

**Suitable location for a new restaurant in Washington**

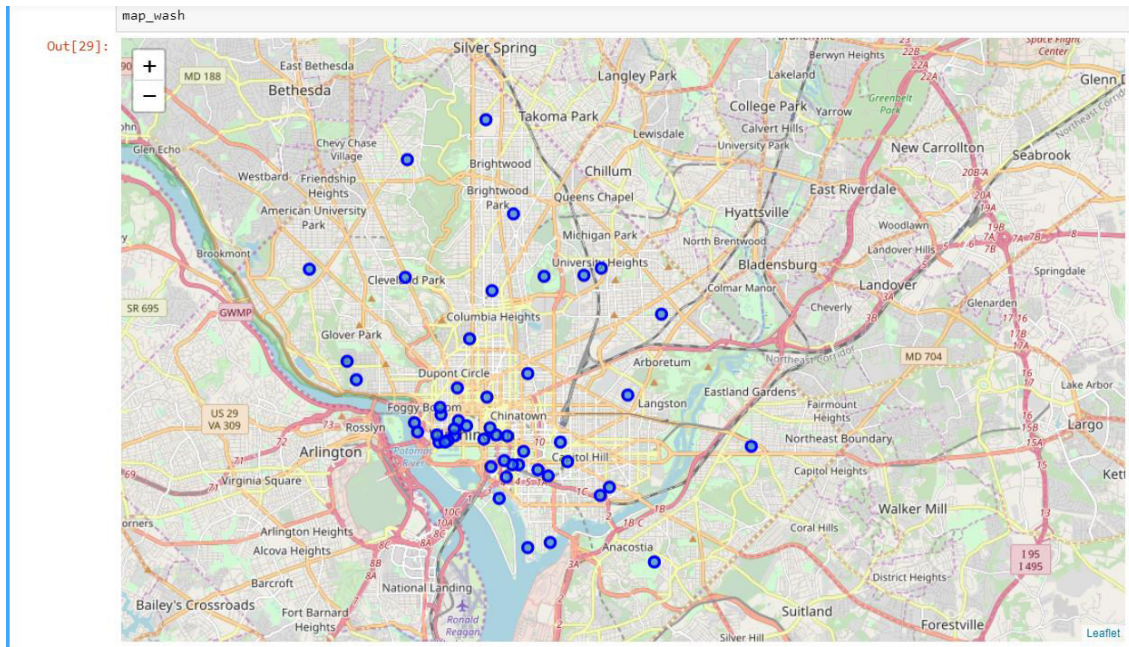
**Kyle Lam**

## Induction/ Business Problem

We want to open a new restaurant in Washington. We want to find out the best location for the new restaurant. The suitable location could make things easier for the new business. Therefore, our aim is to take advantage of the data to decide the suitable location.

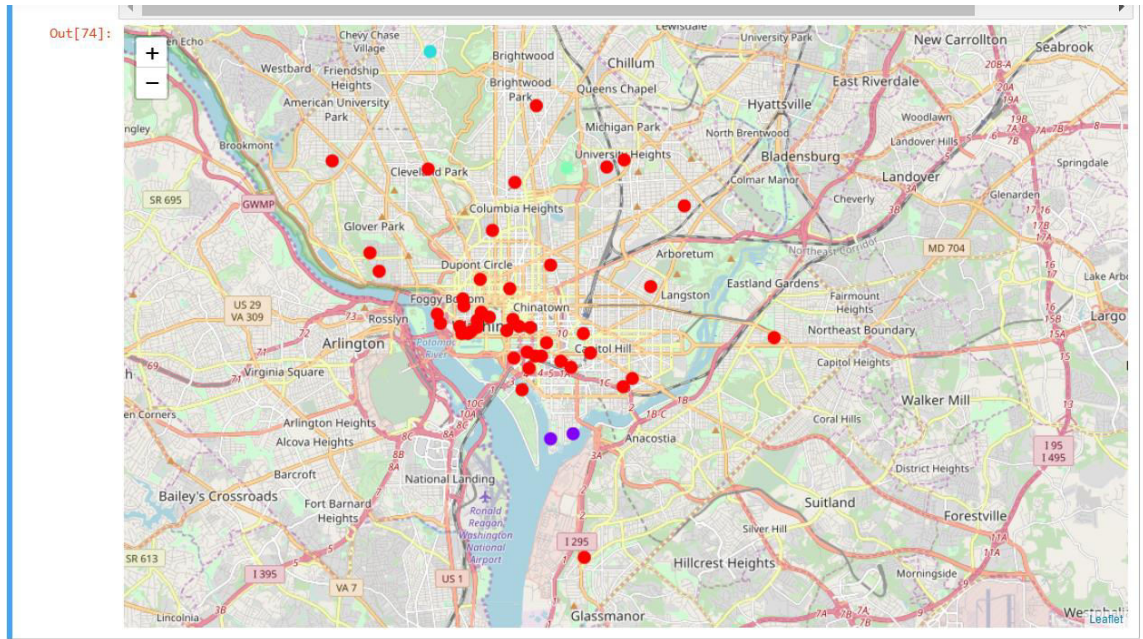
## Data

First, we need to split Washington into different areas and determine the similarity among them. Then, we could easily group them into different clusters. We download the location data into a zip file from free online source. It contains many features including latitude, longitude etc.



