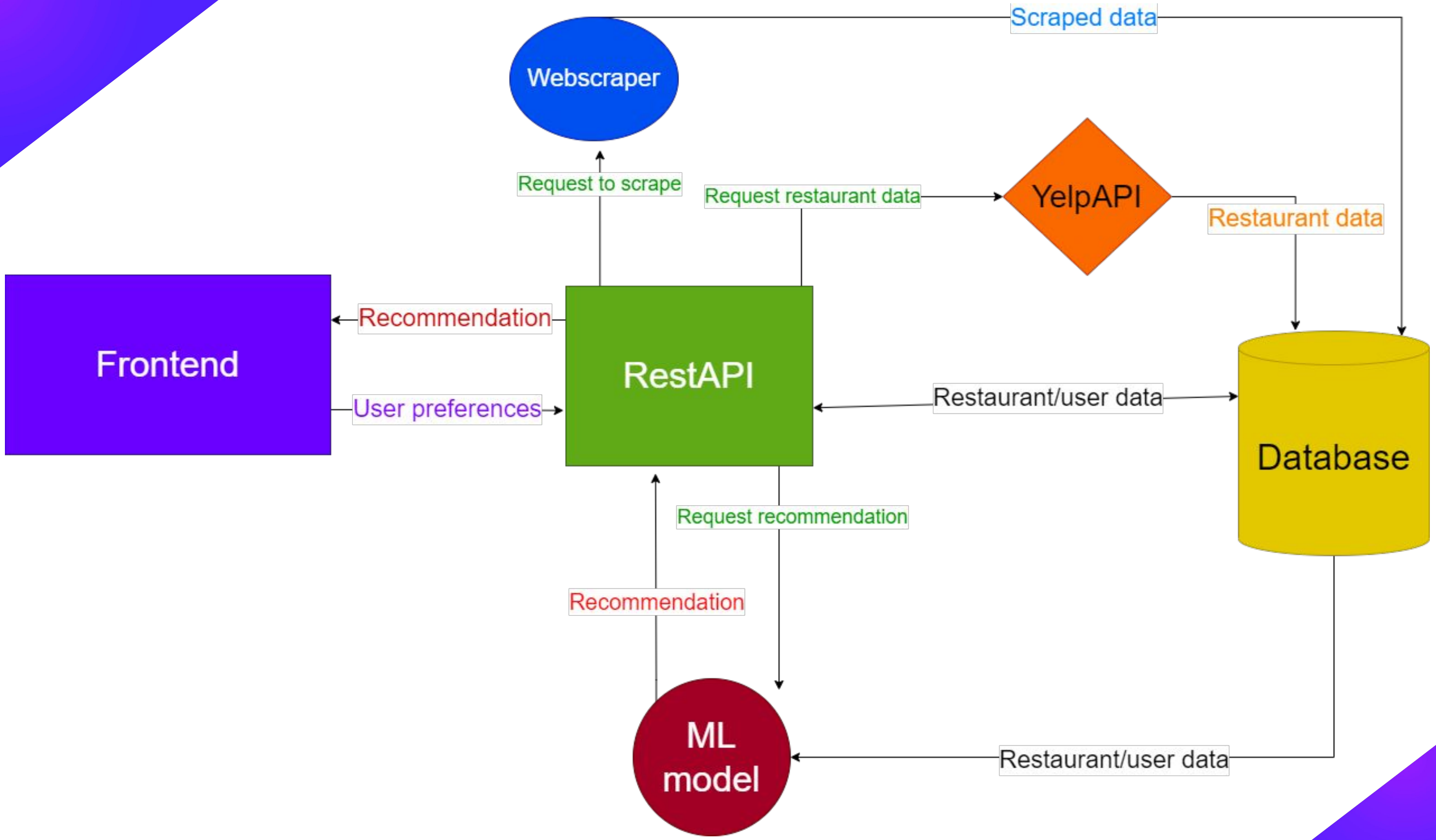
01.

Summary

LetsEat is a restaurant recommendation application that utilizes machine learning to quickly generate a **single personalized recommendation** based on the user’s input.

02.

System Architecture


Scraped data
Webscraper
Request to scrape
Request restaurant data
YelpAPI
Restaurant data
Frontend
Recommendation
RestAPI
User preferences
Restaurant/user data
Database
Request recommendation
Recommendation
ML
model
Restaurant/user data

