IBM Coursera Data Science Capstone

Optimal Location for a Hookah Bar in Austin

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Austin Texas is ideal for situating a niche business with high profit margins

The City has a young population with high disposable income

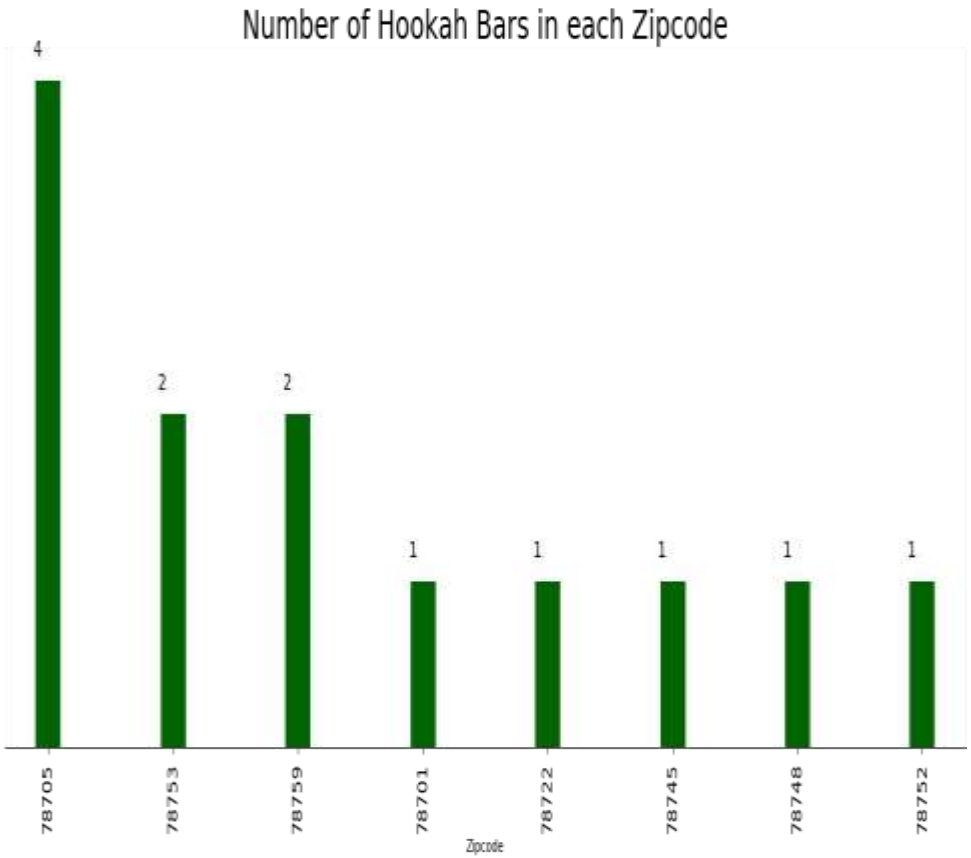
It would be a great place to establish a new hookah bar

There is an influx of talent
-Because of presence of large companies
-Lower tax burden and living cost than coastal tech hubs
A hookah bar is a great place for a young multicultural crowd tomingle

With the right strategy in choosing a location, a new bar is bound tosucceed

Data requirements and acquisition

- List of zip codes along with their geographical coordinates. Acquired from opendatasoft.com
- List of existing hookah bars and their corresponding zip codes. Acquired using API from foursquare.com
- List of venues of all categories in all zip codes (up to specified limit). Acquired using API from foursquare.com
- Distances of regions from city center and other target areas. Acquired using Geopy module



Identify the Region with most Hookah Bars:78705

- This region will be designated as the idealzip code
- It's hidden characteristics will be analyzed and extracted using machine learning
- The recommended location will be strategically placed so as to avoid being in competition with it

K-means clustering machine learning algorithm

- Get list of venues across all categories in all zip codes up to specified limit(100)
- Sort venues by most popular in their region
- Append list of 15 most popular venues to each zip code value
- Apply k-means cluster to split them into specified number of clusters (8)
- Identify cluster containing ideal zip code (78705) and extract zip code values