## Methodology

We are going to use the k-means clustering algorithm to find out each group in Washington. After that, we optimize the k which is 7 in the algorithm.



## Results

We found out that the suitable location for the restaurant should be at cluster 0. It was shown on the last part of the code file.

## Cluster 0

	zip	county_name	Cluster Labels	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
6213	20001	District of Columbia	0	Liquor Store	BBQ Joint	Yoga Studio	Dog Run	Café	Cocktail Bar	Coffee Shop	Convenience Store	Pizza Place
6214	20002	District of Columbia	0	Sandwich Place	Diner	Bus Line	New American Restaurant	Food & Drink Shop	Gym	Liquor Store	Bar	Moving Target
6215	20003	District of Columbia	0	Spa	Gym / Fitness Center	Mobile Phone Shop	Italian Restaurant	Sandwich Place	Chinese Restaurant	Bar	Bakery	Coffee Shop
6216	20004	District of Columbia	0	Hotel	Science Museum	Coffee Shop	Bakery	American Restaurant	Sandwich Place	Plaza	Exhibit	Steakhouse
6217	20005	District of Columbia	0	Hotel Bar	Coffee Shop	American Restaurant	Food Truck	Salon / Barbershop	Latin American Restaurant	Deli / Bodega	Sandwich Place	Sushi Restaurant
6218	20006	District of Columbia	0	Sandwich Place	Hotel	Café	American Restaurant	History Museum	Park	Bakery	Mexican Restaurant	Indian Restaurant
6219	20007	District of Columbia	0	Fast Food Restaurant	Bus Station	Park	Dog Run	Bagel Shop	Food Truck	Food & Drink Shop	Food Court	Fountain
6220	20008	District of Columbia	0	Mexican Restaurant	Italian Restaurant	Mediterranean Restaurant	Supplement Shop	Steakhouse	Sports Bar	Gift Shop	Liquor Store	Café
6221	20009	District of Columbia	0	Pizza Place	Cosmetics Shop	Jazz Club	Restaurant	Taco Place	Diner	Ethiopian Restaurant	Bakery	Latin American Restaurant
6222	20010	District of Columbia	0	Vietnamese Restaurant	Bakery	Pizza Place	Asian Restaurant	Yoga Studio	Caribbean Restaurant	Breakfast Spot	Mediterranean Restaurant	Soccer Field
6223	20011	District of Columbia	0	Burger Joint	Food & Drink Shop	Taco Place	Bar	Latin American Restaurant	Breakfast Spot	Market	Chinese Restaurant	Electronics Store
6226	20016	District of Columbia	0	Tea Room	Tennis Court	College Cafeteria	Sandwich Place	College Residence Hall	Shipping Store	Art Museum	Burger Joint	Restaurant
6227	20017	District of Columbia	0	Bank	Gym Pool	Recreation Center	Vietnamese Restaurant	Rental Car Location	Bar	Convenience Store	Grocery Store	Ethiopian Restaurant
6228	20018	District of Columbia	0	Martial Arts Dojo	Memorial Site	Paper / Office Supplies Store	Coffee Shop	Clothing Store	Grocery Store	Japanese Restaurant	Discount Store	Men's Store
6229	20019	District of Columbia	0	Metro Station	Convenience Store	Parking	Park	Seafood Restaurant	Diner	Hot Dog Joint	IT Services	Fountain
6231	20024	District of Columbia	0	Music Venue	Fish Market	Ice Cream Shop	Café	Seafood Restaurant	Donut Shop	Spanish Restaurant	Caribbean Restaurant	Coffee Shop
6232	20032	District of Columbia	0	Grocery Store	Pizza Place	Convenience Store	Yoga Studio	Food Court	Flower Shop	Food	Food & Drink Shop	Fountain
6233	20036	District of Columbia	0	Salad Place	Café	Hotel Bar	Sandwich Place	Thai Restaurant	Coffee Shop	Pizza Place	Italian Restaurant	Mediterranean Restaurant
6234	20037	District of Columbia	0	Hotel	Performing Arts Venue	Italian Restaurant	Concert Hall	Boat or Ferry	Gift Shop	Café	Chinese Restaurant	Seafood Restaurant
6235	20045	District of Columbia	0	Sandwich Place	American Restaurant	Coffee Shop	Steakhouse	Seafood Restaurant	Café	Monument / Landmark	Bakery	Plaza
6236	20052	District of Columbia	0	Sandwich Place	Hotel	American Restaurant	Bakery	Food Truck	Convenience Store	Café	Chinese Restaurant	Salad Place
6237	20053	District of Columbia	0	Sandwich Place	Gym	Thai Restaurant	Government Building	Coffee Shop	Gym / Fitness Center	Food Court	Mexican Restaurant	Shipping Store
6238	20057	District of Columbia	0	Deli / Bodega	Sandwich Place	Gym / Fitness Center	Park	Farmers Market	Fast Food Restaurant	Snack Place	Café	Bus Station
6239	20064	District of Columbia	0	American Restaurant	Bookstore	Sandwich Place	Theater	College Bookstore	Fast Food Restaurant	Farmers Market	College Arts Building	Pizza Place
6287	20202	District of Columbia	0	Art Museum	Exhibit	Rental Car Location	Science Museum	Sandwich Place	Deli / Bodega	Coffee Shop	Hotel	Sculpture Garden
6288	20204	District of Columbia	0	Sandwich Place	Hotel	Exhibit	Monument / Landmark	Garden	Gym	Pizza Place	Science Museum	Fountain
6289	20228	District of Columbia	0	Art Museum	Sandwich Place	Café	Bookstore	Gift Shop	Harbor / Marina	Boat or Ferry	Art Gallery	Garden
6290	20230	District of Columbia	0	Exhibit	Hotel	Café	Sandwich Place	Coffee Shop	Garden	Monument / Landmark	Plaza	Mexican Restaurant
6291	20240	District of Columbia	0	Sandwich Place	Hotel	History Museum	Garden	Bus Station	Outdoor Sculpture	Mobile Phone Shop	Roof Deck	Concert Hall
6292	20245	District of Columbia	0	Sandwich Place	Plaza	Outdoor Sculpture	Hotel	History Museum	Historic Site	Convenience Store	Monument / Landmark	Food Truck
6293	20260	District of Columbia	0	Sandwich Place	Food Truck	Mexican Restaurant	Seafood Restaurant	Fish Market	Rental Car Location	Pizza Place	Café	Pharmacy

