



## **Highly Favorable Restaurants in Charleston, South Carolina**

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Coursera Capstone Assignment

# **The Report**

## ***Highly Favorable Restaurants in Charleston, South Carolina***

### **1. Introduction**

#### **1.1 Background**

Charleston is filled with beautiful cobblestone walkways, stunning historical monuments, and some of the best restaurants in the world. Furthermore, Charleston has some of the best beaches in the United States of America along with natives who present great southern hospitality. Due to this, Charleston is growing exponentially. New individuals are coming to Charleston every day and because of this, building new restaurants is a great opportunity for anyone interested in doing so. A hypothetical example will be used concerning a client who has requested consultation in opening a new restaurant in Charleston County. The data will be evaluated to see which restaurants in the Charleston area are the most favorable, have the most optimal location, and what food items would be the best sellers for the client. A dataset of South Carolina's geographical coordinates as well as the Foursquare API are used to give the most significant results.

#### **1.2 Client Being Consulted**

The client wants to open a new restaurant in Charleston County, South Carolina, but is wanting consultation on the most optimal location and which type of restaurant will bring the most customers as well as the most popular food items they should sell.

## 2. Data

### 2.1 Overview

The geographical coordinates (latitude and longitude) of Charleston County were retrieved. Next, a list of all restaurant in Charleston County were gathered. Third, the Foursquare API was used to get the Venue Identification for all the different restaurants. Finally, using the Foursquare API, data consisting of each of the restaurants menus and ratings were gathered.

### 2.2 Requirements and Descriptions

<i>Data</i>	<b>Description</b>	<b>Acquired</b>
<i>City</i>	Give the location of Charleston City	South Carolina JSON file scraped from opendatasoft.com
<i>County</i>	Locate the position of Charleston County	South Carolina JSON filer scraped from opendatasoft.com
<i>Latitude</i>	Find the Latitude of cities in Charleston County	South Carolina JSON file scraped from opendatasoft.com
<i>Longitude</i>	Find the Longitude of cities in Charleston County	South Carolina JSON file scraped from opendatasoft.com
<i>Venue Name</i>	The best-known name for the venues	Foursquare API – GET Venues Explore
<i>Venue ID</i>	A unique string identifier for the venues	Foursquare API – GET Venues Explore
<i>Venue Location</i>	An object containing the city, postal code, latitude, and longitude	Foursquare API – GET Venues Explore
<i>Venue Categories</i>	An array of categories that have been applied to the venues	Foursquare API – GET Venues Explore
<i>Venue Likes</i>	Contains count and groups of users who like the venues	Foursquare API – GET Venues Likes
<i>Venue Name</i>	A name for the menus	Premium Foursquare API – GET Venues Menu

<i>Venue MenuID</i>	A unique string identifier for the menus	Premium Foursquare API – GET Venues Menu
<i>Venue Description</i>	More information describing the menus	Premium Foursquare API – GET Venues Menu
<i>Venue Entries</i>	Contains the Name, SectionID, and Entries for each menu item	Premium Foursquare API – GET Venues Menu

## Methodology

### Methodology Requirements

An exploratory data analysis will be used to analyze the multivariate data set to find the primary characteristics and then visualize those characteristics. Also, a clustering method will be used to identify groups of similar objects in the geo-spatial data set.

### Analysis

The first step will be to download the South Carolina dataset and assign the dataset to a data frame. Next, the cities of Charleston County will be counted by filtering the counties with the key word ‘Charleston’. The number of counties in South Carolina is 376. The number of

cities with different postal codes named Charleston is sixteen.

