

Joining California's Mass Exodus

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1. Introduction

1.1 Background

The Great Migration out of California, between 2008 and 2019, more than 18,000 companies have left California for more tax and regulatory friendly states. Major companies that have moved their headquarters out of California in recent years are relocating mostly to Texas, followed by Nevada, Arizona, Colorado, Oregon, and Washington. For example, big companies like Tesla and Oracle are changing their corporate headquarters to Austin, Texas. In the near future, more companies will be a part of this migration due to anti-business laws and regulations passed catching up. Other reasons why California became a less favorable place to live in is because of the high taxes (13% state income tax), high housing costs, cost of living in California is about 50 percent higher than the median. Additionally, with the flexibility from remote work rise in 2020, people are willing to leave the Golden State despite a pay cut.

With the consideration of moving out of California, it is important to first explore potential relocating neighborhood, comparing similarity and dissimilarity to the currently resided neighborhood. Downtown San Jose in San Jose, California. For the simplicity of this project, Austin, TX will be chosen for comparison. By applying methods and techniques learned from this data science course, we wish to find the most optimal relocation spot to continue the journey of chasing the American dream.

1.2 Target audience

This project targets to give first impression of Austin, Texas to people who are considering moving from the Silicon Valley.

2. Data description

2.1 Data Source

Coordinate for Downtown San Jose, CA is obtained directly from google. Neighborhood data for Austin, TX can be obtained from the Housing and Planning Department of the Austin City Government

(<https://jovian.ai/outlink?url=https%3A%2F%2Fdata.austintexas.gov%2FBuilding-and-Development%2FNeighborhoods%2Fa7ap-j2yt%3B>) This dataset is exported as csv format and included as asset in this project folder.

2.2 Data cleaning

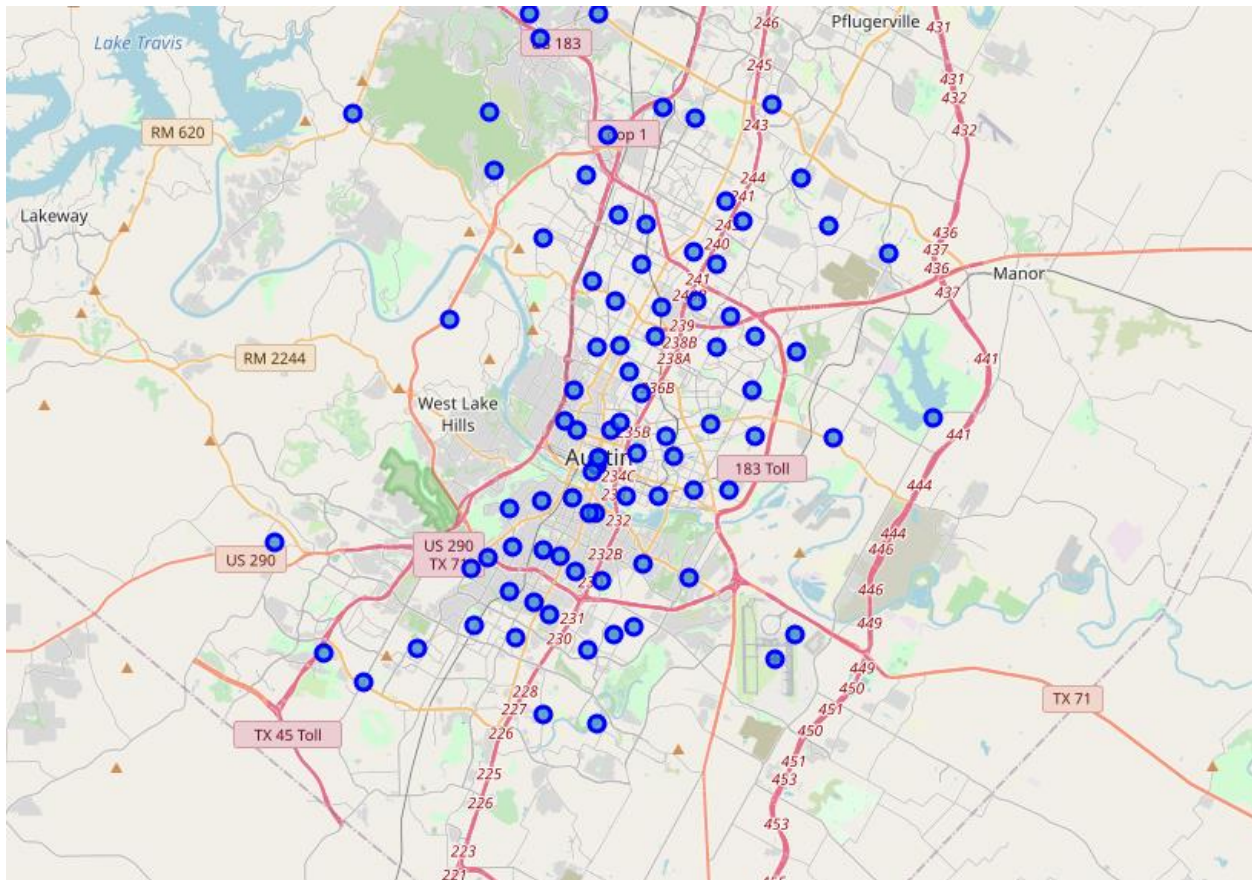
In neighborhood data for Austin, TX, the only useful column extracted is the neighborhood name's section. All other columns are dropped. In order to obtain

