BATTLE OF THE NEIGHBORHOODS

INTRODUCTION

This project will help answer the question of which Los Angeles City police station is located in the best neighborhood, using the following criteria:

- Arrests by neighborhood
- Neighborhood characteristics
- Coffee and donut shops located near police stations
- Ratings of nearby coffee and donut shops

The above information will be used as selection criteria based on the historical use of coffee and donut shops by police officers as hangouts during the day. These venues were most likely chosen because they have sugar-laden products that keep energy high and caffeine-laden products that promote alertness. High energy and alertness are key attributes for police work.

DATA USED

City of Los Angeles police stations (population shown)

X	Y	OBJECTID	DIVISION	LOCATION	PREC
-118.289	33.75766	1	HARBOR	2175 JOHN S. GIBSON BLVD.	5
-118.275	33.93863	2	SOUTHEAST	145 W. 108TH ST.	18
-118.278	33.97031	3	77TH STREET	7600 S. BROADWAY	12
-118.42	33.99166	4	PACIFIC	12312 CULVER BLVD.	14
-118.305	34.01058	5	SOUTHWEST	1546 MARTIN LUTHER KING JR. BLVD.	3
-118.256	34.01236	6	NEWTON	3400 S. CENTRAL AVE.	13
-118.247	34.04402	7	CENTRAL	251 E. 6TH ST.	1
-118.451	34.04378	8	WEST LOS ANGELES	1663 BUTLER AVE.	8
-118.213	34.04501	9	HOLLENBECK	2111 E. 1ST ST.	4
-118.343	34.04675	10	WILSHIRE	4861 VENICE BLVD.	7
-118.291	34.05021	11	OLYMPIC	1130 S. VERMONT AVE.	20
-118.267	34.05669	12	RAMPART	1401 W. 6TH ST.	2
-118.331	34.09583	13	HOLLYWOOD	1358 N. WILCOX AVE.	6
-118.249	34.1192	14	NORTHEAST	3353 SAN FERNANDO RD.	11
-118.386	34.17169	15	NORTH HOLLYWOOD	11640 BURBANK BLVD.	15
-118.445	34.18374	16	VAN NUYS	6240 SYLMAR AVE.	9
-118.547	34.1934	17	WEST VALLEY	19020 VANOWEN ST.	10
-118.6	34.22138	18	TOPANGA	21501 SCHOENBORN ST.	21
-118.41	34.25309	19	FOOTHILL	12760 OSBORNE ST.	16
-118.531	34.25697	20	DEVONSHIRE	10250 ETIWANDA AVE.	17
-118.468	34.27298	21	MISSION	11121 N. SEPULVEDA BLVD.	19

(City of Los Angeles, 2018b)

City of Los Angeles police divisions (sample shown)

OBJECTID	APREC	PREC	AREA	PERIMETER	Shape__Area	Shape__Length
1	MISSION	19	699582609.226	190817.495739	699582609.22168	190817.495739071
2	DEVONSHIRE	17	1346816369.83	175591.702871	1346816369.84277	175591.702871059
3	FOOTHILL	16	1297384550.74	203717.879169	1297384550.74414	203717.879168575
4	TOPANGA	21	909032643.829	155505.795458	909032643.837891	155505.795457753
5	WEST VALLEY	10	936405735.233	136316.899694	936405735.210938	136316.899693628
6	NORTH HOLLYWOOD	15	634601058.555	187366.252732	634601037.733398	187366.238183618

(City of Los Angeles, 2018a)

Los Angeles Police Department arrests from 2010 to the present (sample shown)

	Report ID	Arrest Date	Time	Area ID	Area Name	Reporting District	Age	Sex Code	Descent Code	Charge Group Code	Charge Group Description	Arrest Type Code	Charge	Charge Description	Address	Cross Street	Location
0	111421932	07/02/2016	1845.0	14	Pacific	1411	50	M	H	24.0	Miscellaneous Other Violations	M	LAMC	LOS ANGELES MUNICIPAL CODE	BROOKS	OCEAN FRONT	(33.9918, -118.4791)
1	121801235	12/18/2016	940.0	18	Southeast	1822	38	F	B	24.0	Miscellaneous Other Violations	M	LAMC	LOS ANGELES MUNICIPAL CODE	300 W CENTURY BL	NaN	(33.9456, -118.2784)
2	150604240	01/03/2016	1315.0	6	Hollywood	669	43	M	O	24.0	Miscellaneous Other Violations	M	71.02LAMC	HIRE VEH W/O LIC	HOBART	SANTA MONICA	(34.0908, -118.3046)
3	150704165	04/27/2016	2230.0	7	Wilshire	721	20	F	B	6.0	Larceny	M	484(A)PC	GRAND THEFT (OVER $400)	8500 BEVERLY BL	NaN	(34.0761, -118.3766)
4	151405507	01/22/2016	1309.0	14	Pacific	1427	60	M	W	17.0	Liquor Laws	M	25620BP	OPEN ALCOHOLIC BEV IN PUBLIC PARK/PLACE	VENICE	MOTOR	(34.0237, -118.4246)

