



THE BATTLE OF THE NEIGHBORHOODS

Finding Location Options for a New
Vegan Restaurant in Salt Lake City

Erin Cunningham

May 3, 2020

Table of Contents

Introduction	3
Background.....	3
Business Problem.....	3
Data	3
Zillow via Opendatasoft.com.....	3
Foursquare	Error! Bookmark not defined.
CityFeet.com.....	Error! Bookmark not defined.
Methodology.....	4
Libraries Used	4
Data Acquisition and Cleaning.....	4
Analysis	5
Libraries Used	Error! Bookmark not defined.
Results.....	6
Discussion	7
Conclusion.....	8
References	9

Introduction

Background

According to a 2019 Gallup poll, about 5% of Americans consider themselves vegetarian, and 3% consider themselves vegan. Those numbers have remained nearly unchanged for the last 20 years. While there has not been an increase in people committing to a meat-free diet, almost 1 in 4 Americans have cut back on meat consumption. Most respondents cited health concerns as the reason for the reduction.¹

Salt Lake City, UT is was recently named one of the ten best cities for vegetarians in America by Apartment Guide. The city ranked number 7 and was noted for its strong vegan presence.²

Business Problem

Since the demand for healthy, plant-based dining has increased, a local chef has decided to open a restaurant. This project is focused on narrowing down locations options for opening a vegan restaurant in Salt Lake City, UT, USA. With a limited marketing budget, she wants to be in an area where her target market already frequents. The goal is to find available real estate in neighborhoods with the most vegan-friendly restaurants.

Data

The factors that will influence her decision are the number of vegan-friendly restaurants in each Salt Lake City neighborhood, paired with a current listing of commercial real estate. Three sources of data are required to complete the analysis:

Neighborhood Boundaries

Under a Creative Commons license provided by Zillow, a GeoJSON file containing neighborhood location data for Salt Lake City, UT was downloaded from OpenDatasoft.com. This data file contains the coordinates of the neighborhood boundaries. With this information, neighborhoods will be assigned to the venues and real estate locations.³

Vegan-Friendly Restaurant Data

Through the use of the Foursquare API, a list of venues near Salt Lake City will be compiled. The results contain the venue name, the latitude and longitude coordinates, and the venue category.⁴

Available Commercial Real Estate Data

CityFeet.com was scraped for available commercial real estate that could be suitable for a restaurant in the city. The results contain the street address of the property, as well as the available square footage and price per square foot.⁵

Methodology

Python Libraries Used

The following python libraries required for data gathering and analysis are:

- **Pandas:** Similar to the two-dimensional structure of a spreadsheet, used to store and manipulate the data in a dataframe.
- **Numpy:** Adds support for multi-dimensional arrays and matrices, along with high-level mathematical functions.
- **JSON:** Used read and write JSON-encoded data.
- **Geojson:** Functions for encoding and decoding GeoJSON formatted data
- **Requests:** Used to send HTTP requests.
- **BeautifulSoup:** Used to scrape data from websites.
- **Geopandas:** Extends the datatypes used by pandas to allow spatial operations on geometric data.
- **Shapely:** Used to *perform geometric* operations.
- **Geopy:** Used to *locate* the coordinates of addresses.
- **Pyproj:** Used to place coordinate data at the appropriate location correctly.
- **Time:** Used to measure the time of lapsed seconds to aid with request timeouts.
- **Folium:** Used to create interactive maps.
- **Matplotlib:** Used to plot charts to analyze data.

Data Acquisition and Cleaning

As mentioned previously, the sources of data include Zillow, Foursquare, and CityFeet.com.

Zillow is a leading real estate marketplace and has compiled the boundaries for neighborhoods across the United States. The company has made this information available on [Opendatasoft.com](https://opendatasoft.com/). The GeoJSON file for Salt Lake City was converted into a Geopandas dataframe to define the boundaries for each neighborhood. The data remained unchanged.

