

Viva Las Vegas Strip! Bet on investment

Capstone Project

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Business Problem

- A group of investors would like to invest in the US in the city of Las Vegas, Nevada, specifically on the Las Vegas Strip. They are looking to do business in this major world entertainment metropolis and would like to know what type of business to invest their money in, and that business has little or no competition to help them recoup their investment in a relatively short time.

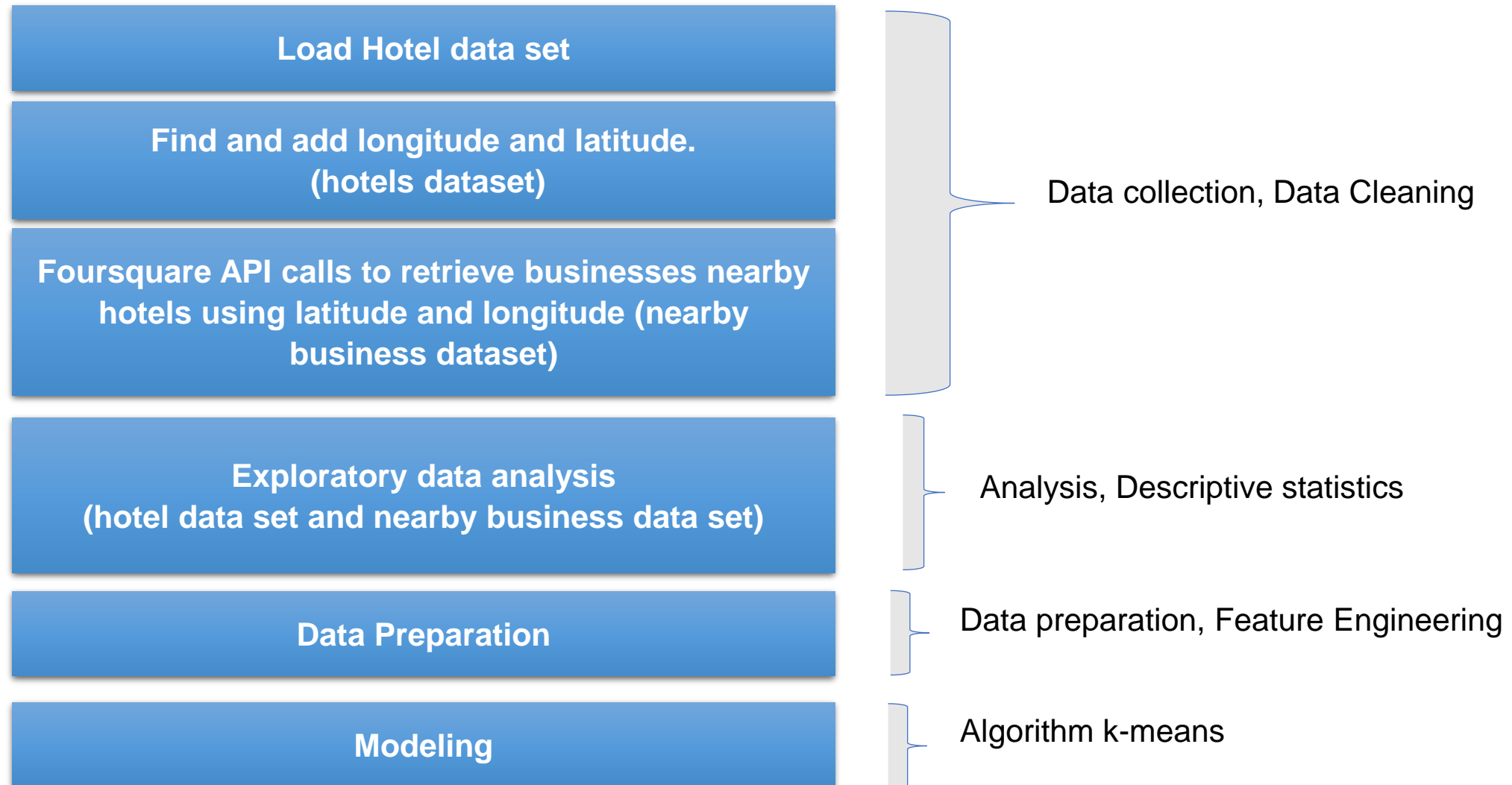
Stating and refining the Question

- What are the types of businesses that are located near the major hotels on the Las Vegas Strip (other than amusement parks, entertainment, other hotels, or large businesses) and how are these businesses distributed or grouped in these areas?

Analytic Approach

- For the point of identifying the main hotels and nearby businesses on the Las Vegas Strip I used descriptive statistics to describe, characterize and summarize the data set through tables and graphs that allowed us to find patterns or references.
- For the point referred to how these businesses are distributed or grouped in the areas of interest (hotels), I used the unsupervised learning machine learning technique (K-means) that allowed us to identify groups or clusters of interest for investors that allows them to identify where direct your investment.

