Applied Data Science
Capstone Report

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Introduction:

Several investors are planning to open a Mexican buffet in Oklahoma City.
Their main concern is the location.
Obviously, in order to achieve high revenue, they are trying to attract more customers by choosing the best location.
There are many restaurants and buffets in Oklahoma City while it is not a very large city, so choosing the right spot is very challenging.
Their priorities are:

1. The location should be close to a shopping center.
2. The location should be as far as possible from other restaurants especially other buffets.
3. The location should not be in the downtown due to the high price and traffic.
4. Other venues in the vicinity of the location would be a plus.

Data:

The main tool in order to extract the venues details will be the Foursquare location data as required.

1. I will start with the main shopping centers in Oklahoma City as the desired locations.
2. I will extract all venues in the vicinity of the desired locations.
3. Then dividing the venues in two categories: negative and positive.
4. The goal is to find a location near the shopping centers to have the highest numbers of positives and lowest number of negatives.
5. The short distance from shopping centers is another positive point.
6. I will use weights to address the priorities. For example, buffets will have higher negative points than other types of restaurants.
7. If several locations were found to be similar, I will use the neighborhood property pricings and population to make the final decision.
8. Folium library will be used to visualize the necessary details.

Methodology:

As discussed briefly above, the ultimate goal is to select the best neighborhood to open a Mexican buffet in Oklahoma City (OKC).
The first step is to set up our neighborhoods based on the major shopping centers in OKC. I selected 6 major shopping centers which are:

- Penn Square Mall
- Quail Springs Mall
- OKC Outlets

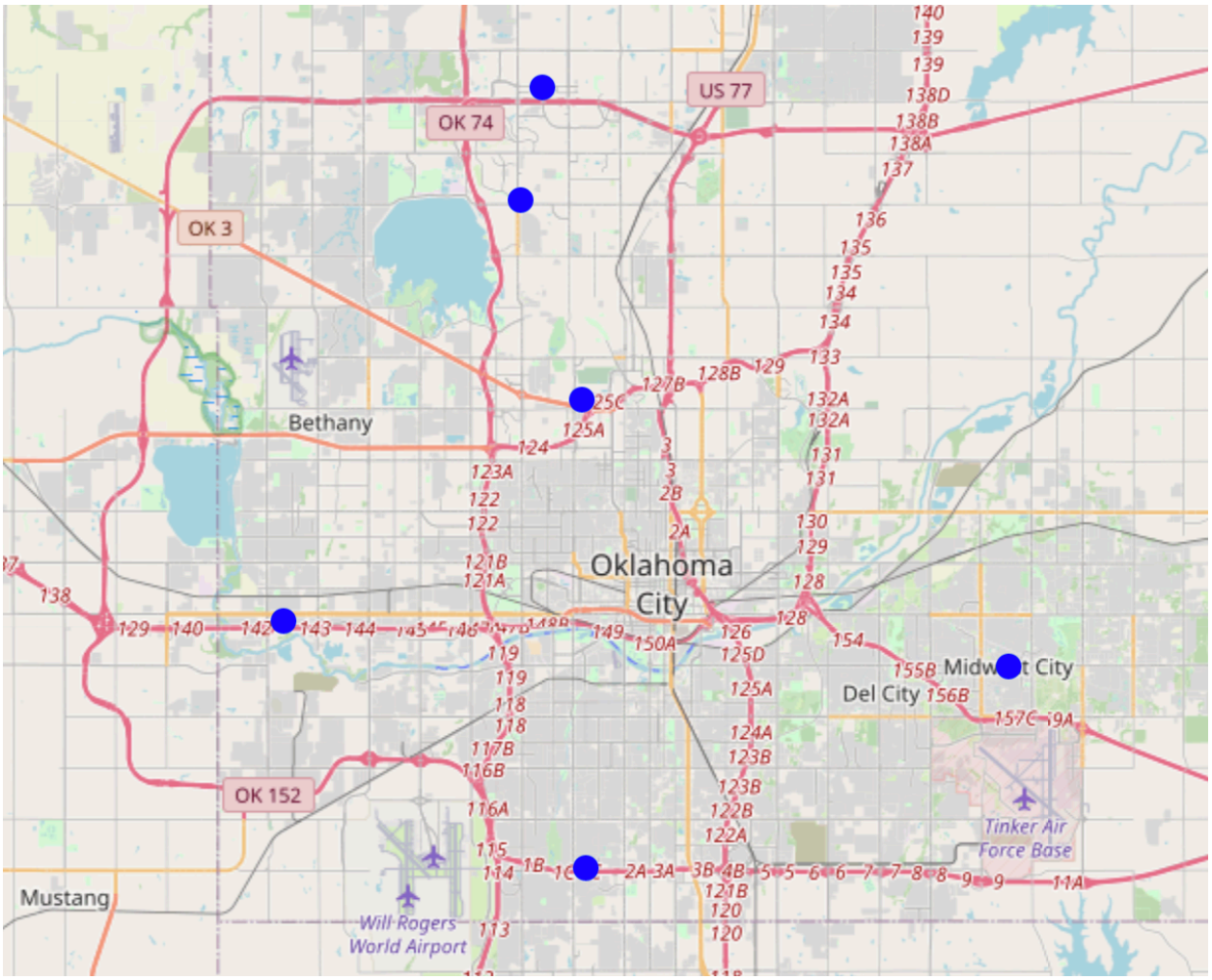
- Quail Plaza Shopping Center
- Penn Park Shopping Center
- Midwest City Town Center Plaza