coordinate information for each neighborhood, geopy.geocoders' Nominatim function is used, pseudo code is shown below:

```
austin_gmaps = Nominatim(user_agent='TX_explore')
for neighborhood in df_Austin['NEIGHNAME']:
    neighborhood_address = neighborhood + ' Austin, TX'
    try:
        location = austin_gmaps.geocode(neighborhood_address)
        df_Austin['LAT'].loc[df_Austin['NEIGHNAME'] == neighborhood] = location.latitude
        df_Austin['LNG'].loc[df_Austin['NEIGHNAME'] == neighborhood] = location.longitude
        #print(neighborhood, location.latitude, location.longitude)
    except:
        print(neighborhood + " has wrong name")
```

The try and except function is to catch any neighborhood name that does not get a feedback from geopy. These incorrectly named neighborhoods are dropped. Latitude and longitude information is concatenated to the data frame. As a result, 89 neighborhoods are retained.

Visualization of Austin's neighborhood is done through the folium package, image is shown below.



Venues around each neighborhood are obtained through Foursquare's API, with 100 result as limit.

Each venue's category is grouped within the same neighborhood. Top 10 most common venues for each neighborhood are extracted, example for Downtown San Jose, CA and couple neighborhoods in Austin are shown below:

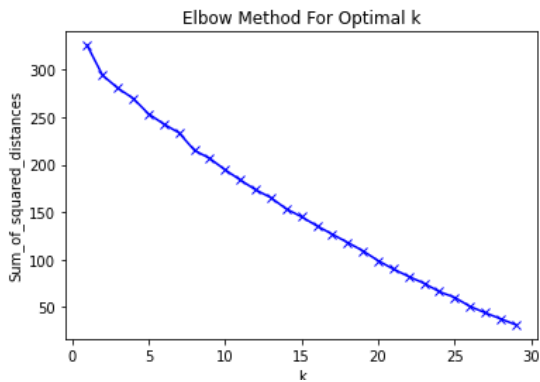
	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Downtown San Jose	Mexican Restaurant	Coffee Shop	Art Gallery	Cocktail Bar	Bar	Sandwich Place	Hotel	Theater	Restaurant	Pub

	Neighbourhood	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	BOULDIN CREEK	Mexican Restaurant	Park	Ice Cream Shop	BBQ Joint	Japanese Restaurant	Food Truck	New American Restaurant	Pool	Basketball Stadium	Thai Restaurant
1	BRENTWOOD	Coffee Shop	Burger Joint	Ice Cream Shop	Bar	Pet Store	Cosmetics Shop	Dive Bar	Sandwich Place	Mobile Phone Shop	Shoe Store
2	BRODIE LANE	Fast Food Restaurant	Ice Cream Shop	Thai Restaurant	Greek Restaurant	Fried Chicken Joint	Mexican Restaurant	Pharmacy	Cosmetics Shop	Coffee Shop	Sandwich Place
3	CENTRAL EAST AUSTIN	Food Truck	Yoga Studio	Boutique	Café	Liquor Store	Movie Theater	Music Store	Park	Gift Shop	Cosmetics Shop
4	CHESTNUT	Coffee Shop	Southern / Soul Food Restaurant	Taco Place	Theater	Market	Park	Convenience Store	Restaurant	Café	Art Gallery

Lastly, neighborhood with less than 10 venues are also dropped, resulting in 37 neighborhoods in Austin, TX.

3. Method/ result

K-mean cluster method is applied to Austin, TX's neighborhoods. In this analysis, there is not an optimal value for k using the elbow method. One reason being the 100 venues data may not be sufficient for clustering. However, k=6 is chosen for this analysis.