Stages of the project



Data Collection / Cleansing

- In total, 32 records were retrieved through the website <https://easy.vegas/casinos/list-interactive> to identify the main hotels in the Las Vegas Strip.
- In total, 2603 records were retrieved from the Foursquare platform through API service using Python getting details of the businesses using hotel coordinates and locating businesses within a 500-meter radius of each hotel.

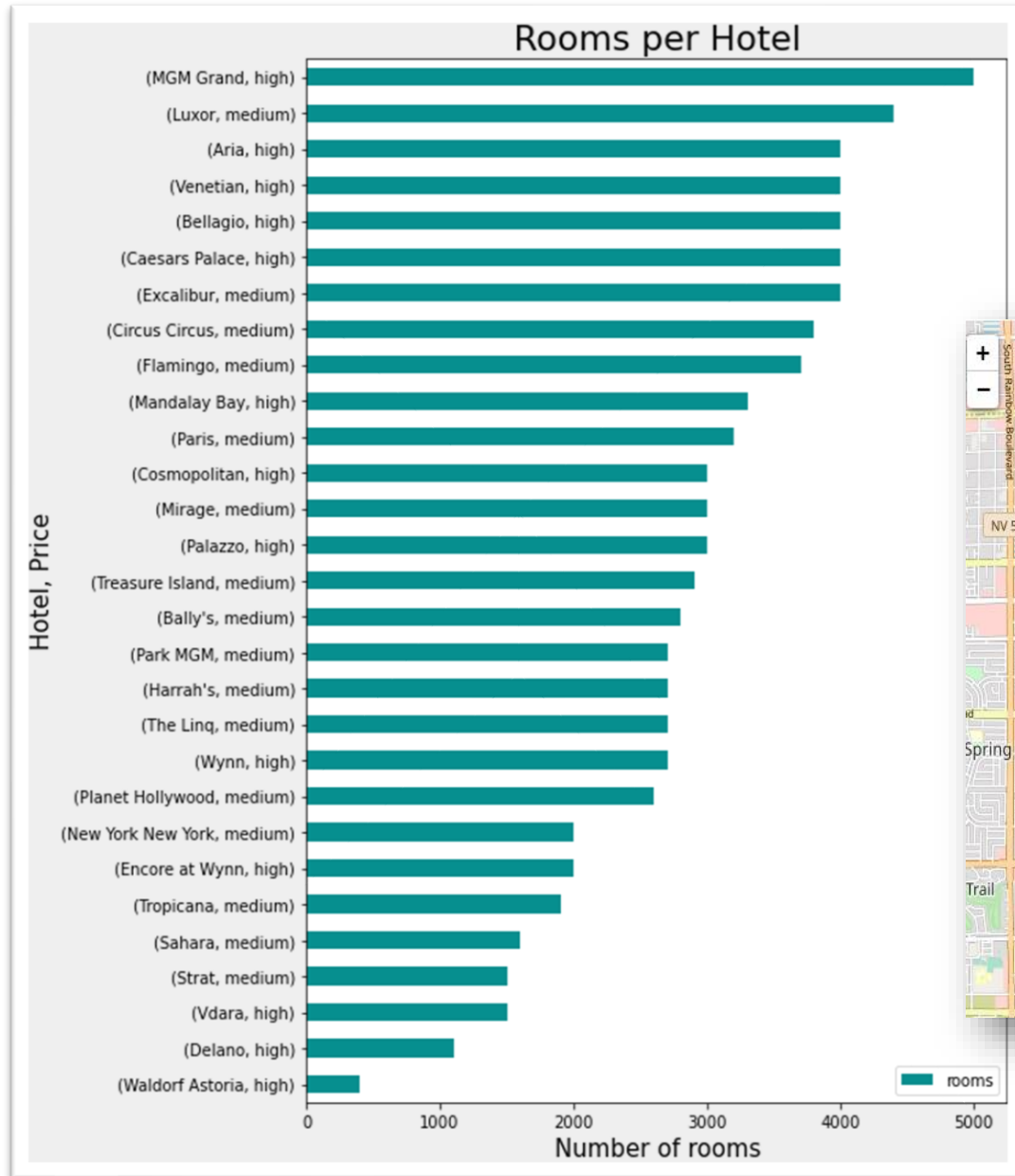
Hotel dataset

- Small hotels on the Strip were not taken in this project, this data was eliminated (focus of the investment will be on business in hotel areas with large accommodation capacity)
- The structure of the address field was modified by removing the word "Blvd" to correctly obtain latitude and longitude from geopy library.