None of these shopping centers is located in the downtown, so no need to remove any of them. With the use of "geopy" library, I extracted the latitude and longitude of these shopping centers. The "Foursquare API" then used to explore maximum of 100 venues around these centers (radius of 750 meters). All of the extracted venue names along with their latitude, longitude, and category were added to our main dataframe.
The next step is to separate the restaurants and buffets from other venues and count them.
I employed a rating system to rate each neighborhood to select the highest rated one as the desired location. In the rating system, each buffet has a point of -3, each restaurant, -2, and other venues +1. As discussed before, the desired location should have lots of other venues around but not many restaurants or buffets.

Results:

The major shopping centers along with their cordinates were extracted by "geopy" and shown on the map.

	Name	lat	long
0	Penn Square Mall	35.5252	-97.5449
1	Quail Springs Mall	35.613	-97.5583
2	OKC Outlets	35.4622	-97.6485
3	Quail Plaza Shopping Center	35.5816	-97.566
4	Penn Park Shopping Center	35.3927	-97.5434
5	Midwest City Town Center Plaza	35.4495	-97.3967



Maximum of 100 venues were extracted near every shopping center.

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OK_venues.head()
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Penn Square Mall	35.525154	-97.544939	The Cheesecake Factory	35.526045	-97.547048	American Restaurant
1	Penn Square Mall	35.525154	-97.544939	AMC Penn Square 10	35.524933	-97.543753	Movie Theater
2	Penn Square Mall	35.525154	-97.544939	Lush	35.525016	-97.545810	Cosmetics Shop
3	Penn Square Mall	35.525154	-97.544939	Lolli and Pops	35.524887	-97.545675	Dessert Shop
4	Penn Square Mall	35.525154	-97.544939	BC Clark Jeweler's	35.525332	-97.545500	Jewelry Store

Restaurants and buffets were separated from the rest.