Foursquare provided the list of vegan-friendly restaurants using the company's API. Since a list of vegan-friendly restaurants is desired, the search term "vegan" was applied to all venues, rather than filtering for only restaurants that Foursquare categorizes as "Vegetarian / Vegan." The query returns a list of restaurants that may not cater specifically to vegans but offer vegan menu items, along with latitude and longitude coordinates. The neighborhood of each venue was determined using the provided coordinates. If a venue fell out of bounds of Salt Lake City, it was removed from the dataset. Duplicate venues were also dropped, and the final venues dataframe was constructed.

CityFeet.com, a marketplace for commercial real estate, was scraped using BeautifulSoup to compile the available listings in Salt Lake City. Rather than latitude and longitude coordinates, the street address was provided. Geopy was used to find the latitude and longitude coordinates. As with the venues, those coordinates were used to determine the neighborhood of the property listing. The search was focused on retail

spaces in Salt Lake City, UT, but produced many results outside of the specified city. Listings outside of the city's boundaries were removed, and the final listings dataframe was constructed.

Data Exploration and Visualization

To understand where the vegan-friendly venues are located, the final venues dataframe was grouped by neighborhood and count. Foursquare categorizes some venues as "Vegetarian / Vegan" if the restaurant chooses to serve only that type of cuisine. A new dataframe with only this category was created to see if there is any difference in neighborhood locations between these restaurants and the ones who only have vegan options on their menus. The distribution of both vegan-friendly and vegetarian/vegan specific restaurants was plotted as horizontal bar charts with Matplotlib.

The final listings dataframe was filtered to contain only listings from the top 3 neighborhoods from the venue counts. A list of available properties within those neighborhoods was produced for the client.

To aid in visualizing where the property listings in relation to the neighborhoods, an interactive map is created using Folium. A choropleth map shows where the highest concentrations of vegan-friendly restaurants are, and blue markers indicate the listings. Neighborhood names are displayed when the user hovers over the area. Clicking on the marker will identify the listing number.

Analysis

Of the 20 neighborhoods in Salt Lake City, 10 contain at least one vegan-friendly option. Because the goal is to find property locations with the highest presence of vegan-friendly restaurants, the total number of restaurants per neighborhood was tabulated (Table 1).

	Neighborhood	Venue Count
0	Downtown	13
1	Central City	12
2	People's Freeway	10
3	Sugar House	7
4	East Central	5
5	Central City-Liberty Wells	3
6	Liberty Wells	3
7	Westpointe	3
8	Fairpark	1
9	Jordan Meadows	1

Table 1: Count of vegan-friendly restaurants by neighborhood.

After analyzing the distribution of vegan-friendly (Figure 1) and vegetarian/vegan specific (Figure 2) venues, it is apparent that the same three neighborhoods have the highest concentration of both. Although, it is worth noting that Downtown has the most vegan-friendly venues, while People's Freeway has the most vegetarian / vegan venues.