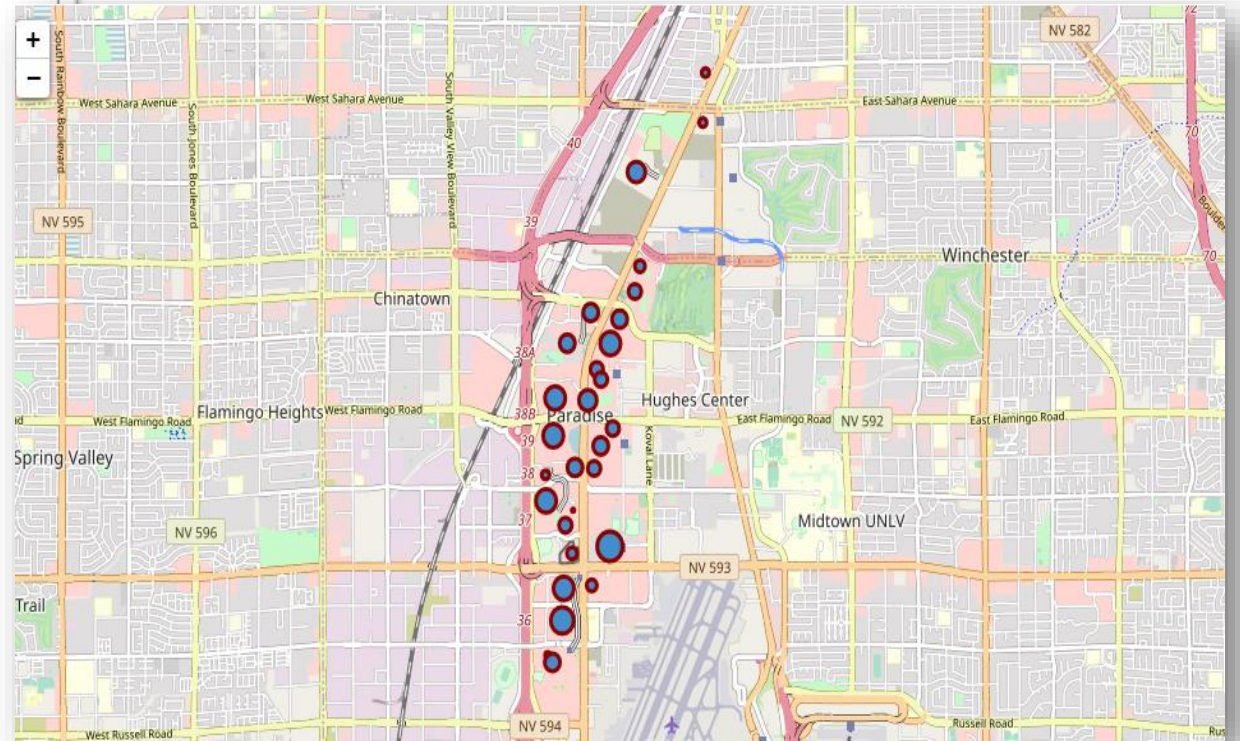
Nearby Business dataset

- The "Name" and "Venue Category" fields in the dataset were renamed to "Hotel" and "Category" respectively
- Businesses or places that do not add value to our case study were excluded, for example, hotels, zoos, theme parks, museums, among others.