Optimizing distances of zip codes acquired from cluster analysis

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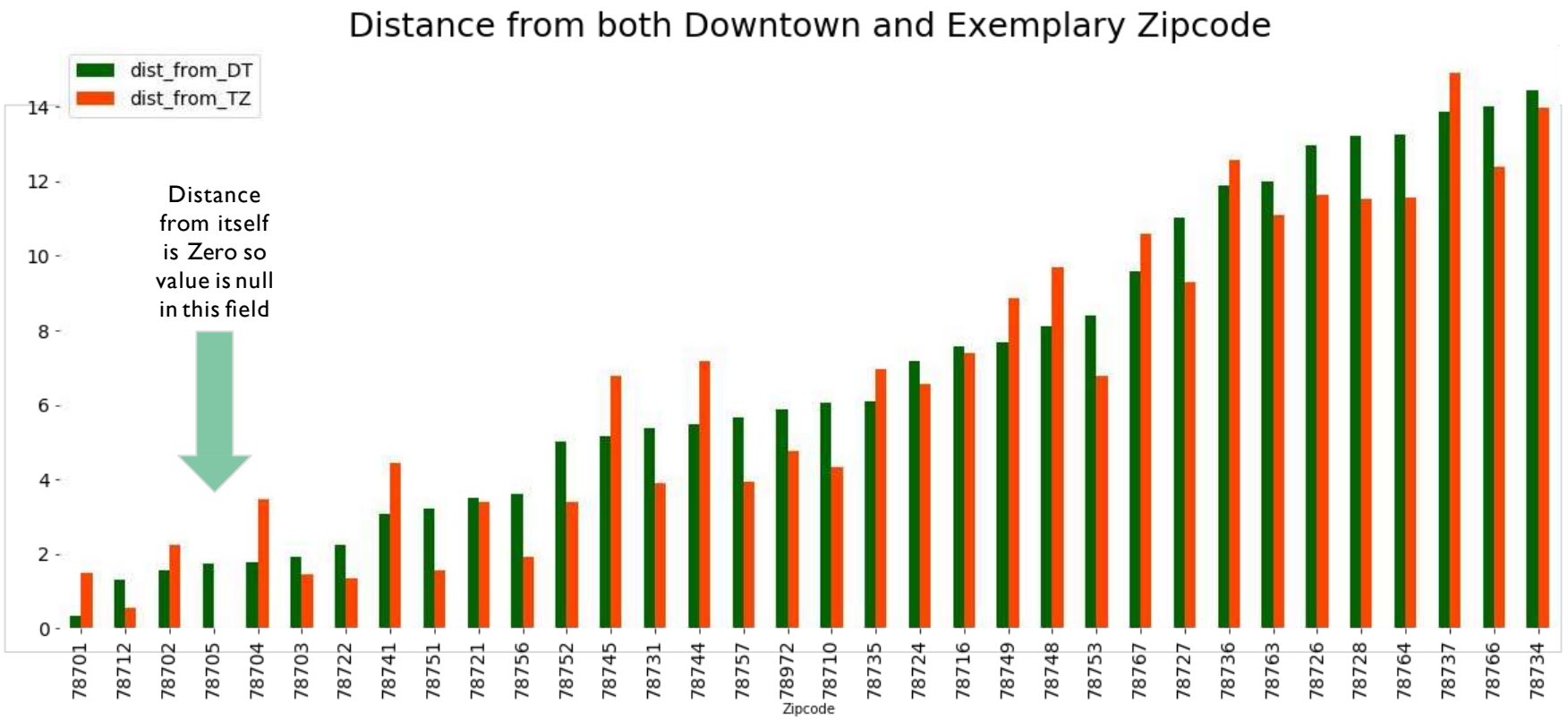
The regions identified in the previous process will be selected for being as close to the city-center as possible, yet as far away from the saturated zip code (78705) as possible

- Merge the zip codes back into the original table with geographical coordinates
  - The new table will now have much fewer rows because only rows with the selected zip codes are kept
- Extract the coordinates of the ideal/saturated zip code (78705)
- Get the coordinates of the city center (Downtown, Austin, TX) using Geopy

Calculate the distance of the selected zip codes from the points in the last 2 steps and append them to the table

Distances from both city-center and saturated region



Results & Conclusion

2 zip codes are chosen based on arbitrary distance criteria that can later be widened if on-ground analysis requires more candidates.

For now, tentative high-confidence locations are: **78702** and **78704**