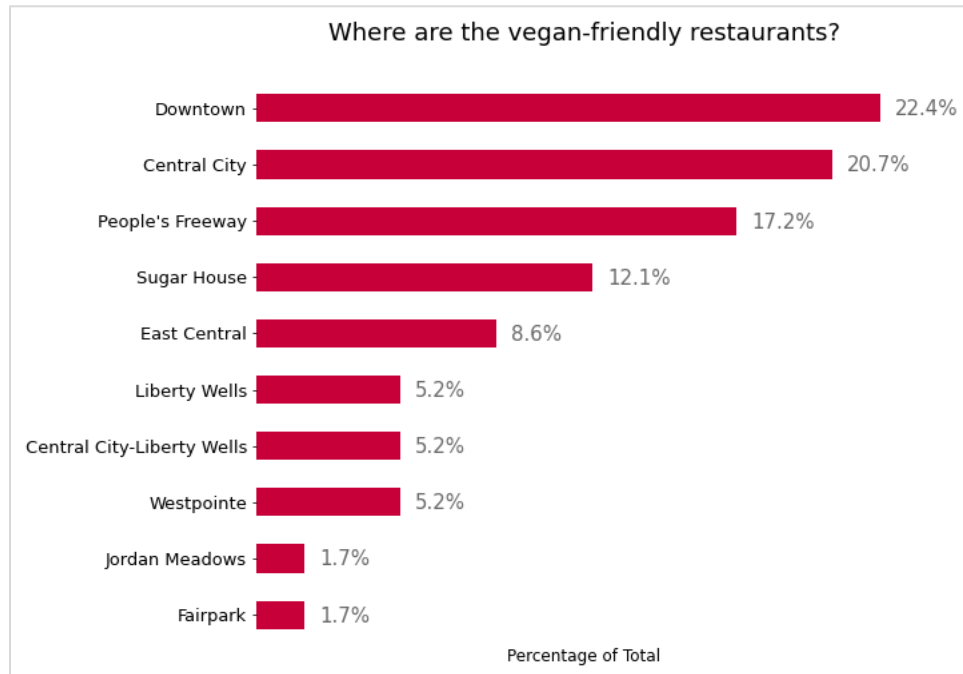


Figure 1: Distribution of vegan-friendly restaurants in Salt Lake City neighborhoods.

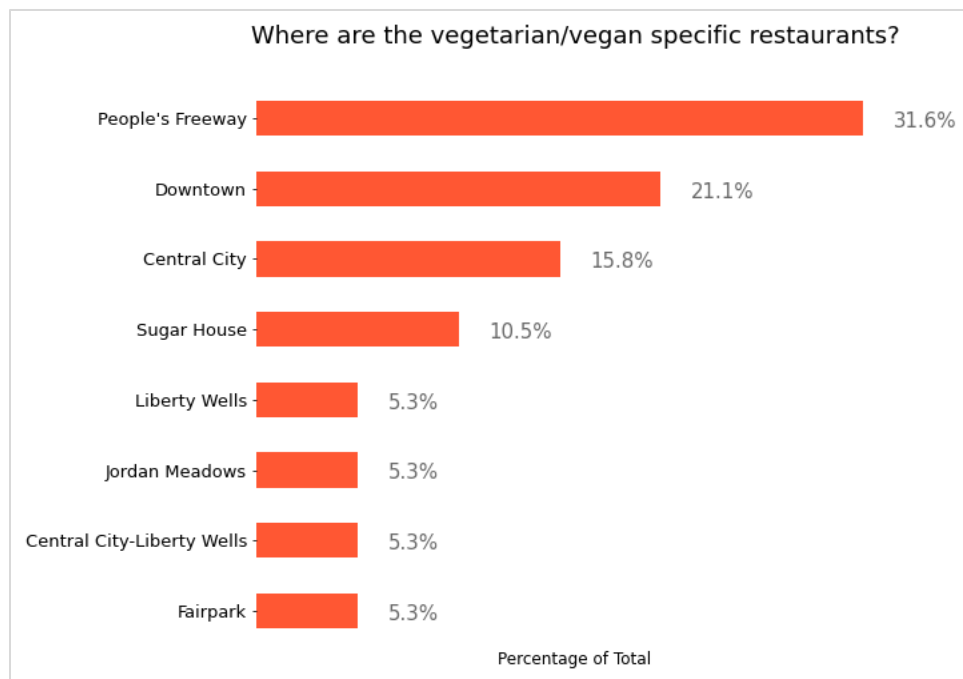


Figure 2: Distribution of vegetarian/vegan specific restaurants in Salt Lake City neighborhoods.

Results

Upon narrowing down the top 3 neighborhoods, the property listings for available real estate shrink from 15 (Table 2) to 7 listings provided to the client (Table 3 and Figure 3).

	Listing_ID	StreetAddress	Neighborhood
0	100	613 E 400 S	Central City
1	103	1107 S State St	People's Freeway
2	105	965 E 900 S	East Central
3	106	979 S State St	People's Freeway
4	109	6151-6191 S Highland Dr	Sugar House
5	110	161 W 900 S	Glendale
6	112	969 S 300 W	People's Freeway
7	117	3737 S 900 E	Sugar House
8	118	365 Paxton Ave	People's Freeway
9	120	122 S Main St	People's Freeway
10	122	1324 S 2100 E	Bonneville Hills
11	123	3615 S Redwood Rd	Glendale
12	125	1030 E 2nd Ave	Greater Avenues
13	126	110 W 900 S	People's Freeway
14	129	3330 S 5600 W	Poplar Grove

Table 2: Commercial real estate listings in Salt Lake City.