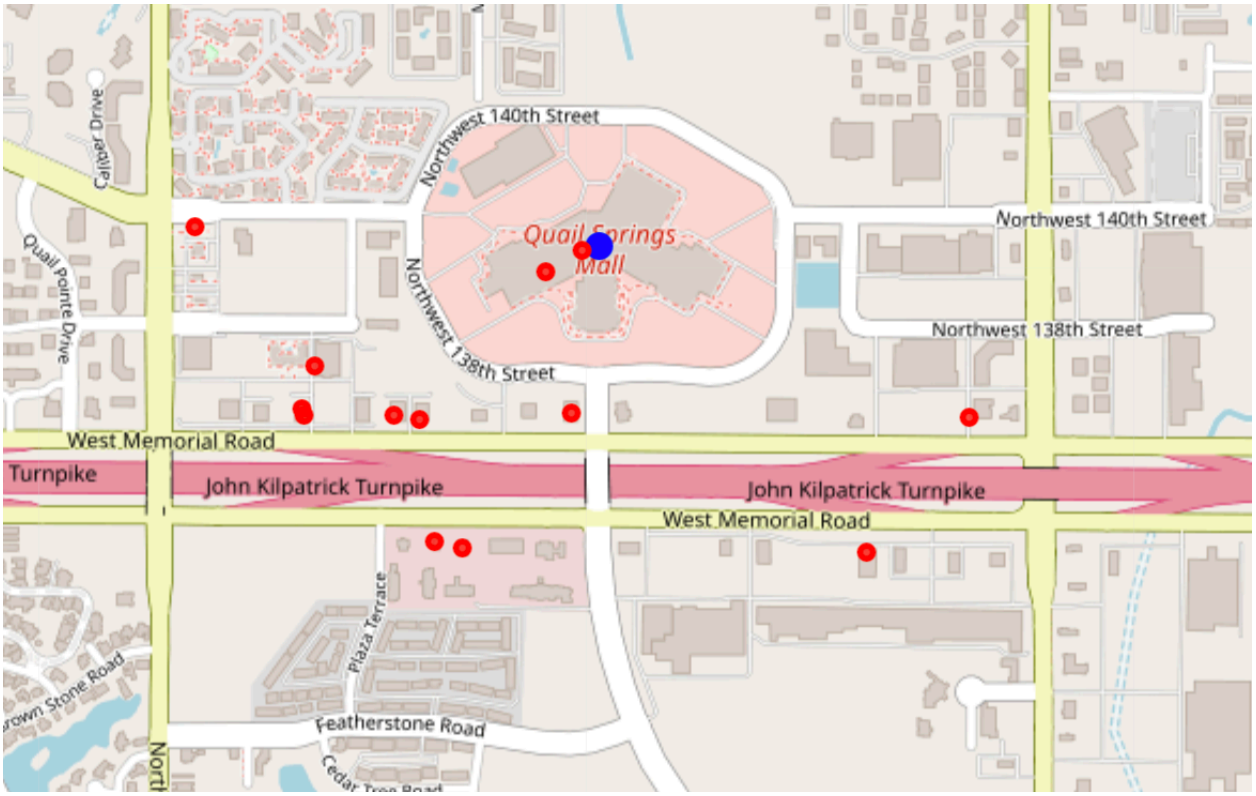
```
Restaurants.head()
```

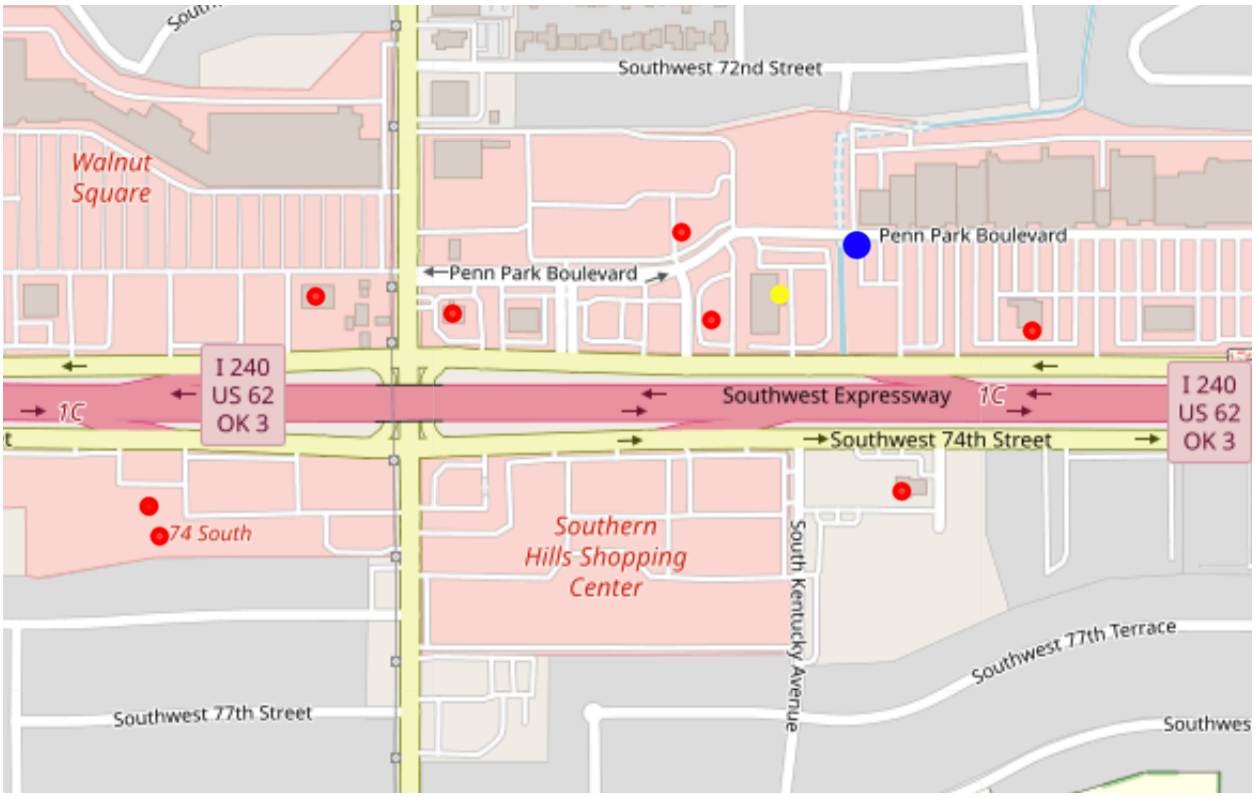
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Penn Square Mall	35.525154	-97.544939	The Cheesecake Factory	35.526045	-97.547048	American Restaurant
10	Penn Square Mall	35.525154	-97.544939	Whiskey Cake Kitchen & Bar	35.523028	-97.543056	New American Restaurant
19	Penn Square Mall	35.525154	-97.544939	Pepperoni Grill	35.524930	-97.546296	Italian Restaurant
20	Penn Square Mall	35.525154	-97.544939	Chick-fil-A	35.524343	-97.544426	Fast Food Restaurant
21	Penn Square Mall	35.525154	-97.544939	Olive Garden	35.521939	-97.544339	Italian Restaurant

```
Buffets.head()
```

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
264	Penn Park Shopping Center	35.392682	-97.543365	Golden Corral	35.392292	-97.544133	Buffet

On the map, restaurants are shown by red dots and buffets are shown by yellow dots.





Finally, the rating table:

	Name	Restaurants	Buffets	Other_venues	Rating
0	Penn Square Mall	8	0	52	36
1	Quail Springs Mall	13	0	80	54
2	OKC Outlets	2	0	52	48
3	Quail Plaza Shopping Center	7	0	15	1
4	Penn Park Shopping Center	9	1	35	14
5	Midwest City Town Center Plaza	2	0	17	13

Discussion:

As shown in the results section, the ratings were calculated and the “Quail Springs Mall” was the best neighborhood to open the buffet in.
Many other parameters can also be considered based on the needs of the investors.
For example, different radiuses can be used in order to have a more comprehensive conclusion.
For a smaller radius, another neighborhood might receive the highest rating.
Another way to improve the rating system can be considering more categories than just three.
For example, cinemas or movie theaters can be considered as another positive category around our buffet.
Another improvement might be considering more shopping malls than the major ones considered here.

Conclusion:

The objective of this project was to select the best place in Oklahoma City to open a Mexican buffet. The investors want their buffet to be placed in the vicinity of a shopping center to attract more customers.
They obviously do not want many restaurants or buffets nearby to raise the competition.
Six major shopping centers were selected and up to 100 venues in a radius of 750 meters were extracted using the Foursquare API. The restaurants and buffets were extracted and counted. A rating system were employed to rate each neighborhood as a potential place to open the buffet.
Each restaurant nearby has -2 points, each buffet nearby has -3 points, and any other type of venues has +1 point. At the end, the “Quail Springs Mall” was the best neighborhood to open the buffet in.