2.1

Frontend: Web App

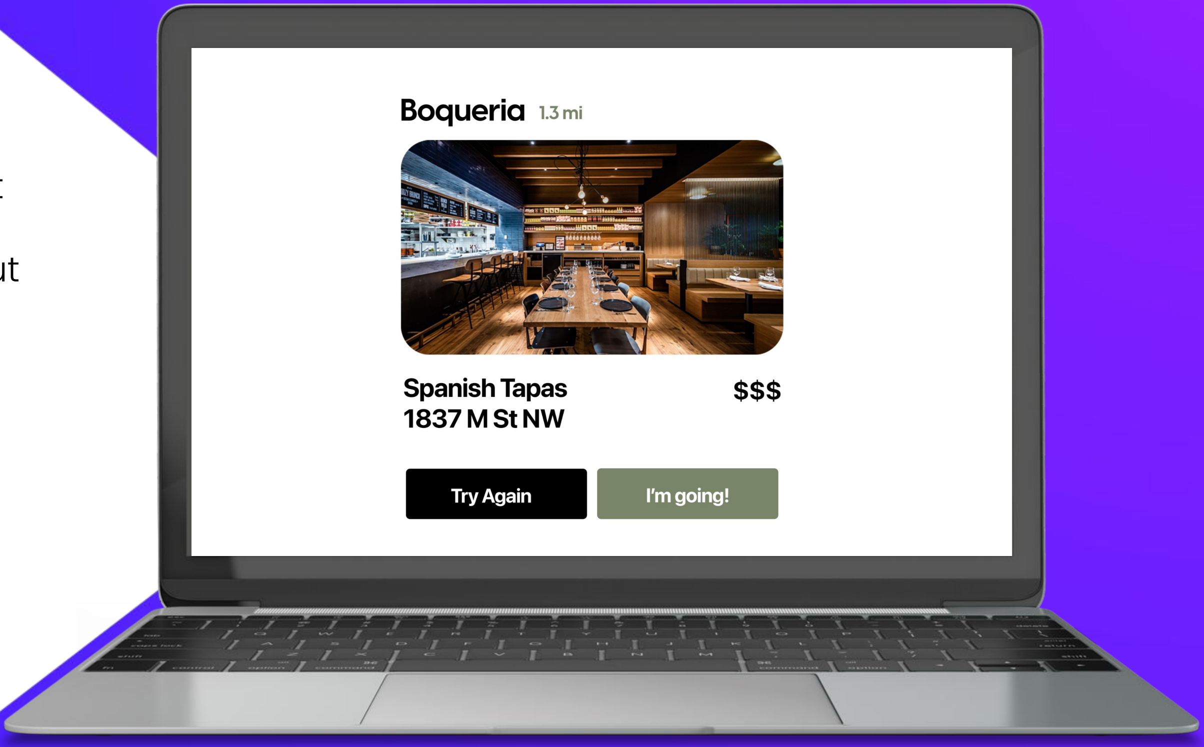
Technologies

REACT, Bootstrap

FRONT END

The **LetsEat** platform is built on the **REACT** library with **BootStrap** for styling. We put importance on having a modern and minimal user interface.

The user experience on our website is designed to be **seamless** so that the user can **quickly and easily** receive a restaurant recommendation.



Boqueria 1.3 mi

Spanish Tapas
1837 M St NW

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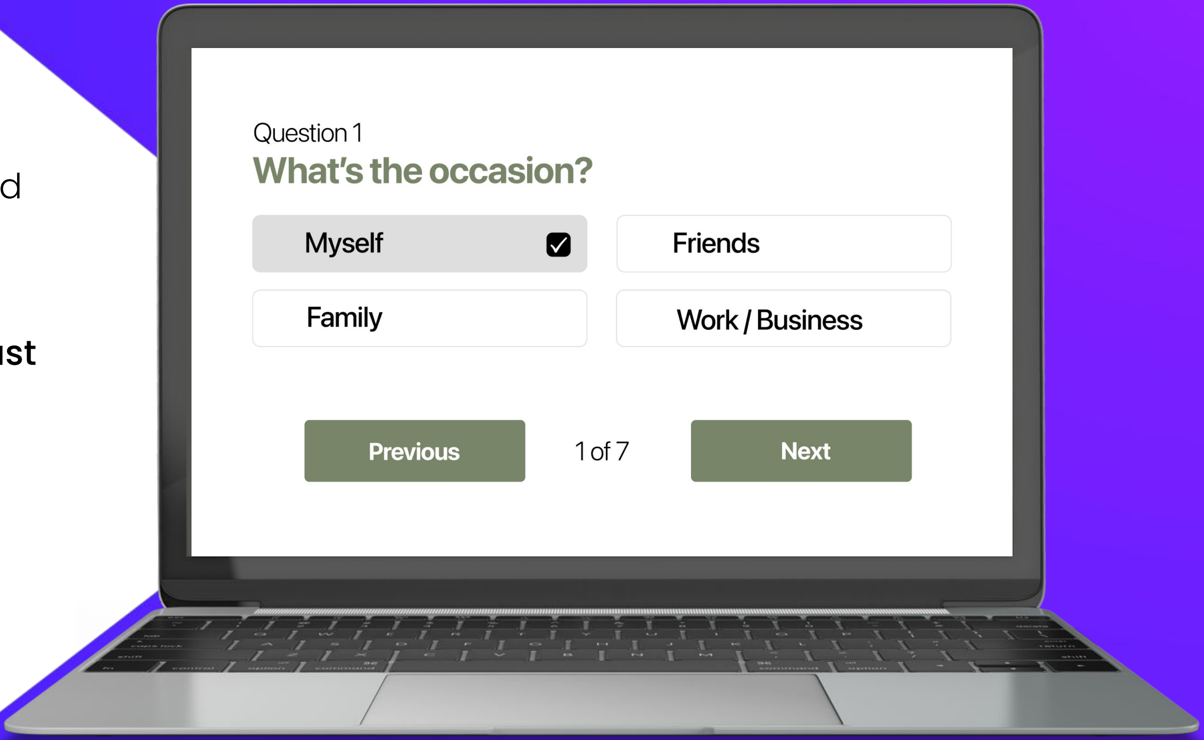
FRONT END