	Listing_ID	Neighborhood	Price	Size	FullAddress
0	100	Central City	40.00–45.00 /Sq Ft/yr	1,800 - 2,455 Sq Ft	613 E 400 S, Salt Lake City, UT 84102
1	103	People's Freeway	\$10.00 /Sq Ft/yr	3,485 Sq Ft	1107 S State St, Salt Lake City, UT 84111
2	106	People's Freeway	\$19.50 /Sq Ft/yr	11,218 - 15,956 Sq Ft	979 S State St, Salt Lake City, UT 84111
3	112	People's Freeway	\$17.00 /Sq Ft/yr	1,986 - 2,257 Sq Ft	969 S 300 W, Salt Lake City, UT 84101
4	118	People's Freeway	\$24.00 /Sq Ft/yr	1,000 - 4,591 Sq Ft	365 Paxton Ave, Salt Lake City, UT 84101
5	120	People's Freeway	\$22.50 /Sq Ft/yr	2,400 Sq Ft	122 S Main St, Salt Lake City, UT 84101
6	126	People's Freeway	\$26.50 /Sq Ft/yr	1,204 - 1,962 Sq Ft	110 W 900 S, Salt Lake City, UT 84101

Table 3: Real estate listings provided to the client.

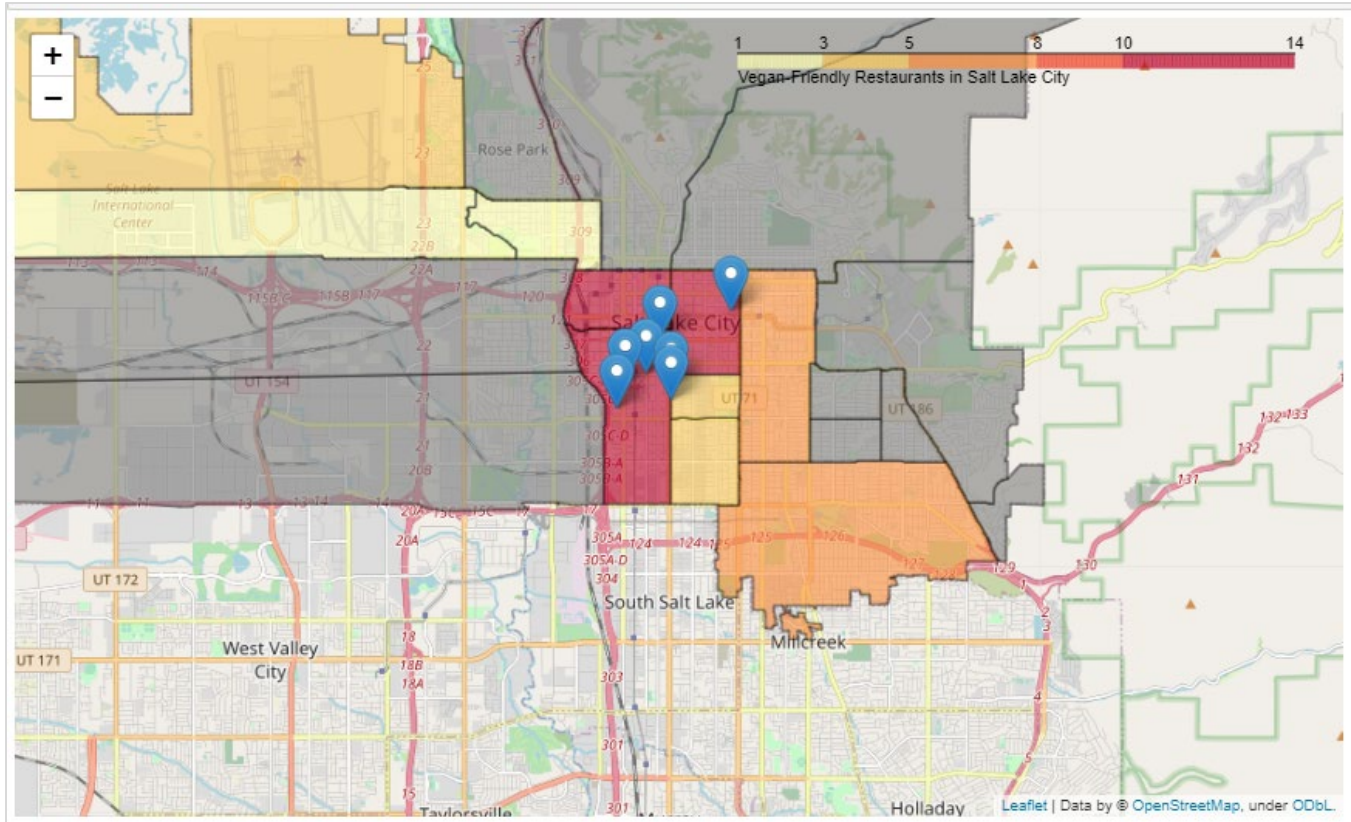


Figure 3: Map of listings provided to the client.

Discussion

Results of the analysis show that People's Freeway is the neighborhood with the most vegetarian/vegan restaurants and the most property listings. While the goal of finding locations in the specified neighborhoods was met, the number of locations is limited.

Conclusion

The goal of this project was to find possible commercial real estate locations for a new vegan restaurant in Salt Lake City. Since the client wants to be located near other vegan or vegan-friendly restaurants, the neighborhoods with the highest concentration of those types of restaurants were identified. Available property listings in those neighborhoods were found. Should the client not like the properties identified, the same process can be followed as listings update on the marketplace.