	City	County	Latitude	Longitude
193	Charleston	Charleston	32.779126	-79.9355
194	Charleston	Charleston	32.84885	-79.85773
195	Charleston	Charleston	32.799326	-79.94813
198	Charleston	Charleston	32.918757	-80.0228
199	Charleston	Charleston	32.794841	-80.005
200	Charleston	Charleston	32.84885	-79.85773
202	Charleston	Charleston	32.73727	-79.95409
203	Charleston	Charleston	32.84885	-79.85773
204	Charleston	Charleston	32.821238	-80.05353
206	Charleston	Charleston	32.84885	-79.85773
207	Charleston	Charleston	32.84885	-79.85773
211	Charleston	Charleston	32.84885	-79.85773
212	Charleston	Charleston	32.981952	-80.07363
213	Charleston	Charleston	32.783076	-79.93701
214	Charleston	Charleston	32.786176	-79.94711
263	Charleston	Berkeley	32.91583	-79.8846

The next step will be to get the venue name, latitude, longitude, identification number, and category from the Foursquare API. Then, the number of venues in the County must be counted. Next, a one-hot table should be generated, and the statistical mean of the county should be calculated. A frequency analysis of each category should be created for the county. The resulting table looks like this:

~~~Charleston~~~			
	venue	frequency	
0	Baseball Field	0.10	
1	Coffee Shop	0.07	
2	Hotel	0.05	
3	Southern / Soul Food Restaurant	0.05	
4	Park	0.04	

From looking at this table, one may assume the frequency of the county is respective of other large counties, however, the frequency of these categories in Charleston is rather high. Lastly, the venues should be sorted to get the ten most common venues in the county based on K-Means Method.

	County	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Charleston	Baseball Field	Coffee Shop	Southern / Soul Food Restaurant	Hotel	Park	Restaurant	Gym / Fitness Center	Clothing Store	American Restaurant	Gym

All the information should then be collected and filtered from the restaurants that is needed. The Foursquare API should be called using the Venue ID of the restaurants to return the data of likes and menus.

## Results

### K-Means

	County	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Charleston	Baseball Field	Coffee Shop	Southern / Soul Food Restaurant	Hotel	Park	Restaurant	Gym / Fitness Center	Clothing Store	American Restaurant	Gym

### Popularity Index

The number of likes was requested using the Foursquare API to get the popularity index. However, not all restaurants were able to provide such information.

	County	County Latitude	County Longitude	Venue	Venue Latitude	Venue Longitude	Venue ID	Venue Category
0	Charleston	32.779126	-79.93550	Second State Coffee	32.779859	-79.937648	4062e3db07d0b409c166e	Coffee Shop
1	Charleston	32.779126	-79.93550	City Lights Coffee	32.780651	-79.932774	4b192d809644x20d8d823e3	Coffee Shop
2	Charleston	32.779126	-79.93550	82 Queen	32.777916	-79.932343	4b4d9075896495215b9d6d6e	Southern / Soul Food Restaurant
3	Charleston	32.779126	-79.93550	The Rise	32.782181	-79.934870	58f402e9499e7e44e271d754	Coffee Shop
4	Charleston	32.779126	-79.93550	Husk	32.777976	-79.931996	4b5c2e8886d4952120b0ade6	Southern / Soul Food Restaurant
5	Charleston	32.779126	-79.93550	Charleston Grill	32.780890	-79.933037	4b7dc7479644x2011642e3	American Restaurant
6	Charleston	32.779126	-79.93550	Progan's Porch	32.777894	-79.931887	4b4b58b9644x203b9d25e3	Southern / Soul Food Restaurant
7	Charleston	32.779126	-79.93550	Starbucks	32.781226	-79.933416	4b5b48b9644x2011b1d2e3	Coffee Shop
8	Charleston	32.779126	-79.93550	Circa 1886 Restaurant	32.779861	-79.939899	4b899c329644x20114d32e3	Southern / Soul Food Restaurant
9	Charleston	32.779126	-79.93550	Peninsula Grill	32.781093	-79.931494	4b33eaf09644x20f32125e3	American Restaurant
