Coursera Capstone

IBM Applied Data Science
Capstone

Opening a Seafood Restaurant in Houston

Final Report

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March 2021

1. Introduction

Houston is the most populous city in the U.S. state of Texas, fourth-most populous city in the United States, most populous city in the Southern United States, as well as the sixth-most populous in North America, with an estimated 2019 population of 2,320,268. Houston's demographics show that it is a large and ethnically diverse city. An estimated 600,000 illegal immigrants resided in the Houston area in 2017,comprising nearly 9% of the city's metropolitan population.

This final project explores the best locations for seafood restaurants throughout the city of Houston. The seafood diet is based on the principle of health and longevity. Seafood is not only tasteful and mouth-watering but also offers various health benefits. Now when the idea of a healthy lifestyle conquered the minds of people all over the country, seafood restaurants became extremely popular, as they offer a healthy alternative to regular American eating habits. That's why potentially the owner of the new East European restaurant can have great success and consistent profit. However, as with any business, opening a new restaurant requires serious considerations and is more complicated than it seems from the first glance. In particular, the location of the restaurant is one of the most important factors that will affect whether it will have success or a failure. So, my project will attempt to answer the questions “Where should the investor open a seafood restaurant?” and “Where should I go If I want great seafood?”

2. Business Problem

The objective of this Capstone project is to analyze and select the best locations in Houston to open a new seafood restaurant. Using Data Science methodology and instruments such as Data Analysis and Visualization, this project aims to provide solutions to answer the business question: Where do you suggest the successful investment to open a seafood restaurant? And where are the best seafood restaurants in Houston?

3. Target Audience of this project and some demographic facts

This project is particularly useful to developers and investors looking to open or invest in a seafood restaurant in the city of Houston. Overall, Houston is a great place to open a restaurant with an ethnical cuisine. With its diverse culture, comes diversity in the food items. There are many restaurants in Houston, each

belonging to different categories like Chinese, Indian, French, etc. Why did I decide to focus on seafood cuisine in my project? Now when the idea of a healthy lifestyle conquered the minds of people all over the country, seafood restaurants became extremely popular, as they offer a healthy alternative to regular American eating habits.

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4. Data

Required data to solve the problem:

- Houston city data containing the neighborhoods and districts.
- Latitude and longitude coordinates of those neighborhoods. This is required to plot the map and get the venue data.
- Venue data, particularly data related to restaurants from Foursquare location data. I am going to use this data to perform further analysis of the neighborhoods.

Data source and extract's methods:

Houston data containing the neighborhoods and districts, latitudes, and longitudes will be obtained from the data source: https://www.kaggle.com/mrchristolpher/houston-texas-neighborhoods-lat-long-list. After it, I will get the geographical coordinates of the neighborhoods (latitude and longitude) using Python Geocoder package.

Finally, I will use Foursquare API to get the venue data for the neighborhoods defined at the previous step. Foursquare has one of the largest databases of 105+ million places and over 125,000 developers use this application. Foursquare API provides many categories of the venue data; I am particularly interested in the restaurant data to solve the business defined problem.

This project will require using of many data science skills, from web scrapping (open-source dataset), working with API (Foursquare), data cleaning, data wrangling, to map visualization (Folium). In the next Methodology section, I will discuss and describe any exploratory data analysis that I did, any inferential statistical testing that I performed, and what machine learning techniques were used.

5. Methodology

• Data will be collected from https://www.kaggle.com/mrchristolpher/houston-texas-neighborhoods-lat-long-list and cleaned and processed into a DataFrame.

• Foursquare be used to locate all venues and then filtered by seafood restaurants. Ratings, tips, and likes by users will be counted and added to the DataFrame.