Exploratory Data Analysis

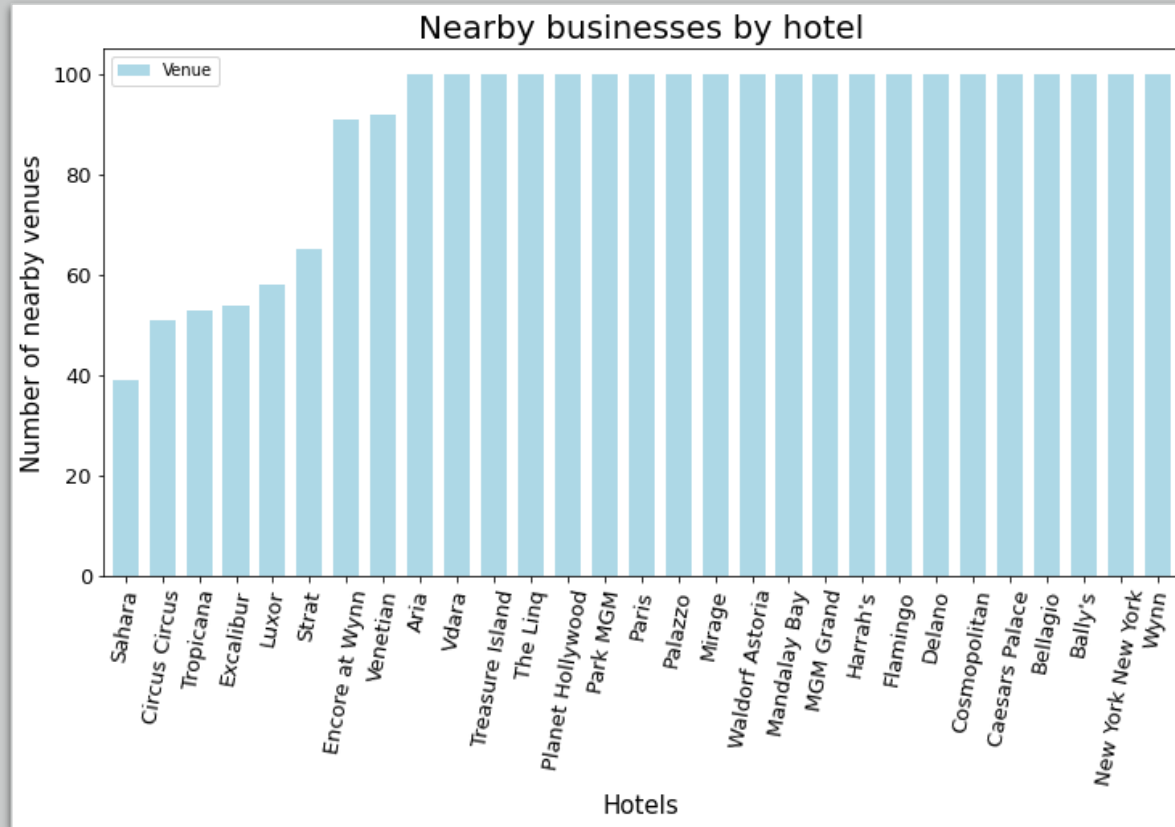


Distribution of hotels in terms of accommodation, appreciation price, and geographical location.