10	Charleston	32.779126	-79.93550	Ellis Table	32.778335	-79.931297	4e9326d355937a9896a02419	Southern / Soul Food Restaurant
11	Charleston	32.779126	-79.93550	Hymen's Seafood	32.781794	-79.931633	4ab78ca9644x20b07b20e3	Seafood Restaurant
12	Charleston	32.779126	-79.93550	The Watch Rooftop Kitchen & Spirits	32.781933	-79.934804	58faf5e896e20e4d0e67	New American Restaurant
13	Charleston	32.779126	-79.93550	Billy & Beau's Coffee	32.779800	-79.930541	5aee8233d441c1ee97c8408	Coffee Shop
14	Charleston	32.789326	-79.94813	Leon's Oyster Shop	32.788359	-79.948965	5295c7e4d0e4064d0d0b	Seafood Restaurant
15	Charleston	32.789326	-79.94813	Little Jack's Tavern	32.788817	-79.948582	5712d69d9696a420b102b	American Restaurant
16	Charleston	32.789326	-79.94813	The Oyster Shed at Leon's	32.788474	-79.948684	585e385493e788f1d835e4f	Southern / Soul Food Restaurant
17	Charleston	32.783076	-79.93701	The Rise	32.782181	-79.934870	58f402e9499e7e44e271d754	Coffee Shop
18	Charleston	32.783076	-79.93701	Second State Coffee	32.779859	-79.937648	4062e3db07d0b409c166e	Coffee Shop
19	Charleston	32.783076	-79.93701	Circa 1886 Restaurant	32.779861	-79.939899	4b899c329644x20114d32e3	Southern / Soul Food Restaurant
20	Charleston	32.783076	-79.93701	The Watch Rooftop Kitchen & Spirits	32.781933	-79.934804	58faf5e896e20e4d0e67	New American Restaurant
21	Charleston	32.783076	-79.93701	City Lights Coffee	32.780651	-79.932774	4b192d809644x20d8d823e3	Coffee Shop
22	Charleston	32.783076	-79.93701	Charleston Grill	32.780890	-79.933037	4b7dc7479644x2011642e3	American Restaurant
23	Charleston	32.783076	-79.93701	Kudu Coffee & Craft Beer	32.787217	-79.937719	4b806ac29644x201b1e429e3	Coffee Shop
24	Charleston	32.783076	-79.93701	Starbucks	32.781226	-79.933416	4b5b48b9644x2011b1d2e3	Coffee Shop
25	Charleston	32.783076	-79.93701	Swamp Fox Restaurant & Bar	32.786009	-79.936426	4b7220d0f9644x20167020e3	Southern / Soul Food Restaurant
26	Charleston	32.783076	-79.93701	Starbucks	32.785860	-79.936443	52b89089496e3289d4f75936	Coffee Shop
27	Charleston	32.783076	-79.93701	Virginia on King	32.787457	-79.937364	4b3949c29644x201e35825e3	Southern / Soul Food Restaurant
28	Charleston	32.786176	-79.94711	Wicoff's House	32.786100	-79.946808	4b6332099644x201c0892e3	American Restaurant
29	Charleston	32.786176	-79.94711	132 Spring Coffee & Kitchen Bar	32.789726	-79.948724	5c5c441be55b8002c9b0e41	Coffee Shop

The count of likes for all these restaurants combined is 543.

## Menu

	0	1
0	Christmas Eve First Course	Starters
1	Christmas Eve Second Course	Salads
2	Christmas Eve Third Course	Dinner Sides
3	Nye First Course	Dinner Entrées

## Discussion

According to the results, Foursquare only allowed us access to thirty restaurants in Charleston, as listed above. So, the optimal location would need to be somewhere in Charleston within a radius of 1000 meters. However, from the frequency analysis, the restaurants here appear to be mainly Southern / Soul Food and American Food. These food choices may be the

wisest option. The results of the popularity analysis seem to show that the thirty restaurants listed are also popular in Charleston. Furthermore, it may be wise to choose a coffee shop as those also seem to be popular here with Starbucks holding almost one-third of the coffee shops in Charleston.

## **Conclusion**

Limits were placed on the data being accessed; therefore, a smaller sample size was used for the targeted problem. This, in turn, caused variation and inaccuracy in the results. Future research should test more cities in Charleston County and retrieve more likes and menu items than the present research was able to obtain. Lastly, deep learning methods could also be put into play to analyze the textual descriptions of the menu items to retrieve useful and significant information.