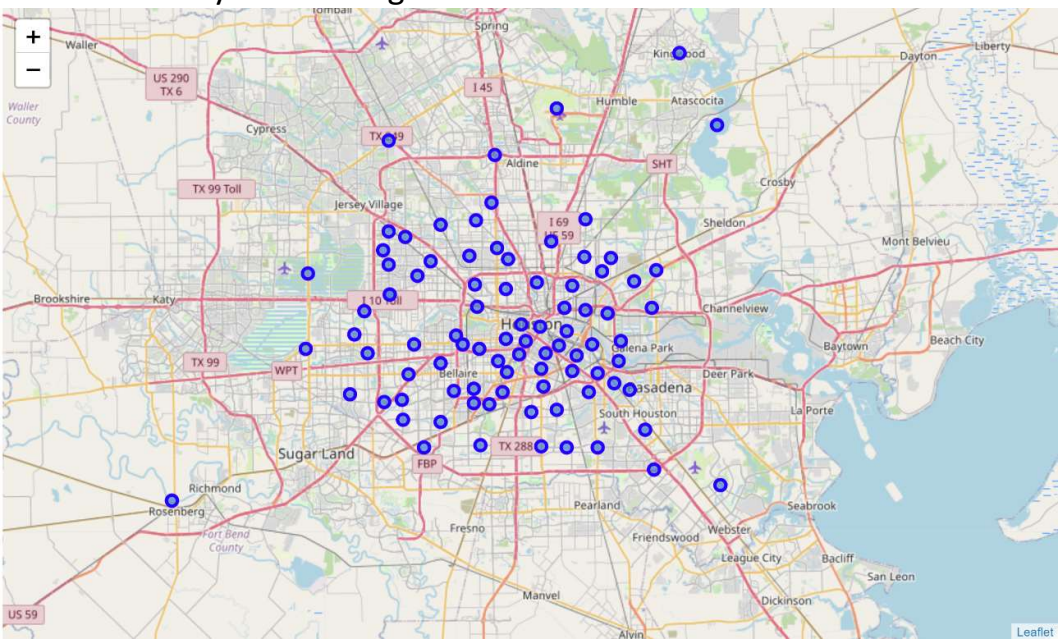
• Data will be sorted based on ratings.

• Finally, the data will be visually assessed using graphing from Python libraries.

6. Results

Based on the accuracy of Foursquare data for seafood restaurants in Houston neighborhoods:

1. Houston city has 88 neighborhoods distributed in 8 districts.



2. There are 215 seafood restaurants in 88 neighborhoods with 32 unique restaurant names. The Pappadeaux Seafood Kitchen with 41 branches is the greatest one.

```
Number of unique seafood resturants in Houston : 32

Pappadeaux Seafood Kitchen             41
Mambo Seafood                          24
Goode Company Seafood                  22
Eddie V's Prime Seafood                22
Captain Benny's Seafood                10
McCormick & Schmick's                   9
TP Seafood Restaurant And Market        9
Pappas Seafood House                    8
Eunice                                  7
Texas Grill Seafood                     7
Truluck's                               7
Liberty Kitchen & Oyster Bar            7
Culichi Town                            6
Casian Crawfish                         5
Lotus Seafood                           5
Captain Tom's Seafood and Oyster Bar    4
Connie's Seafood Market & Restaurant    3
Captain Tom's                           3
Ostioneria Michoacan                    2
Lotus Seafood Market                    2
Cajun Fuze                              1
Capitan Seafood Kitchen                 1
Baytown Seafood                         1
Babin's Seafood House                   1
Rockfish Seafood Grill                  1
La Lucha                                1
J&J Seafood                             1
Crawfish N More                         1
Pier 36 Seafood & Oyster Bar            1
Ostionerias La Reyna                    1
Captain Tom's Seafood Kitchen           1
Captain Benny's                         1
Name: Name, dtype: int64
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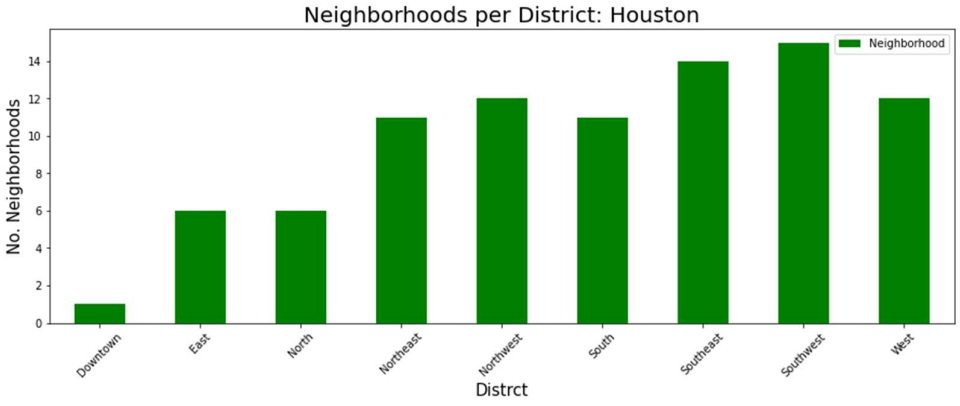
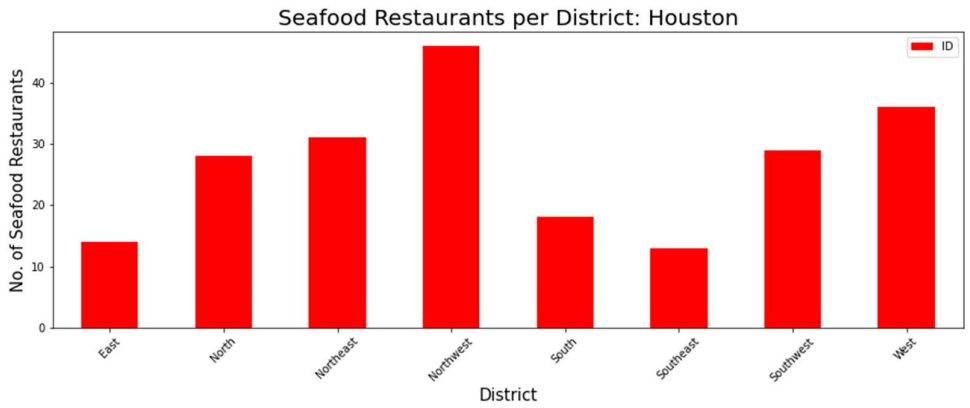
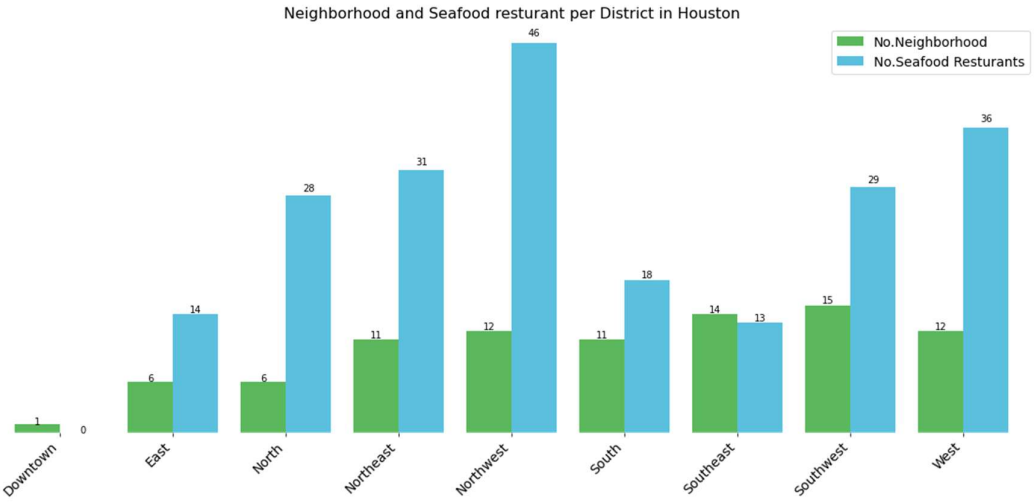
3. Southwest and Southeast districts with 15 and 14 neighborhoods have the maximum number of neighborhoods, respectively. Downtown with just 1 neighborhood has the minimum one.



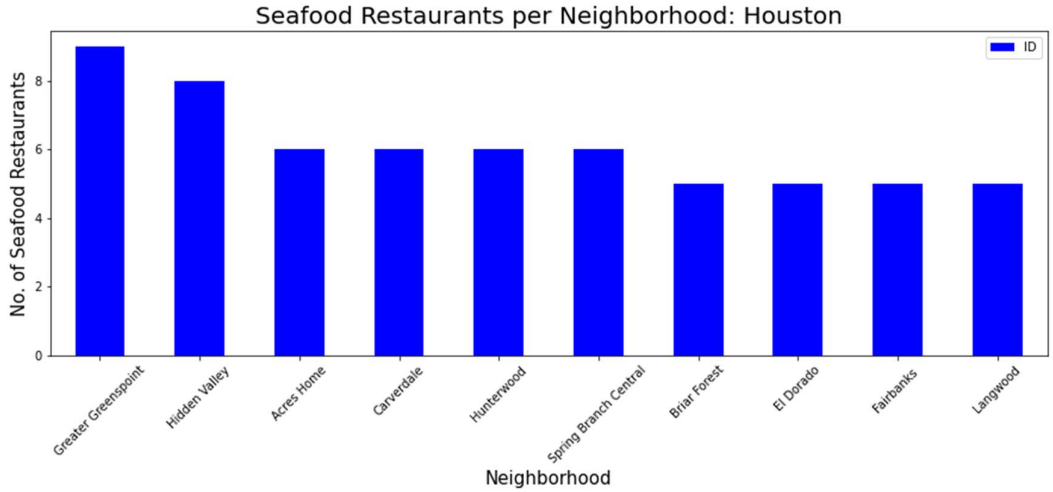
4. Northwest district with 46 seafood restaurants has the maximum number of seafood restaurants and Downtown and Southeast with 0 and 13 seafood restaurants have the minimum numbers.



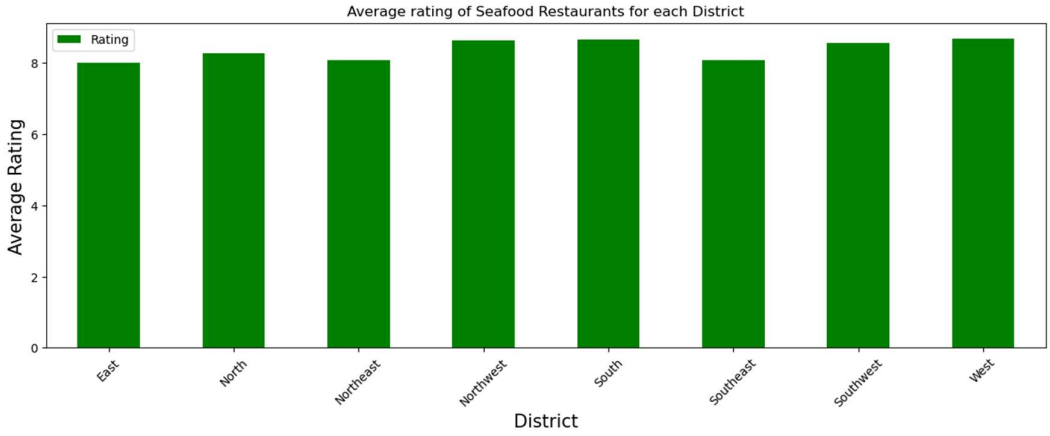
5. Despite Southeast district has a maximum number of neighborhoods but it has a minimum number of seafood restaurants.



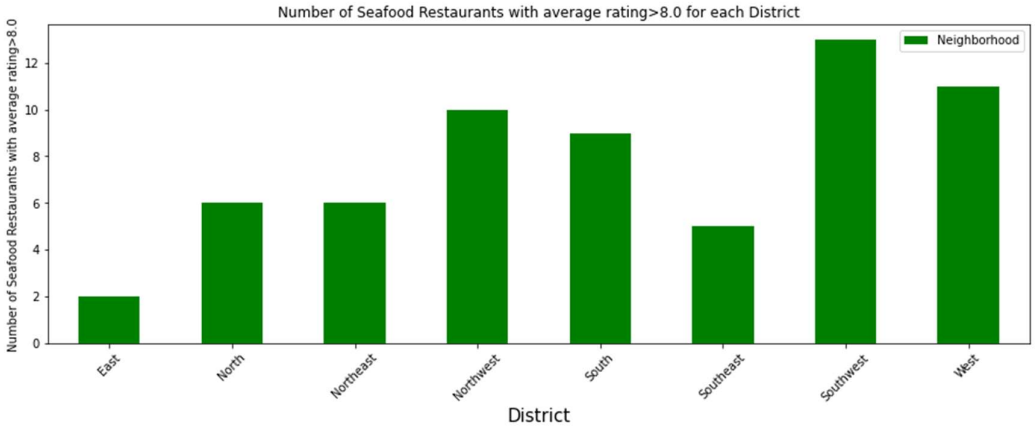
6. Greater Greenspoint neighborhood in North district with 9 restaurants has the greatest number of seafood restaurants.



7. The overall rating of seafood restaurants in all districts is greater than 8.0 (62 among 215 seafood restaurants).