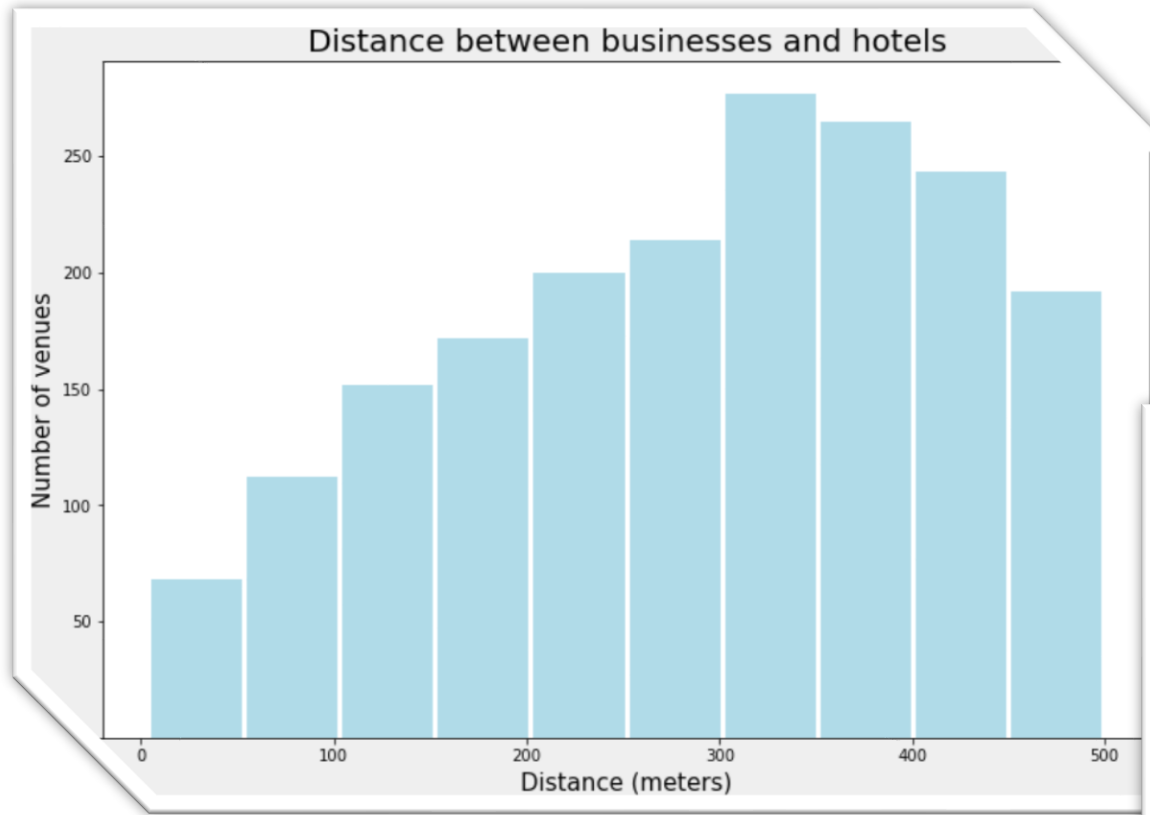
Nearby business by hotel

Foursquare limits a maximum of 100 venues
per coordinate given



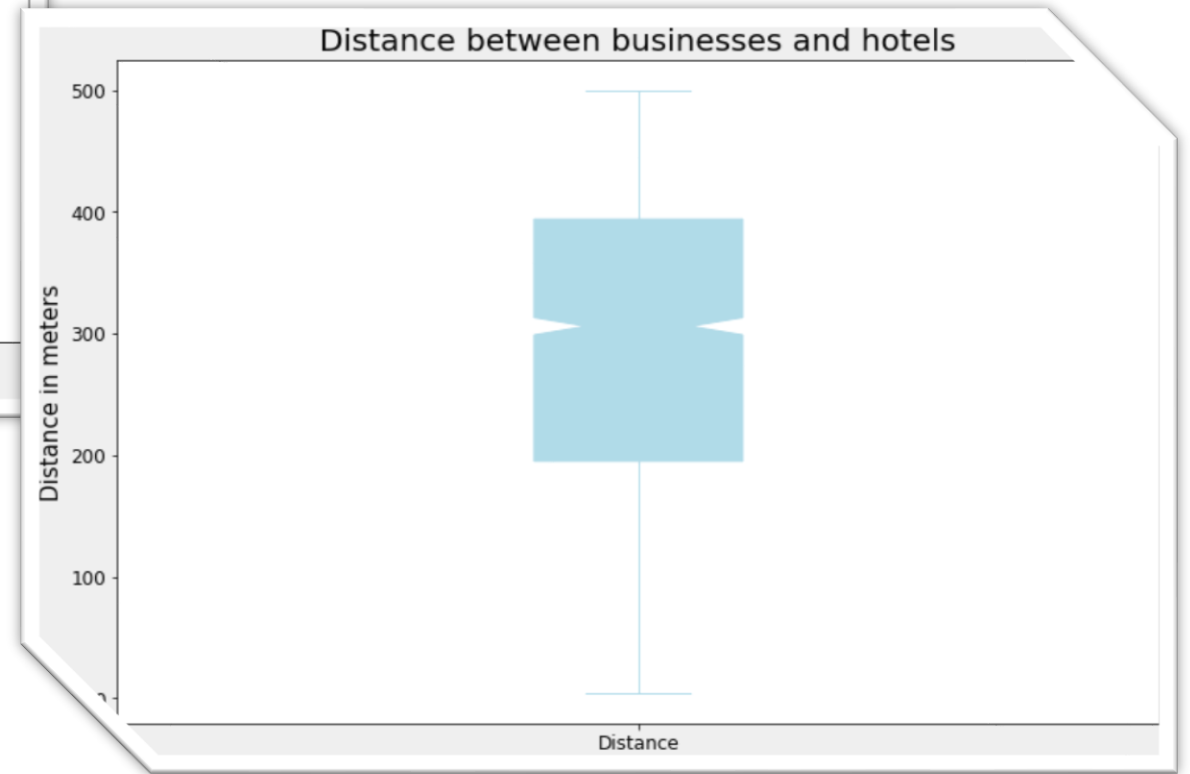
Most frequent businesses or venues by category





Distance (meters) between business and hotels

- 25% of the businesses are at a radial distance between 0 and 200 meters
- 25% of the businesses are at a radial distance between 400 and 500 meters
- 50% of the businesses are at a radial distance >200 and <400 meters from the coordinates of the hotels.



Clustering

Data Preparation (features “Category”, “Distance”, and “Price”)

One Hot encoding

Category Feature

Out[97]:

	Hotel	Accessories Store	Advertising Agency	American Restaurant	Arcade	Arts & Crafts Store	Asian Restaurant	BBQ Joint	Bagel Shop	Bakery	...	Tapas Restaurant	Tattoo Parlor	Tea Room	Tennis Court	Thai Restaurant	T Rest
0	Aria	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	
1	Aria	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	
2	Aria	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	

Out[98]:

	Hotel	Accessories Store	Advertising Agency	American Restaurant	Arcade	Arts & Crafts Store	Asian Restaurant	BBQ Joint	Bagel Shop	Bakery	...	Tapas Restaurant	Tattoo Parlor	Tea Room	Tennis Court	T Rest
0	Aria	0.0	0.0	0.014286	0.000000	0.000000	0.014286	0.000000	0.000000	0.0	...	0.0	0.0	0.014286	0.0	
1	Bally's	0.0	0.0	0.044776	0.000000	0.014925	0.000000	0.014925	0.000000	0.0	...	0.0	0.0	0.000000	0.0	
2	Bellagio	0.0	0.0	0.014286	0.000000	0.000000	0.014286	0.000000	0.000000	0.0	...	0.0	0.0	0.000000	0.0	
3	Caesars Palace	0.0	0.0	0.041096	0.000000	0.000000	0.000000	0.000000	0.000000	0.0	...	0.0	0.0	0.000000	0.0	
4	Circus Circus	0.0	0.0	0.071429	0.071429	0.000000	0.000000	0.000000	0.035714	0.0	...	0.0	0.0	0.000000	0.0	

