Work Assessment Analysis

Methods

This project is going to find which place is the best place for coworking of 2022 xtern summer internship program. Since I don't know the exact start date of this program, I suggest that the whole program will start at May 16th and will end at July 24th, the time length is 10 weeks here. Then I used google map api and folium api to get geometry information for events, restaurants, coworking places, and housing place. After figuring out all geometry information, I started clustering. I set 5 coworking places as center of each cluster. Basically, I cluster by geometry position. However, I think clustering by itself may not give me the optimal coworking place, so I not only calculate the time to the events and restaurants that for the optimal coworking place generated from clustering result, but also calculate all time spent information for other coworking place.

Analysis

In the time range from 5/16/2022 to 7/24/2022, there are 17 events nearby, including 4 conferences or TED talks. There are 35 restaurants that in the range 1000m of coworking places that have 4.5 or higher rating and can be visited as dinner place because I think for rating that is higher than 4.5, food quality of restaurants will not have big difference so I can just focus on the position of restaurants. The clustering result shows that Industrious Mass Ave is the best place for coworking. It has 21 events or restaurants in the cluster. Here is the table of cluster information.

label	lat	long	name
0	18	18	18
1	7	7	7
2	9	9	9
3	21	21	21
4	3	3	3

Figure 1

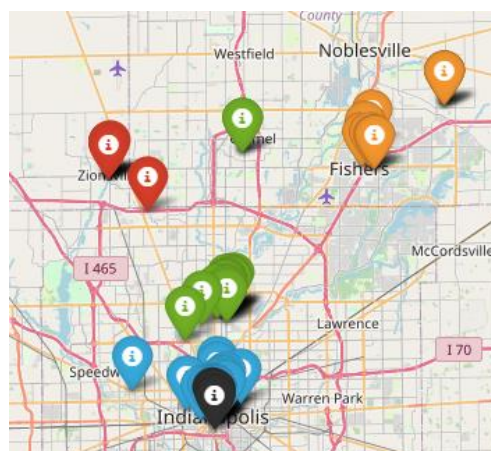And here is the clustering information on the map.

Figure 2

You can check "All_info_with_cluster.html" for a more detailed look. And

"All_info_without_cluster.html" is for all information that not clustered on map.

Since I think clustering by itself may not give me the optimal coworking place, I scheduled events and restaurants for all coworking place to see if Industrious Mass Ave is the best place for coworking. And here is the result. I evaluate the goodness of a place by calculating the time spent on travel to there. In order to get rid of the influence of rush hour traffic, I set the departure time at 7/2/2022 23:59:59:00 for all time calculation in this project. The result still shows Industrious Mass Ave is the best coworking place overall.

	event_time	restaurant_time	to_housing	total
0	5360	1343	1252	7955
1	8241	8571	1696	18508
2	9461	8853	1952	20266
3	1882	2204	521	4607
4	2101	2564	551	5216

Figure 3

I calculate event_time by adding up all time spent to events, and get restaurant_time by adding up time spent on top 10 restaurants that takes the least time to get there. to_housing is simply the time spent on traveling from coworking to housing.

	name	lat	long	time	type	location
4	Industrious Mass Ave	39.765831	-86.157617	4607	Coworking	350 Massachusetts Ave Suite 300, Indianapolis,...
5	Launch Indy	39.759349	-86.158047	5216	Coworking	525 S Meridian St, Indianapolis, IN 46225
1	The Speak Easy	39.848873	-86.141295	7955	Coworking	5255 Winthrop Ave #110, Indianapolis, IN 46220
2	zWORKS	39.951492	-86.260870	18508	Coworking	85 E Cedar St #1502, Zionsville, IN 46077
3	Launch Fishers	39.966764	-86.008809	20266	Coworking	12175 Visionary Way, Fishers, IN 46038

Figure 4

We can see that Industrious Mass Ave always spent least time except on travelling to restaurants. However, the difference is not large. Therefore, based on time spent information, you always want to set coworking place at Industrious Mass Ave unless you only care about the time spent on travelling to restaurants. Here is an overall plot of all time spent.
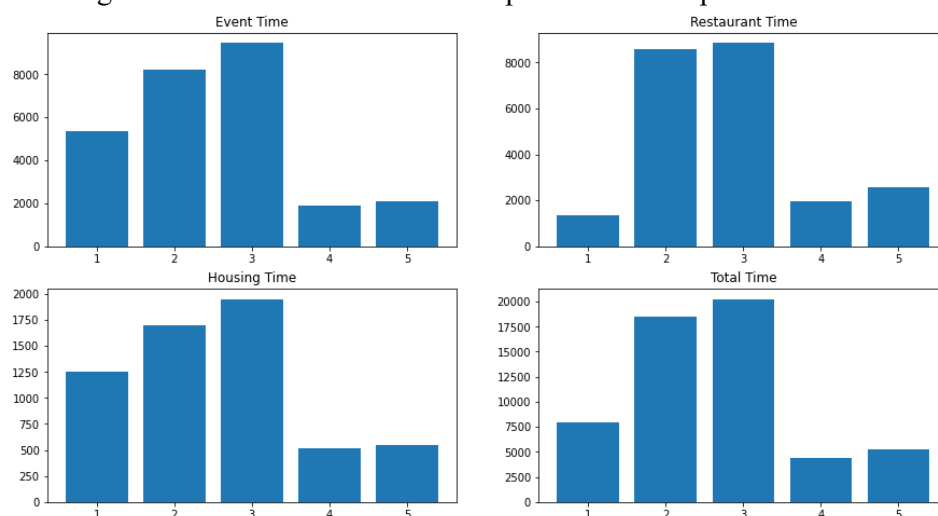

Figure 5

There is another reason why I want to choose Industrious Mass Ave as the coworking place. It has the least time spent travel to housing. I think this is important is because that coworkers have to travel between coworking place and housing place 10 times a week. So in total there will be 100 travels between housing and coworking, and this will be a great amount of time.