The REACT frontend will send and receive data with the backend, such as the questionnaire and user answer choices, through **Fast API** which will be discussed further in the backend portion.



Question 1

What’s the occasion?

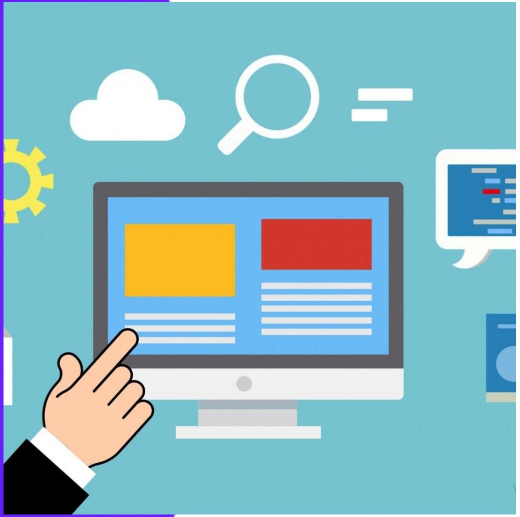
- Myself ☑
- Friends
- Family
- Work / Business

2.2

Backend: Web Server

Technologies

FastAPI, MySQL, PyTest, OAuth



What is the Web Server?

Will host all the Backend Logic

Connects the front end application to all the functional aspects of the website, such as logging in and picking a restaurant.

Storage of User Information

Users will login through the server and have their profile information saved.

How will the Web Server be built?

FastAPI

- Will host API endpoints
- Connected to REACT app
- Receives and sends info

MySQL

- Stores user information
- Logins, cuisine preferences, dietary restrictions

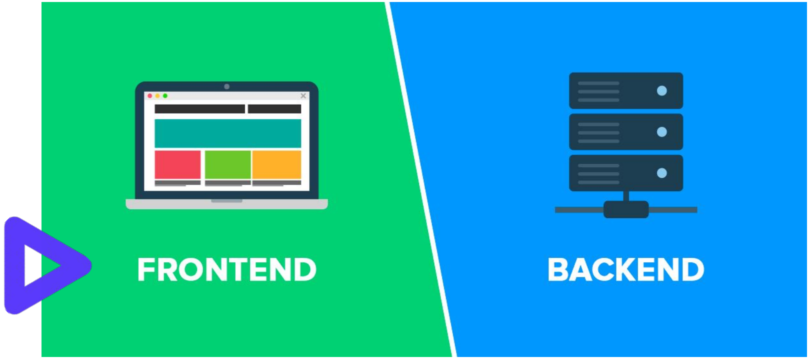
PyTest

- Test driven framework
- All pushed code must pass local tests

OAuth

- Allows users to create accounts easily
- Can connect directly to Google, Facebook

What challenges will arise?



Integration

Making sure the REACT App successfully sends and receives information from FastAPI.

Machine Learning

Testing and ensuring calls to the machine learning functions are quick and concise.

2.3

Backend: Data Collection

Technologies

Yelp API, Selenium WebDriver, Vader Sentiment Analysis, MySQL

Challenges with getting the data

01.

Getting Real Users

Training the ML model requires a lot of information from a lot of users

02.

Getting Enough Restaurant Data

Training the ML model requires a lot of information about the restaurant

03.

Speed

The aforementioned data is online, but getting it is slow

04.

Formatting the Data

What will the data look like at each step?