Price Feature

Out[99]:

	Hotel	high_price	medium_price
0	Aria	1	0
1	Bally's	0	1
2	Bellagio	1	0
3	Caesars Palace	1	0
4	Circus Circus	0	1

Binning

Distance Feature

Out[103]:

	Hotel	minimum_distance	medium_distance	maximum_distance
0	Aria	43	312.514286	493
1	Bally's	26	305.119403	500
2	Bellagio	19	314.657143	497
3	Caesars Palace	65	304.205479	481
4	Circus Circus	33	203.321429	499

Venue Analysis (Top 10)

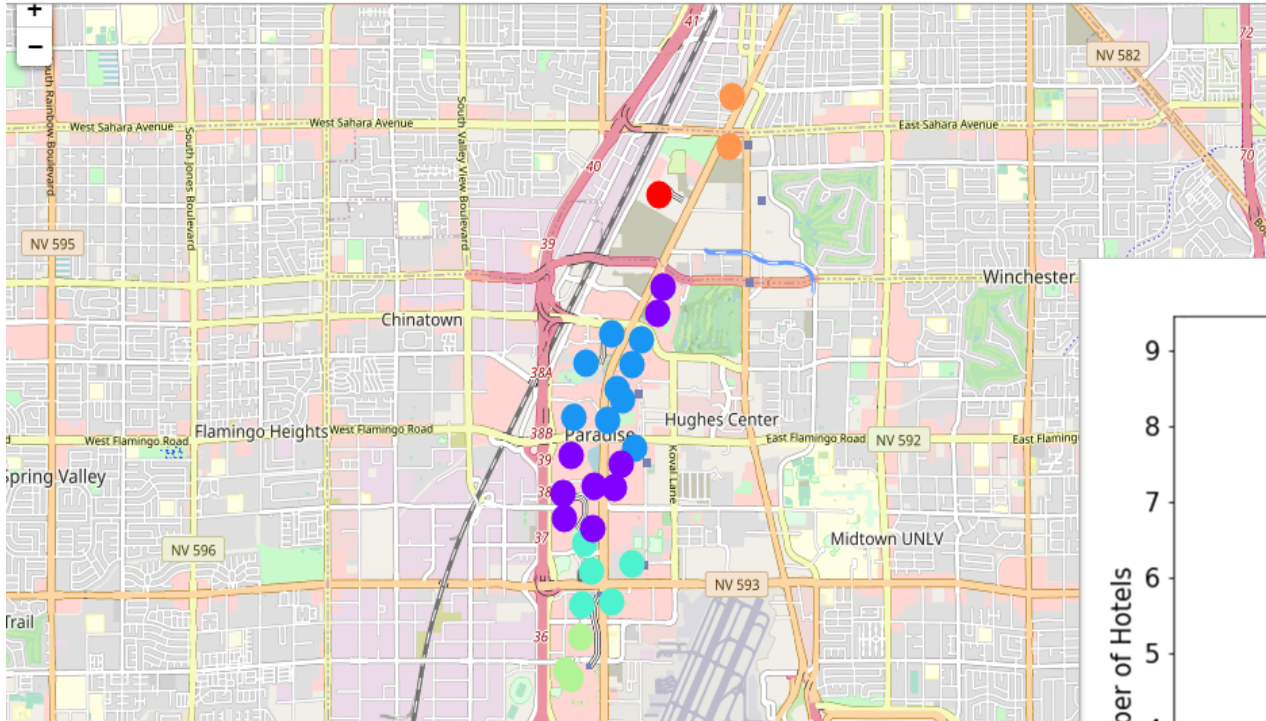
- To simplify the analysis of the large number of business categories associated with each hotel, I determined the 10 most common venues (sorted by their relative frequency) per hotel to later append to our cluster data set.

Out[107]:

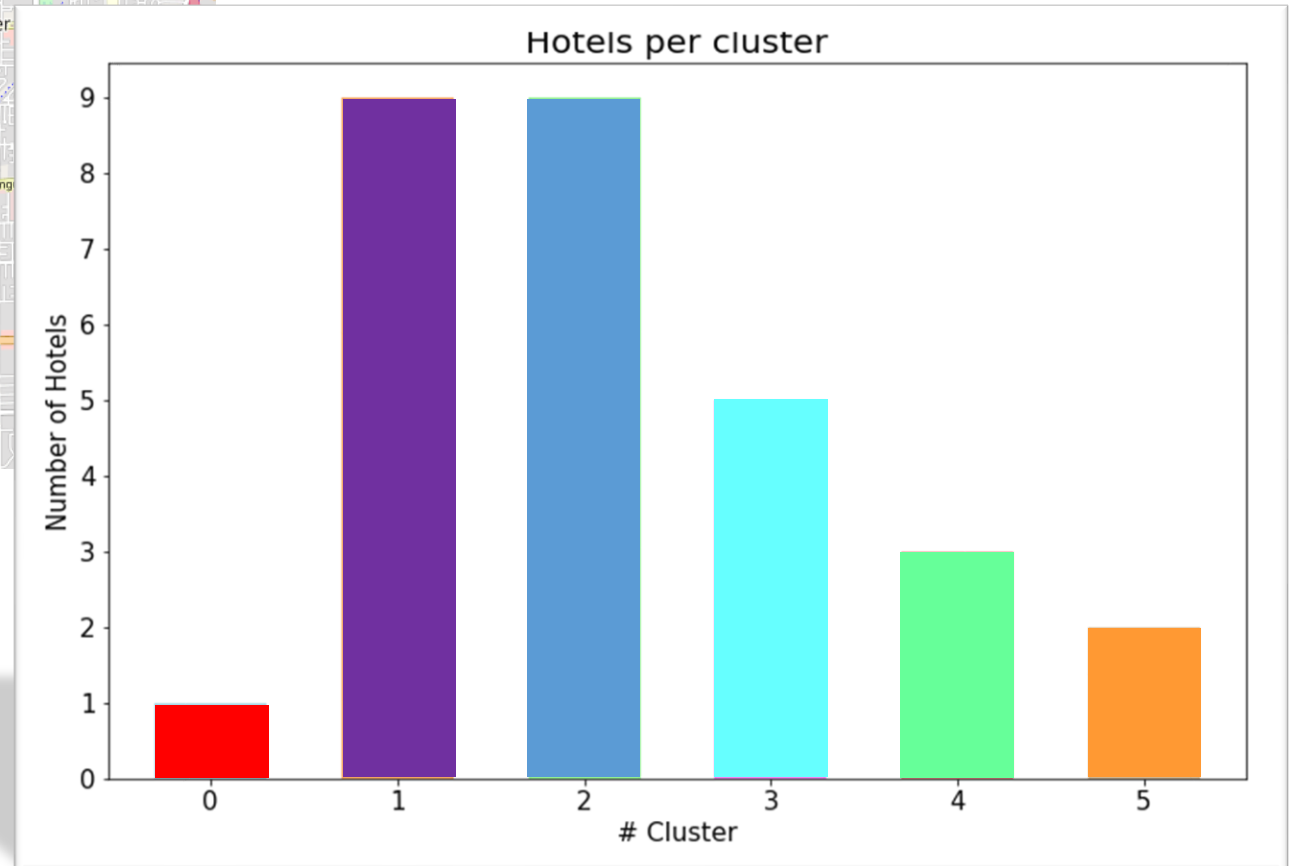
	Hotel	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Aria	Lounge	Spanish Restaurant	Italian Restaurant	Cocktail Bar	Steakhouse	Sushi Restaurant	Buffet	Seafood Restaurant	Spa	Bar
1	Bally's	French Restaurant	Steakhouse	Cocktail Bar	American Restaurant	Gift Shop	Hotel Bar	Italian Restaurant	Burger Joint	Bar	Lounge
2	Bellagio	Lounge	Italian Restaurant	French Restaurant	Spa	Japanese Restaurant	Cocktail Bar	Steakhouse	Buffet	Burger Joint	Beer Garden
3	Caesars Palace	Italian Restaurant	Clothing Store	Lounge	Bar	Women's Store	American Restaurant	French Restaurant	Cosmetics Shop	Boutique	Lingerie Store
4	Circus Circus	Bar	Fast Food Restaurant	American Restaurant	Arcade	Gym	Convenience Store	Coffee Shop	Donut Shop	Sandwich Place	Snack Place

Top 10 most common venues or business (see Jupiter notebook for full view)

Cluster Hotels (using k-means algorithm)