(Los Angeles Police Department, 2018)

Venues within 500 meters of City of Los Angeles police stations (sample shown)

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
0	HARBOR	33.757661	-118.289242	4bae708ef964a520a1b23be3	Fantastic Cafe	33.755438	-118.292600	American Restaurant
1	HARBOR	33.757661	-118.289242	4bd88a8635aad13a682491f3	Big Nick's Pizza	33.754244	-118.291864	Italian Restaurant
2	HARBOR	33.757661	-118.289242	4b4914a6f964a5200e6526e3	Target	33.760138	-118.293621	Big Box Store
3	HARBOR	33.757661	-118.289242	4e31c4302fb6ede816e372f6	Redbox	33.758032	-118.292398	Video Store
4	HARBOR	33.757661	-118.289242	4bc9301e3740b713a66e5e65	7-Eleven	33.758819	-118.293099	Convenience Store

(Foursquare.com, 2019)

First, LAPD arrests were grouped by police divisions showing arrest counts from 2010 to the present. Arrests by police division were displayed in a bar chart to easily identify relative arrests across police divisions.

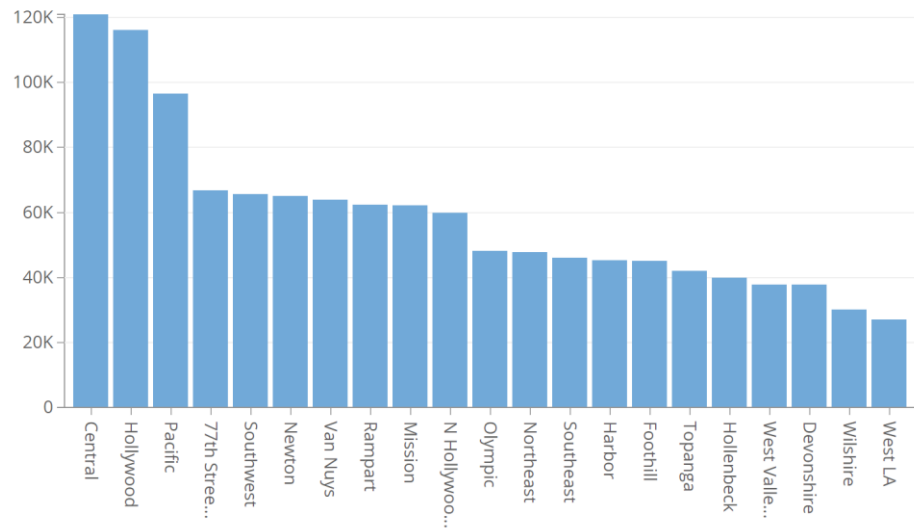| Area Name	Count
77th Street	66711
Central	120841
Devonshire	37747
Foothill	45154
Harbor	45358
Hollenbeck	39967
Hollywood	116034
Mission	62213
N Hollywood	59825
Newton	64949
Northeast	47706
Olympic	48106
Pacific	96507
Rampart	62302
Southeast	46056
Southwest	65597
Topanga	41989
Van Nuys	63794
West LA	27078
West Valley	37802
Wilshire	30148

Figure 1: Count of arrests by division

Figure 2: Bar chart of count of arrests by LAPD division

Second, police stations were added to the map related to police divisions above. In the interest of workplace convenience, data from Foursquare.com (2019) was used to map the locations of coffee and donut shops near each police station. Each shop also displays its visitor rating to determine the best coffee and donuts shops of those found.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
5	HARBOR	33.757661	-118.289242	4bf808e0508c0f4777313e31	Starbucks	33.760089	-118.293582	Coffee Shop
40	PACIFIC	33.991655	-118.419842	5b82de39234724002c252318	Sachi.LA	33.991579	-118.421575	Coffee Shop
75	NEWTON	34.012356	-118.256119	4e9cb664f7905e04cd9723e8	Primera Taza	34.013348	-118.256447	Coffee Shop
111	CENTRAL	34.044019	-118.247294	4ad7ae48f964a5209d0d21e3	Spring For Coffee	34.046210	-118.250748	Coffee Shop
114	CENTRAL	34.044019	-118.247294	501b1306e4b04341bebae94c	Tierra Mia	34.044781	-118.252099	Coffee Shop