6297	20390	District of Columbia	0	Sandwich Place	Bar	Art Gallery	Italian Restaurant	Café	Sushi Restaurant	Steakhouse	New American Restaurant	Spa
6298	20405	District of Columbia	0	Sandwich Place	Hotel	History Museum	American Restaurant	Food Truck	Art Museum	Convenience Store	Plaza	Café
6299	20418	District of Columbia	0	Monument / Landmark	Outdoor Sculpture	Sandwich Place	Food Truck	Hotel	Lake	Garden	Food Court	Gift Shop
6300	20427	District of Columbia	0	Sandwich Place	American Restaurant	Hotel	Salad Place	Café	Bakery	Indian Restaurant	Greek Restaurant	Burger Joint
6301	20506	District of Columbia	0	Hotel	Park	Sandwich Place	Garden	American Restaurant	Government Building	Salad Place	Mediterranean Restaurant	Monument / Landmark
6302	20510	District of Columbia	0	American Restaurant	Hotel	Library	Plaza	Deli / Bodega	Gift Shop	Park	Sculpture Garden	Coffee Shop
6303	20520	District of Columbia	0	Sandwich Place	Hotel	Outdoor Sculpture	Convenience Store	Grocery Store	Café	Deli / Bodega	Plaza	Pizza Place
6304	20535	District of Columbia	0	Theater	History Museum	American Restaurant	Steakhouse	Pizza Place	Indian Restaurant	Coffee Shop	Italian Restaurant	Burger Joint
6305	20540	District of Columbia	0	Library	Sandwich Place	Taco Place	American Restaurant	Mexican Restaurant	Food Truck	Bar	Deli / Bodega	Spa
6306	20551	District of Columbia	0	Sandwich Place	Outdoor Sculpture	Hotel	Monument / Landmark	Plaza	Food Truck	Convenience Store	Pharmacy	Scenic Lookout
6307	20553	District of Columbia	0	Sandwich Place	Science Museum	Art Museum	Exhibit	Coffee Shop	Rental Car Location	Plaza	Burger Joint	Sculpture Garden
6308	20560	District of Columbia	0	Food Truck	History Museum	Art Museum	Sandwich Place	Plaza	Gift Shop	Coffee Shop	Café	Sculpture Garden
6309	20565	District of Columbia	0	Art Museum	Food Truck	History Museum	Science Museum	Gift Shop	Garden	Plaza	Monument / Landmark	American Restaurant
6310	20566	District of Columbia	0	Performing Arts Venue	Hotel	Chinese Restaurant	Concert Hall	Gift Shop	Boat or Ferry	Opera House	Restaurant	Fast Food Restaurant

## Conclusion

We used the location data and machine learning algorithm which is k-means clustering to find out the suitable area for the new restaurant. Turns out that we should choose cluster 0 as the location. It would help the stakeholders to make a final decision.