

Introduction

Restaurant capacity and "crowdedness" can have tremendous impact on the quality of a dining experience, and affect wait time as well as service speed. While several technology services exist for the restaurant industry, a capacity measuring website is a relatively unexplored area.

The Restaurant Capacity Tracker site uses real time information from various Web APIs to estimate the current capacity of a restaurant. From a list of restaurants fitting the given specifications, the user may choose the best option from the calculated results to plan a convenient dining experience.

Project Structure

The site is built using JavaScript, HTML, and PHP. The site communicates with the Yelp API, Google Maps API, and OpenTable API to receive the following information about restaurants: address, cuisine type, and average rating from Yelp; estimated driving time from a given start location from Google Maps; and price range and reservation information from the OpenTable API.

Relevant information is stored in a SQLite database from which an algorithm is used to calculate the estimated capacity. The algorithm uses the time of day, type of restaurant, and capacity trends parsed from user reviews to determine a numerical estimate.

In addition the site uses an account system to customize the page for the user by prefilling known fields, and receives real-time user input on capacity to aid its calculations.

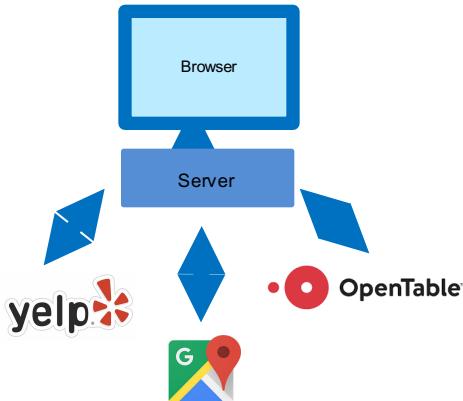


Fig. 1: The server communicates with APIs from Yelp, OpenTable and Google Maps to display the results in the browser.

Web Application for Optimizing Restaurant Experience

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Site Functionalities

After "Cuisine Type" and "Location" fields are submitted, the site returns a list of restaurants, with the option to alter the number displayed. The price range, average rating, Yelp page link and estimated driving time are displayed in columns, with each row comprising a restaurant. If the restaurant exists in the OpenTable database, a link to make a reservation is displayed.

Hi, Olivia. Here are French restaurants in Alexandria, VA:		
Show 10	Sort by	Start Location
Search	Rating	Yelp
Sort by	Distance	Yelp
Sort by	Capacity	Yelp
Sort by	Wait Time	Yelp
Sort by	Driving Time	Yelp
Sort by	Reserve	OpenTable
Le Refuge Restaurant	\$ Yelp: [4.0 / 5]	32 min to seat (27 mins traffic, 5 min wait)
Bastille	\$ Yelp: [3.5 / 5]	33 min to seat (28 mins traffic, 5 min wait)
Fontaine Caffe & Creperie	\$ Yelp: [4.0 / 5]	33 min to seat (29 mins traffic, 5 min wait)
La Bergerie	\$ Yelp: [3.5 / 5]	34 min to seat (31 mins traffic, 5 min wait)
Del Ray Cafe	\$ Yelp: [4.0 / 5]	36 min to seat (31 mins traffic, 5 min wait)
Bistro Royal	\$ Yelp: [4.0 / 5]	37 min to seat (32 mins traffic, 5 min wait)
Yves' Bistro	\$ Yelp: [3.5 / 5]	28 min to seat (28 mins traffic, 5 min wait)

Fig. 2: Screen capture of the restaurant results page.

Upon clicking on the "estimated driving time", shown in green, the user is directed to the traffic page where he or she can view the route from a given start location to the restaurant. Zooming capabilities and an option to toggle traffic display are also included. The "directions" button provides a list of step-by-step driving instructions through the Google Maps directions services.



Fig. 3: Screen capture of the traffic page, with options to view driving routes.

Site Functionalities (cont.)

The Login page allows users the option to access accounts and facilitates site usage by storing the name and "home location" of the user, and auto-fills these values into each search. A user can also report real time capacity value for a restaurant they may currently be at, represented as an integer from 1 (Least Crowded) to 5 (Extremely Busy), which is then used in the calculation algorithm.

Fig. 4: Screen capture of the form for real-time user-reported capacity.

Capacity Algorithm

The capacity is displayed as a waiting time in the application. Several factors are assigned number values, and a weighted average is scaled and translated into a time duration. The primary factors in the capacity algorithm are day of the week, with weekend and Friday as the busiest, and time of day, with evenings as the busiest. Past reviews are also parsed for key phrases and wait times. In the account system, users have the option to report real-time capacity information to the site, which is also used in the algorithm: the current time is checked with the time reported by the user, and the reported capacity is incorporated into the calculation.

Data Storage

Data for the Restaurant Capacity site is stored using an SQLite database, with tables for (1) User Account Information, (2) Restaurant Information, and (3) Reviews. For each account, the reviews contributed by that user are tracked by storing the keys of each review in an array field of the user.

Conclusions & Future Work

The application provides a streamlined view of real-time restaurant information, and aids the user in choosing a place to eat.

Future improvements include the creation of a more sophisticated calculation algorithm that more comprehensively incorporates past user reviews and time of day to detect capacity trends and yields closer estimations for capacity, in addition to recognizing exceptions for holidays, closings, etc. Load time of the results page can also be improved by caching previous searches and increasing code efficiency.