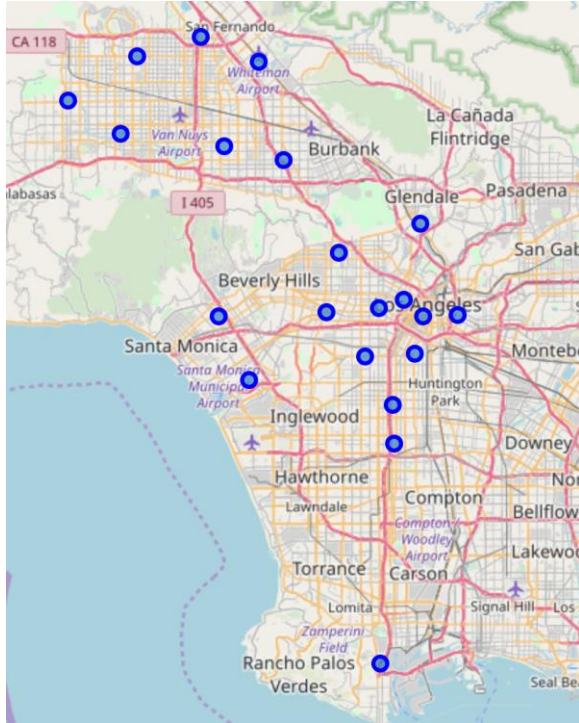*Figure 3: Sample of nearby venues filtered by coffee and donut shops*
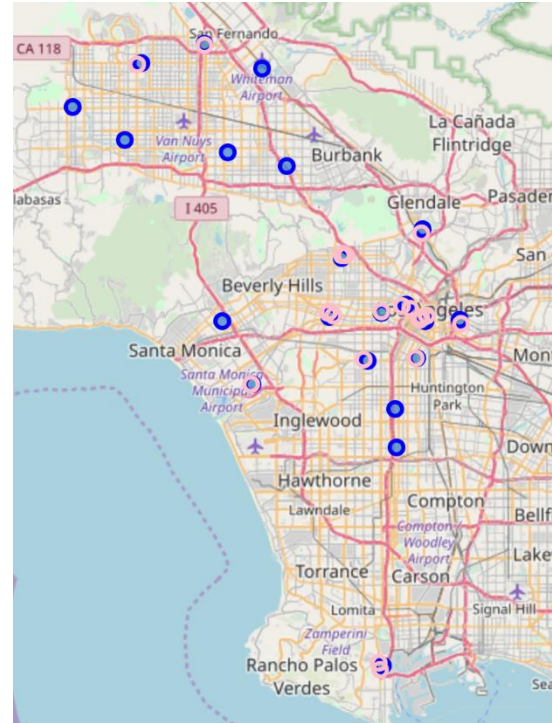
Figure 4: Police station locations

Figure 5: Coffee and donut shops mapped near police stations

Neighborhood	Count
CENTRAL	4
DEVONSHIRE	1
HARBOR	2
HOLLENBECK	1
HOLLYWOOD	5
MISSION	1
NEWTON	1
NORTHEAST	1
OLYMPIC	1
PACIFIC	2
RAMPART	2
SOUTHWEST	1
WILSHIRE	3

Figure 6: Count of coffee and donut shops by neighborhood

Neighborhood	Coffee/Donut Shops Avg Rating
CENTRAL	8.25
DEVONSHIRE	5.80
HARBOR	3.35
HOLLENBECK	0.00
HOLLYWOOD	8.06
MISSION	7.40
NEWTON	0.00
NORTHEAST	6.40
OLYMPIC	7.20
PACIFIC	0.00
RAMPART	7.45
SOUTHWEST	0.00
WILSHIRE	7.20

Figure 7: Average ratings of coffee and donut shops by neighborhood

0.00 ratings mean no ratings were provided.

Counts and average ratings of coffee and donut shops by neighborhood were determined as shown in Figures 6 and 7.

Third, the top ten venues near each police station were determined using data from Foursquare.com (2019) and analyzed for similarity using one hot encoding and k-means clustering.