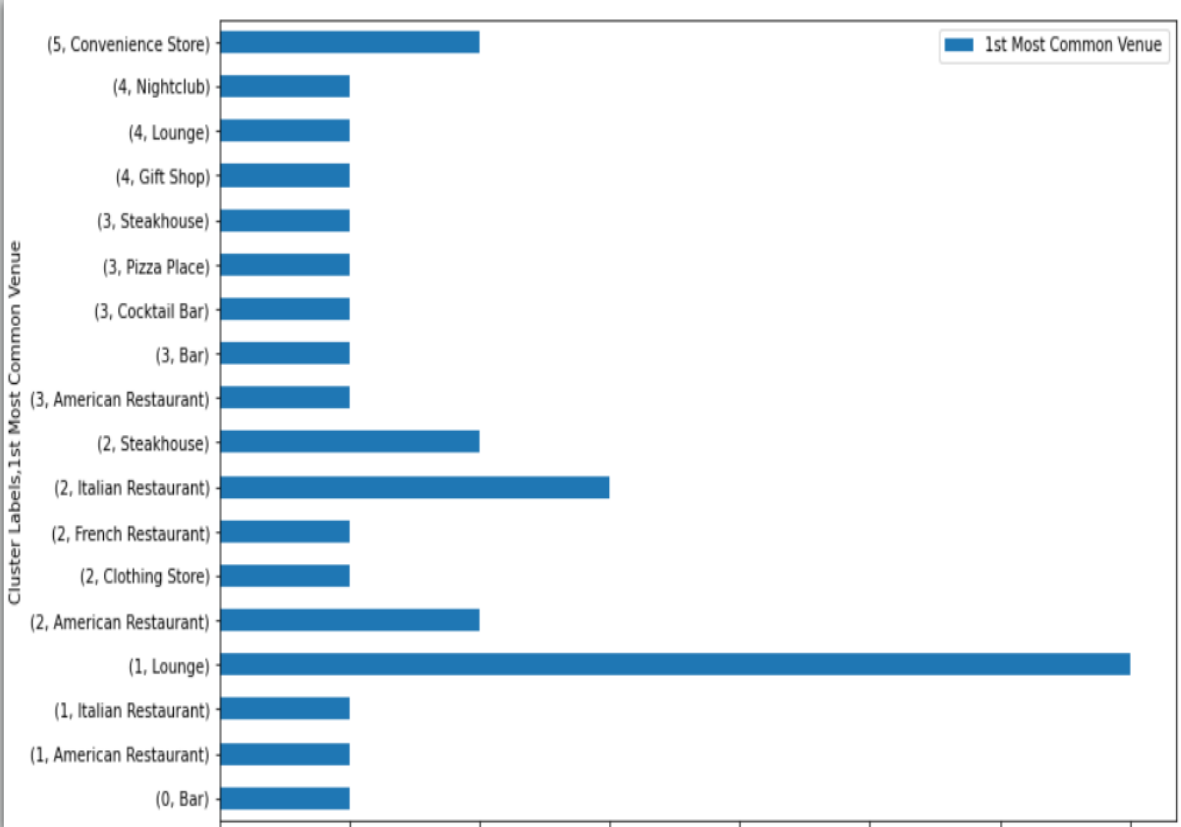


On the map of the Las Vegas Strip, we can see the 6 groups obtained from the algorithm according to the “Category”, “Distance”, and “Price” features. The largest group of clusters (violet and blue color) are located between Tropicana and Desert Inn avenues, practically the heart of the Strip.



We can see that 18 hotels (62%) are in clusters 1 and 2.

1st Most common business by cluster



Detailed information by cluster

(see Jupiter notebook for full view)

Cluster 1

Common: (Restaurants, Foods, Bar, Lounge, Spa) Not common: Clothing Store, Nightclub, Boutique, Leather goods store, Lingerie Store

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In [116]: hotels_merged.loc[hotels_merged['Cluster Labels'] == 1, hotels_merged.columns[[0] + list(range(1, hotels_merged.shape[1]))]]
```

Out[116]:

	Hotel	Price	rooms	Address	Zip code	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
0	Aria	high	4000	3730 S. Las Vegas	89158	36.107035	-115.177976	1	Lounge	Spanish Restaurant	Italian Restaurant	Cocktail Bar	Steakhouse	Sushi Restaurant
2	Bellagio	high	4000	3600 S. Las Vegas	89109	36.113115	-115.177006	1	Lounge	Italian Restaurant	French Restaurant	Spa	Japanese Restaurant	Cocktail Bar
5	Cosmopolitan	high	3000	3708 S. Las Vegas	89109	36.110157	-115.174091	1	Lounge	Seafood Restaurant	French Restaurant	Steakhouse	Spa	Spanish Restaurant

Cluster 2

(Restaurants, Foods, Bar, Clothing Store, Nightclub) Not common: Jewelry Store, Cosmetics Shop, Pharmacy, Lingerie Store, Women's Store

```
In [117]: hotels_merged.loc[hotels_merged['Cluster Labels'] == 2, hotels_merged.columns[[0] + list(range(1, hotels_merged.shape[1]))]]
```

Out[117]:

	Hotel	Price	rooms	Address	Zip code	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue
1	Bally's	medium	2800	3645 S. Las Vegas	89109	36.113784	-115.169011	2	French Restaurant	Steakhouse	Cocktail Bar	American Restaurant	Gift Shop	Hotel Bar
3	Caesars Palace	high	4000	3570 S. Las Vegas	89109	36.116628	-115.176757	2	Italian Restaurant	Clothing Store	Lounge	Bar	Women's Store	American Restaurant
9	Flamingo	medium	3700	3555 S. Las Vegas	89109	36.116425	-115.172364	2	Italian Restaurant	American Restaurant	Lounge	Bar	French Restaurant	Steakhouse
10	Harrah's	medium	2700	3475 S. Las Vegas	89109	36.119303	-115.171162	2	American Restaurant	Italian Restaurant	Steakhouse	Nightclub	Bar	Cocktail Bar