8. Southwest and East districts with 13 and 2 restaurants have the greatest and lowest number of seafood restaurants, respectively.



9. East district with just 2 high-rated restaurants among 14 has just 14% high-rated restaurants.

	District	Average Rating>8.0
0	East	2
1	North	6
2	Northeast	6
3	Northwest	10
4	South	9
5	Southeast	5
6	Southwest	13
7	West	11

10. Fort Bend neighborhood with an average rating of 8.9 is the best neighborhood of high-quality seafood restaurants.

	Neighborhood	Average Rating
21	Fort Bend	8.9
47	Museum Park	8.8
66	University Place	8.8
2	Afton Oaks	8.8
29	Greenway	8.8
28	Greater Uptown	8.8
40	Magnolia Park	8.8
48	Neartown	8.8
14	Denver Harbor	8.8
67	Washington Avenue Coalition	8.8

11. West district with an average rating of 8.68 is the best district of high-quality seafood restaurants.

	District	Average Rating
7	West	8.683333
4	South	8.666667
3	Northwest	8.639130
6	Southwest	8.562069
1	North	8.278571
2	Northeast	8.077419
5	Southeast	8.076923
0	East	8.014286

12. Eddie V's Prime Seafood branches in the West or Northwest with a 9.1 overall rating are the best locations for Seafood cuisine in Houston.

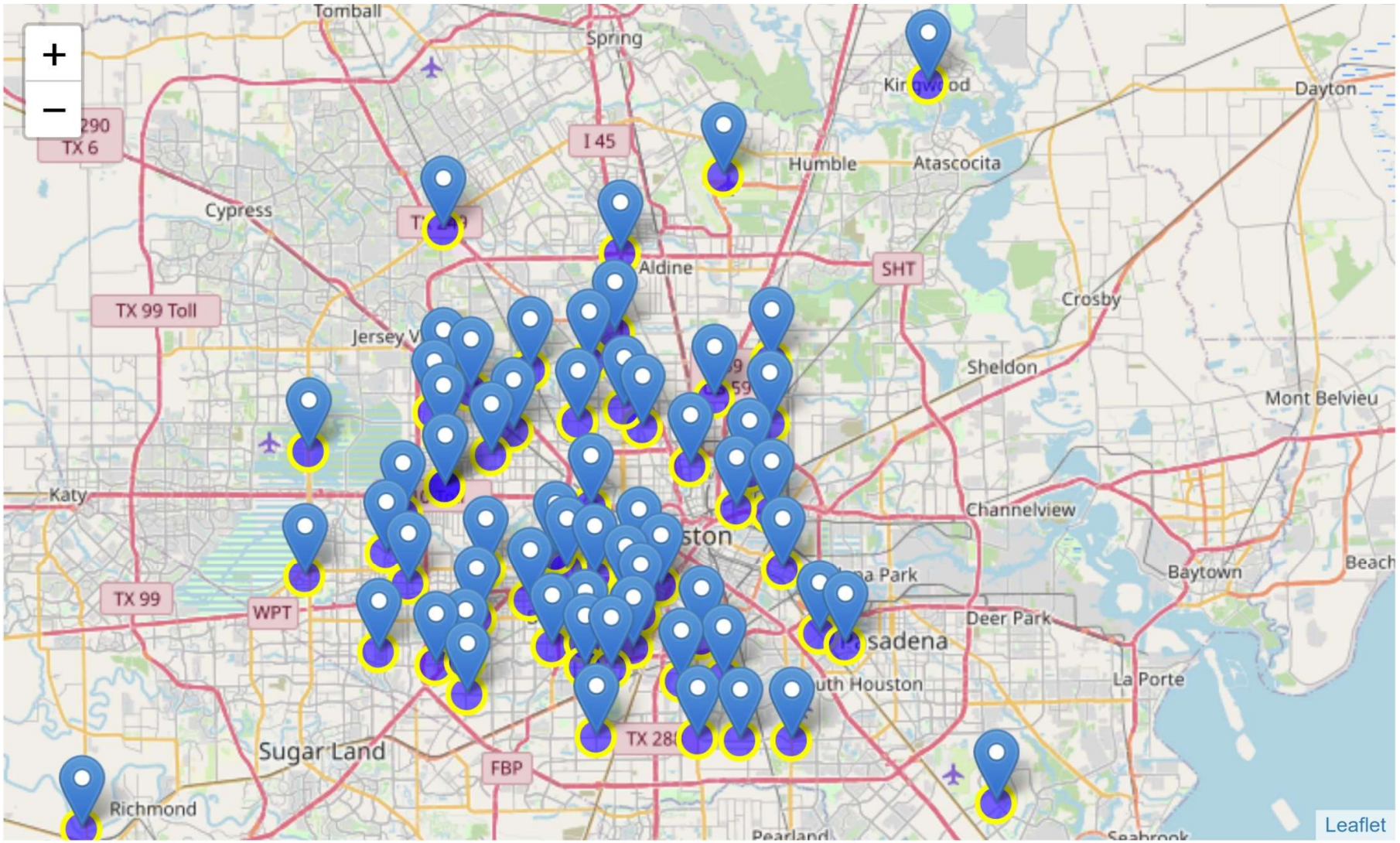
```
# Resturant with maximum Ratings
seafood_rest_stats_hu.iloc[seafood_rest_stats_hu['Rating'].idxmax()]
```

```
District                            West
Neighborhood                     Addicks
ID              4c98392a05a1b1f711088c53
Name             Eddie V's Prime Seafood
Likes                                114
Rating                               9.1
Tips                                  38
Name: 7, dtype: object
```

7. Conclusions

In the project I have gone through the process of identifying the business problem, specifying the data required, extracting, and preparing the data, performing data analysis, and lastly providing recommendations to the investors/developers. During the project, I applied different data science methods and instruments to get the answer to our main question: “Where in the city of Houston, should the investor open a seafood restaurant?” The findings of this project will help the relevant investor better understand the advantages and disadvantages of different Houston neighborhoods/districts in terms of opening a seafood restaurant.

So, based on these data-driven insights:
1. I would state that Downtown, Southeast, or East District preferences are the best locations for opening a seafood restaurant in Houston.
2. I would go to one of Eddie V's Prime Seafood restaurants in the West district based on the 9.1 ratings and distance to my home.


Tomball
Spring
Dayton
I 45
Humble
Atascocita
Cypress
Aldine
SHT
TX 99 Toll
Crosby
Sheldon
Mont Belvieu
Katy
Channelview
Baytown
TX 99
WPT
Deer Park
La Porte
Sugar Land
FBP
Richmond
Leaflet