	Neighborhood	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	77TH STREET	Print Shop	Chinese Restaurant	Trail	Taco Place	Food	Wings Joint	Food & Drink Shop	Fried Chicken Joint	French Restaurant	Food Truck
1	CENTRAL	Bar	Coffee Shop	Lounge	Ice Cream Shop	Gastropub	Burger Joint	Restaurant	Music Venue	Sushi Restaurant	Bookstore
2	DEVONSHIRE	Fish & Chips Shop	Gas Station	Sushi Restaurant	Fast Food Restaurant	Pizza Place	Park	Chinese Restaurant	Frozen Yogurt Shop	Mexican Restaurant	Donut Shop
3	FOOTHILL	Burger Joint	Fried Chicken Joint	Supermarket	Convenience Store	Sandwich Place	Food & Drink Shop	Frozen Yogurt Shop	French Restaurant	Food Truck	Food Court
4	HARBOR	Mexican Restaurant	Harbor / Marina	Convenience Store	Sandwich Place	Food Truck	Coffee Shop	Skate Park	Mobile Phone Shop	Pizza Place	Big Box Store
5	HOLLENBECK	Mexican Restaurant	Convenience Store	Food Truck	Taco Place	Grocery Store	Bakery	Japanese Restaurant	Light Rail Station	Pizza Place	Donut Shop
6	HOLLYWOOD	Coffee Shop	Pizza Place	Lounge	Vegetarian / Vegan Restaurant	Salon / Barbershop	Burger Joint	Park	Bar	Mexican Restaurant	Record Shop
7	MISSION	Fast Food Restaurant	Convenience Store	Auto Dealership	Sandwich Place	Coffee Shop	Food & Drink Shop	Frozen Yogurt Shop	Fried Chicken Joint	French Restaurant	Food Truck
8	NEWTON	Fast Food Restaurant	Café	Coffee Shop	Sandwich Place	Mexican Restaurant	Wings Joint	Fried Chicken Joint	French Restaurant	Food Truck	Food Court
9	NORTH HOLLYWOOD	Restaurant	Video Store	Pharmacy	Convenience Store	Tailor Shop	Wings Joint	Flower Shop	French Restaurant	Food Truck	Food Court
10	NORTHEAST	Gym / Fitness Center	Gym	Dance Studio	Martial Arts Dojo	Print Shop	Gift Shop	Furniture / Home Store	Construction & Landscaping	Paper / Office Supplies Store	Theater
11	OLYMPIC	Korean Restaurant	Fast Food Restaurant	Ice Cream Shop	Grocery Store	Diner	Pizza Place	Cosmetics Shop	Convenience Store	Sandwich Place	Coffee Shop
12	PACIFIC	Mexican Restaurant	Food Truck	Sandwich Place	Café	Bus Station	Massage Studio	Donut Shop	Coffee Shop	Food	Music Store
13	RAMPART	Fast Food Restaurant	Mexican Restaurant	Convenience Store	Sandwich Place	Coffee Shop	Liquor Store	Steakhouse	Rental Car Location	Food Truck	Chinese Restaurant
14	SOUTHEAST	Comedy Club	Food	Gym	Gym / Fitness Center	Construction & Landscaping	Fried Chicken Joint	French Restaurant	Food Truck	Food Court	Food & Drink Shop

Figure 8: Sample of top ten venues in each police division

Each neighborhood marker was then colored by its assigned cluster, indicating similar neighborhoods (Figure 9).
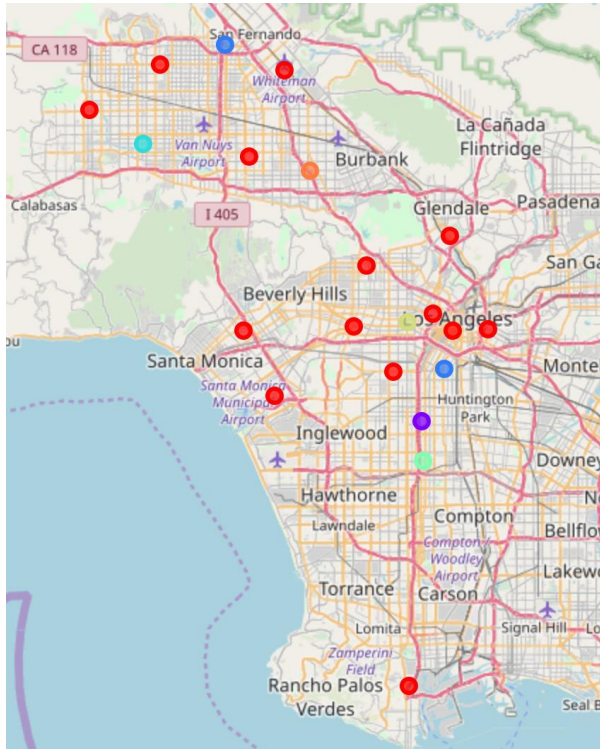

Figure 9: Police stations colored by cluster value indicating similarity of surrounding neighborhoods

RESULTS

The results of this analysis (Straede, 2019) indicate that the majority of City of Los Angeles police stations are located in similar neighborhoods, as shown in Figures 8, 9, and 10.