Collecting Data

Yelp API

Get list of restaurants that meet general specifications of user (like location, allergies)

Get details of a specific restaurant

Selenium WebDriver

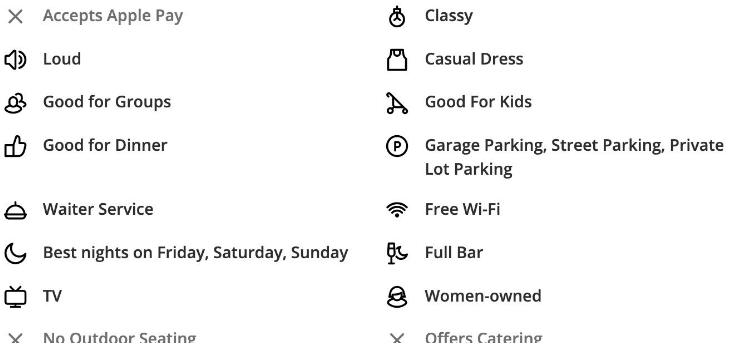
Web scrape Yelp Restaurant Website to get atmospheric attributes

Web scrape User Reviews to determine experience from content/keywords

Vader Sentiment Analysis & MySql

Vader: Use Sentiment Analysis to determine value based on review

MySql: Store all scraped data



✕ Accepts Apple Pay

Loud

Good for Groups

Good for Dinner

Waiter Service

Best nights on Friday, Saturday, Sunday

TV

✕ No Outdoor Seating

Classy

Casual Dress

Good For Kids

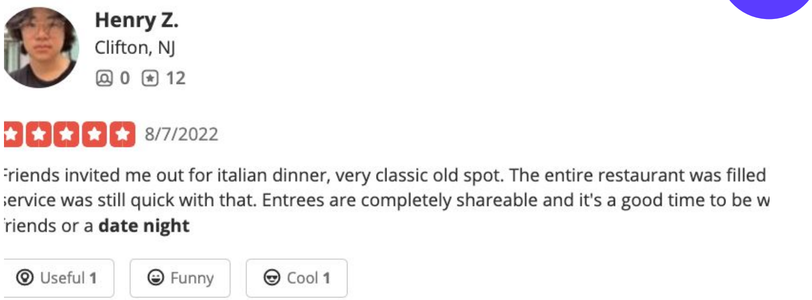
Garage Parking, Street Parking, Private Lot Parking

Free Wi-Fi

Full Bar

Women-owned

✕ Offers Catering



Henry Z.
Clifton, NJ
0 12

★★★★★ 8/7/2022

Friends invited me out for italian dinner, very classic old spot. The entire restaurant was filled service was still quick with that. Entrees are completely shareable and it's a good time to be w friends or a **date night**

Scraped Restaurant Data

Good for Dinner, Good for Groups, Good for Kids, Casual Dress

Scraped User Data

Henry had a positive experience at the restaurant for date night

2.4

Backend: Machine Learning

Technologies

Python, Scikit Learn, PyTorch, Numpy,
Jupyter Notebook

Machine Learning

How it Works

- Model will take in **answers of users** and **features of restaurants**
- Matches the users and restaurants
- Based on **model training** and **embeddings**

Content Filtering

- Find restaurants based for a user based on what they previously liked
- **History-based**

Collaborative Filtering

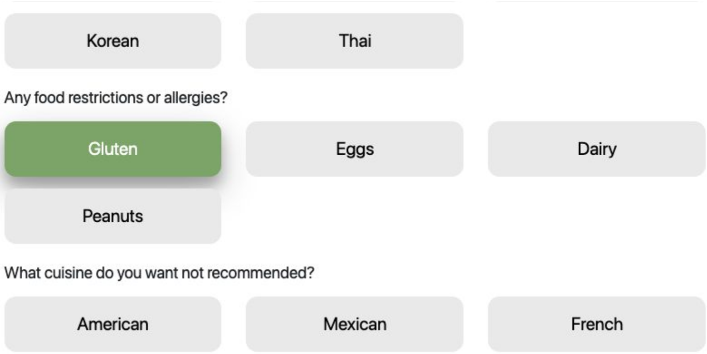
- Find restaurants for a user based on what similar users liked
- **Similarity-based**

Challenges

- Deciding between **matrix factorization** and **decision tree** models
- Making sure model can interpret data correctly

03.

Alpha Prototype

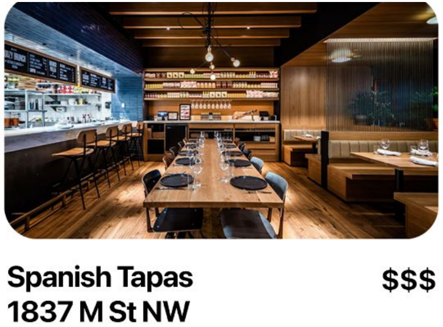

Korean | Thai

Any food restrictions or allergies?

[✓ Gluten] | Eggs | Dairy | Peanuts

What cuisine do you want not recommended?

American | Mexican | French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Integrated, Working Application

- Able to create a profile
- Fill out the questionnaires
- Receive restaurant recommendation

Low Confidence Machine Learning Algorithm

- Model is chosen
- Model is integrated with application
- Low confidence suggestion is given

Thanks !

Questions?