The 6 clusters obtained by this method are shown below.

Cluster 1:

	NEIGHNAME	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
12	WINDSOR ROAD	Italian Restaurant	Pet Store	Snack Place	Soccer Stadium	Grocery Store	Park	Lighthouse	Plaza	Food Truck	Historic Site

Cluster 2:

	NEIGHNAME	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
1	WINDSOR PARK	Cosmetics Shop	Pizza Place	Recording Studio	Veterinarian	Taco Place	Pharmacy	Gym / Fitness Center	Discount Store	Food Truck	Restaurant
2	DAWSON	Furniture / Home Store	Cosmetics Shop	Coffee Shop	Taco Place	Bar	Garden Center	Convenience Store	Pizza Place	Athletics & Sports	Hawaiian Restaurant
15	WESTGATE	Salon / Barbershop	Cosmetics Shop	Yoga Studio	Furniture / Home Store	Shoe Store	Movie Theater	Mobile Phone Shop	Juice Bar	Hookah Bar	Gas Station
18	HYDE PARK	Bus Station	Cheese Shop	Italian Restaurant	Pool	Park	Lighthouse	Tailor Shop	Salon / Barbershop	Grocery Store	Bakery
21	GRACY WOODS	Gym	Mexican Restaurant	Donut Shop	Food Truck	Liquor Store	Coffee Shop	Karaoke Bar	College Bookstore	Shipping Store	Pizza Place
22	PLEASANT VALLEY	Convenience Store	Bus Station	Pool Hall	Music Venue	Sandwich Place	Pharmacy	Gym / Fitness Center	Pizza Place	Video Store	Health & Beauty Service
25	FOUR POINTS	Coffee Shop	Sandwich Place	Pharmacy	Video Store	Bank	Taco Place	Salon / Barbershop	Big Box Store	Liquor Store	Shipping Store
26	POND SPRINGS	Health & Beauty Service	Mattress Store	Frozen Yogurt Joint	Fried Chicken Joint	Sushi Restaurant	Supplement Shop	Playground	Market	Martial Arts School	Food Truck
29	HIGHLAND	Clothing Store	Hookah Bar	Automotive Shop	Mobile Phone Shop	Chinese Restaurant	Gas Station	Brewery	Gift Shop	Shoe Store	Bank
40	GATEWAY	Warehouse Store	Hotel	Arts & Crafts Store	Furniture / Home Store	Supplement Shop	Food Court	Grocery Store	Bakery	Optical Shop	Pizza Place
42	HOLLY	Food Truck	Mexican Restaurant	BBQ Joint	Gym / Fitness Center	Italian Restaurant	Art Gallery	Arts & Crafts Store	Recreation Center	Bakery	Dance Studio
46	EAST CESAR CHAVEZ	History Museum	Bed & Breakfast	Print Shop	Park	Salon / Barbershop	Miscellaneous Shop	Food Truck	Mexican Restaurant	Café	Spa
66	SOUTH BRODIE	Mexican Restaurant	Fried Chicken Joint	Grocery Store	Food Truck	Shoe Store	Clothing Store	Café	Seafood Restaurant	Pizza Place	Liquor Store
87	TRIANGLE STATE	Coffee Shop	Salon / Barbershop	Mexican Restaurant	Yoga Studio	Supplement Shop	Sandwich Place	Restaurant	Park	Mobile Phone Shop	Mediterranean Restaurant
92	JOLLYVILLE	Bar	Convenience Store	Chinese Restaurant	Sporting Goods Shop	Gas Station	Gun Shop	Gym	Food	Liquor Store	Pizza Place
95	BRENTWOOD	Coffee Shop	Burger Joint	Ice Cream Shop	Bar	Pet Store	Cosmetics Shop	Dive Bar	Sandwich Place	Mobile Phone Shop	Shoe Store
99	SPICEWOOD	Grocery Store	Pizza Place	Chinese Restaurant	Asian Restaurant	Mexican Restaurant	Korean Restaurant	Garden Center	Pharmacy	Cajun / Creole Restaurant	South India Restaurant

Cluster 3:

	NEIGHNAME	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
79	PARKER LANE	Hotel	Gym	Food Truck	Coffee Shop	Scenic Lookout	Harbor / Marina	Park	Pool	American Restaurant	Food Court

Cluster 4:

	NEIGHNAME	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
54	WEST CONGRESS	Mexican Restaurant	Taco Place	Convenience Store	Music Venue	Art Gallery	Restaurant	Pet Store	Park	Office	Music Store