	Neighborhood	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	CENTRAL	0	Bar	Coffee Shop	Lounge	Ice Cream Shop	Gastropub	Burger Joint	Restaurant	Music Venue	Sushi Restaurant	Bookstore
2	DEVONSHIRE	0	Fish & Chips Shop	Gas Station	Sushi Restaurant	Fast Food Restaurant	Pizza Place	Park	Chinese Restaurant	Frozen Yogurt Shop	Mexican Restaurant	Donut Shop
3	FOOTHILL	0	Burger Joint	Fried Chicken Joint	Supermarket	Convenience Store	Sandwich Place	Food & Drink Shop	Frozen Yogurt Shop	French Restaurant	Food Truck	Food Court
4	HARBOR	0	Mexican Restaurant	Harbor / Marina	Convenience Store	Sandwich Place	Food Truck	Coffee Shop	Skate Park	Mobile Phone Shop	Pizza Place	Big Box Store
5	HOLLENBECK	0	Mexican Restaurant	Convenience Store	Food Truck	Taco Place	Grocery Store	Bakery	Japanese Restaurant	Light Rail Station	Pizza Place	Donut Shop
6	HOLLYWOOD	0	Coffee Shop	Pizza Place	Lounge	Vegetarian / Vegan Restaurant	Salon / Barbershop	Burger Joint	Park	Bar	Mexican Restaurant	Record Shop
10	NORTHEAST	0	Gym / Fitness Center	Gym	Dance Studio	Martial Arts Dojo	Print Shop	Gift Shop	Furniture / Home Store	Construction & Landscaping	Paper / Office Supplies Store	Theater
12	PACIFIC	0	Mexican Restaurant	Food Truck	Sandwich Place	Café	Bus Station	Massage Studio	Donut Shop	Coffee Shop	Food	Music Store
13	RAMPART	0	Fast Food Restaurant	Mexican Restaurant	Convenience Store	Sandwich Place	Coffee Shop	Liquor Store	Steakhouse	Rental Car Location	Food Truck	Chinese Restaurant
15	SOUTHWEST	0	Fast Food Restaurant	Southern / Soul Food Restaurant	Spanish Restaurant	Donut Shop	Currency Exchange	Cosmetics Shop	Road	Sandwich Place	Seafood Restaurant	Chinese Restaurant
16	TOPANGA	0	Mexican Restaurant	Thrift / Vintage Store	Breakfast Spot	Pizza Place	Chinese Restaurant	Strip Club	Supermarket	Convenience Store	Soccer Field	Hobby Shop
17	VAN NUYS	0	Convenience Store	Chinese Restaurant	Mobile Phone Shop	Pizza Place	Mexican Restaurant	Shipping Store	Sandwich Place	Food	Skating Rink	Bank
18	WEST LOS ANGELES	0	Mexican Restaurant	Sushi Restaurant	Japanese Restaurant	Indie Movie Theater	Middle Eastern Restaurant	Pharmacy	Shoe Store	Café	Cocktail Bar	Sake Bar
20	WILSHIRE	0	American Restaurant	Coffee Shop	Mexican Restaurant	Wings Joint	Donut Shop	Shipping Store	Sandwich Place	Comedy Club	Convenience Store	Dessert Shop

Figure 10: Majority of police divisions are in the same cluster

There are less police stations located in the lower arrest divisions. In addition, there is a surprising lack of coffee or donut shops nearby many of the police stations. Also, the highest number and average highest rating for coffee and donut shops are located in highest arrest divisions – Central and Hollywood.

DISCUSSION

To find the "best" LAPD police station neighborhood based on the criteria cited in the introduction, a balance between number and quality of coffee and donut shops and arrest volume. Clearly, Central and Hollywood have the highest number and highest average ratings of coffee and donut shops nearby. However, they are also the neighborhoods that have the highest arrests.

Neighborhood clustering indicated that the majority of police station neighborhoods are similar based on all nearby venues, not just coffee and donut shops.

CONCLUSION

From the analysis, the "best" police station neighborhood is Wilshire due to its lower arrests (indicating a safer neighborhood), neighborhood cluster (similar to many neighborhoods with a wide variety of venues nearby), and number and average rating of nearby coffee and donut shops, 3 and 7.2 respectively.

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