References

¹ McCarthy, J., & DeKoster, S. (2019, January 27). Nearly One in Four in U.S. Have Cut Back on Eating Meat. Retrieved April 30, 2020, from <https://news.gallup.com/poll/282779/nearly-on>

² Carbarry, B. (2019, January 17). The 10 Best Cities for Vegetarians in America. Retrieved April 30, 2020, from <https://www.apartmentguide.com/blog/best-cities-for-vegetarians/>

³ Zillow - US Neighborhoods. (n.d.). Retrieved April 30, 2020, from <https://data.opendatasoft.com/explore/dataset/zillow-neighborhoods@public/export/?refine.state=UT&refine.city=Salt+Lake+City&dataChart=eyJxdWVyaWVzIjpbeYJib25maWciOnsiZGF0YXNldCI6InppbGxvdy1uZWlnaGJvcmhvb2RzQHB1YmxpYyIsIm9wdGlbnMiOnsicmVmaW5ILnN0YXRlljoiVVQiLCJyZWZpbmUuY2I0eSI6IlnhbHQGTGFrZSBDaXR5In19LCJjaGFydHMiOiI7ImFsaWduTW9udGgiOnRydWUsInR5cGUiOiJib2x1bW4iLCJmdW5lIjoiQ09VTlQjLCJyZ2lbnRpZmliRGJzcGxheSI6dHJ1ZSwiY29sb3IiOiIjMTQyRTdCln1dLCJ4QXhpcyl6InN0YXRlliwibWF4cG9pbmRzIjo1MCwic29ydCI6IiJ9XSwidGltZXNjYWxlIjoiIiwzZGlzcGxheUxIZ2VuZCI6dHJ1ZSwiYWxpZ25Nb250aCI6dHJ1ZX0=>

⁴ Foursquare Developer. (n.d.). Retrieved April 30, 2020, from <https://api.foursquare.com/>

⁵ Salt Lake City Retail for Lease. (n.d.). Retrieved April 30, 2020, from <https://www.cityfeet.com/cont/salt-lake-city-ut/retail-space-for-lease>