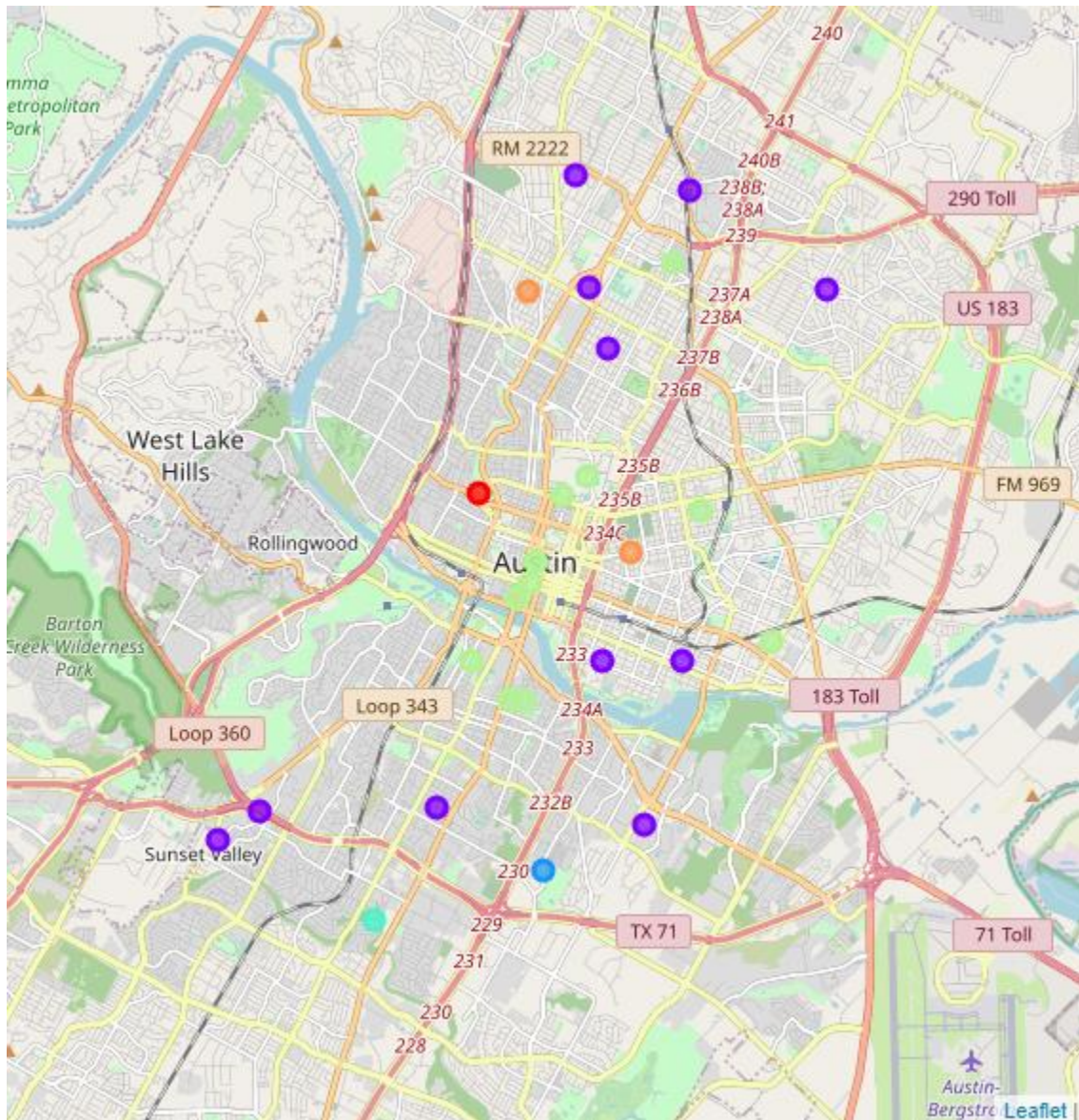
Cluster 5:

	NEIGHNAME	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
3	WEST UNIVERSITY	Fast Food Restaurant	Coffee Shop	Pizza Place	Pool	Bubble Tea Shop	Indian Restaurant	Art Museum	Public Art	Sushi Restaurant	Japanese Restaurant
5	SOUTH RIVER CITY	Coffee Shop	Shoe Store	Food Truck	Sandwich Place	Music Venue	Hotel	Vegetarian / Vegan Restaurant	Pizza Place	Souvenir Shop	Clothing Store
8	BOULDIN CREEK	Mexican Restaurant	Park	Ice Cream Shop	BBQ Joint	Japanese Restaurant	Food Truck	New American Restaurant	Pool	Basketball Stadium	Thai Restaurant
14	CIRCLE C SOUTH	Hotel	Coffee Shop	Italian Restaurant	Ice Cream Shop	Food Truck	Shoe Store	Sandwich Place	Boutique	Gym / Fitness Center	Pizza Place
17	BRODIE LANE	Fast Food Restaurant	Ice Cream Shop	Thai Restaurant	Greek Restaurant	Fried Chicken Joint	Mexican Restaurant	Pharmacy	Cosmetics Shop	Coffee Shop	Sandwich Place
28	UT	Coffee Shop	History Museum	Pool	Fast Food Restaurant	Performing Arts Venue	College Gym	Taco Place	Gift Shop	Football Stadium	Theater
30	DOWNTOWN	Hotel	Bar	Cocktail Bar	Coffee Shop	New American Restaurant	Italian Restaurant	Speakeasy	Lounge	Gay Bar	Grocery Store
35	WEST AUSTIN NG	Coffee Shop	Bar	New American Restaurant	Cocktail Bar	Hotel	Italian Restaurant	Restaurant	Mexican Restaurant	Sushi Restaurant	Taco Place
47	NORTH LOOP	Pizza Place	Convenience Store	Cocktail Bar	Thrift / Vintage Store	Bar	Dive Bar	Deli / Bodega	Park	Music Store	Coffee Shop
48	MCNEIL	Fast Food Restaurant	Mexican Restaurant	Bank	Convenience Store	Thai Restaurant	Restaurant	Coffee Shop	Sandwich Place	Shipping Store	Spa
61	CHESTNUT	Coffee Shop	Southern / Soul Food Restaurant	Taco Place	Theater	Market	Park	Convenience Store	Restaurant	Café	Art Gallery
64	NORTH BURNET	Convenience Store	Athletics & Sports	Home Service	Pool	Hotel	Taco Place	Burger Joint	Pizza Place	Grocery Store	Gym Pool
68	GOVALLE	Mexican Restaurant	Farm	Garden Center	Coffee Shop	Deli / Bodega	Bike Shop	Tea Room	Gym / Fitness Center	Bar	Bakery
70	RIVERSIDE	Hotel	Coffee Shop	Cocktail Bar	Steakhouse	Hotel Bar	Capitol Building	Bar	Mexican Restaurant	Burger Joint	Lounge
77	HIGHLAND PARK	Hotel	Coffee Shop	Cocktail Bar	Steakhouse	Hotel Bar	Capitol Building	Bar	Mexican Restaurant	Burger Joint	Lounge

Cluster 6:

	NEIGHNAME	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
62	ROSEDALE	Food Truck	Mexican Restaurant	Taco Place	Coffee Shop	Bus Station	Gym	Bakery	Park	Athletics & Sports	Convenience Store
84	CENTRAL EAST AUSTIN	Food Truck	Yoga Studio	Boutique	Café	Liquor Store	Movie Theater	Music Store	Park	Gift Shop	Cosmetics Shop

Map of the clusters is plotted and shown below, including Cluster 1 (red), Cluster 2 (purple), Cluster 3 (blue), Cluster 4 (Teal), Cluster 5 (green), Cluster 6 (Orange)



4. Discussion

Summary of the 6 cluster from the result section:

1. The first cluster consists of restaurants, grocery stores, and outdoor park/facilities.
2. The second cluster consists of utility stores such as cosmetic, salon, and mattress stores, and restaurants.
3. The third cluster consists of hotel, sports facilities such as gym, park, and pool.
4. The fourth cluster consists of restaurants, and stores.
5. The fifth cluster consists of restaurants, coffee shops, bars, hotels, and grocery stores.
6. The sixth cluster consists of restaurants, shops, and park.

Neighborhood in cluster 1, 3, 4, 6 have significantly less neighborhood than cluster 2 and 5.

As an initial assessment into neighborhoods in Austin, TX is sufficient to gain general insight of where things are in town.

The current living environment (Downtown San Jose, CA) is largely composed of restaurants, coffee shop, bars, and entertainment facilities.

If one wants to change their lifestyle minimally, neighborhoods in cluster 5 should be first looked into. For example, Govalle neighborhood in Austin, TX.

5. Conclusion

Moving from a familiar place to a completely strange place can be fearsome.

With the help of data science and Foursquare API data, one can visualize the differences in lifestyle, hence prepared with expectations.

However, one should dive deeper and consider other factors, such as housing price, crime rate, and traffic conditions, contributing to the ideal living environment in Austin, TX.