The schedule I made for Industrious Mass Ave are below.

	lat	long	label	name	type	time	date	Location	details
0	39.763119	-86.157761	4	Illusions The Drag Queen Show Indianapolis - D...	Art	167	2022-05-21	247 S Meridian St, Indianapolis, IN 46225	Illusions the Drag Queen Show Indianapolis is ...
3	39.784061	-86.154390	3	Coffee with the Curator 2022	Conference or TED	385	2022-06-03	1230 North Delaware Street, Indianapolis, IN 4...	If you love coffee, pastries, and a good dose ...
2	39.767445	-86.161028	3	Steel Magnolias	Art	264	2022-06-04	140 West Washington Street, Indianapolis, IN	Before it was a movie, this pop culture favori...
5	39.788434	-86.154912	3	Talbot Street Art Fair	Art	445	2022-06-18	16th and Talbott Sts., Indianapolis, IN 46202	With over 200 artists from across the nation, ...
1	39.767361	-86.156675	3	H.M. Saffer, II	Art	201	2022-07-02	42 East Washington Street, Indianapolis, IN	New York-based painter H.M. Saffer, II is know...
4	39.776642	-86.146297	3	ComedySportz	Sports	420	2022-07-16	721 Massachusetts Avenue, Indianapolis, IN	Two teams battle for laughs and points as they...

Figure 5

	lat	long	label	name	type	time	location	details	date
0	39.766791	-86.155693	3	Fogo de Chão Brazilian Steakhouse	Restaurant	117	117 E Washington St, Indianapolis	Housed in the former Zipper Building – named f...	2022-05-22
1	39.764556	-86.159645	4	Harry & Izzy's	Restaurant	145	153 Illinois St, Indianapolis	Harry & Izzy's is a restaurant that offers a s...	2022-05-29
2	39.766069	-86.158312	3	The Oceanaire Seafood Room	Restaurant	159	30 S Meridian St, Indianapolis	The Oceanaire provides the perfect setting to ...	2022-06-05
3	39.766272	-86.159535	3	Ruth's Chris Steak House	Restaurant	197	45 S Illinois St, Indianapolis	At Ruth's Chris, your last bite is just as goo...	2022-06-12
4	39.766249	-86.156826	3	Pearl Street Pizzeria & Pub	Restaurant	214	65 E Pearl St, Indianapolis	The locally owned Pearl Street Pizzeria & Pub ...	2022-06-19
5	39.771813	-86.153972	3	The Eagle	Restaurant	226	310 Massachusetts Ave, Indianapolis	We start with cage free, free roaming, all nat...	2022-06-26
6	39.767406	-86.159195	3	The Capital Grille	Restaurant	227	40 W Washington St, Indianapolis	Make it a day to remember. From birthdays and ...	2022-07-03
7	39.768380	-86.159623	3	Hyde Park Prime Steakhouse	Restaurant	277	51 N Illinois St, Indianapolis	Offering American entrees, craft cocktails, we...	2022-07-10
8	39.770901	-86.147055	3	Vida	Restaurant	286	601 E New York St, Indianapolis	Vida embodies a modern expression of culinary ...	2022-07-17
9	39.774737	-86.149746	3	LouVino Indianapolis Mass Ave Restaurant & Win...	Restaurant	356	530 Massachusetts Ave #140, Indianapolis	LouVino is a southern inspired small plates re...	2022-07-24

Figure 6

For a more detailed look, I stored figure 5 in "shceduled_events.csv" and figure 6 in "schedule_restaurants_info.csv". I also attached other files. In the appendix, I will include a file description.

Result

From clustering alone, I suggest Industrious Mass Ave as coworking place, for time spent on travelling to scheduled events, restaurants, and housing, I would suggest Industrious Mass Ave in general. If one only care about work close to good restaurants, then I would suggest The Speak Easy, for any other condition, I would suggest Industrious Mass Ave. If one wants to spent less time one housing to coworking travelling, I would still suggest Industrious Mass Ave, for which is my biggest concern.

Appendix

All_info_with_cluster.html

map information of all events, restaurants, coworking, and housing, interactive, clustered

All_info_without_cluster.html

map information of all events, restaurants, coworking, and housing, interactive, not clustered

Coworking_detailed_time_spent.csv

Time spent on travelling from different coworking places to different scheduled events, restaurants, and housing. Shows total and separate data.

Coworking_time_spent.csv

Time spent on travelling from different coworking places to different scheduled events, restaurants, and housing. Just shows total time but includes more detailed coworking geometry information

d.csv

Detail information of scheduled events for Industrious Mass Ave

d2.csv

Detail information of scheduled restaurants for Industrious Mass Ave

Data.csv

Initial information of housing and coworking

event.csv

Nearby event information

Housing_Coworking_Info.csv

Coworking and housing coordinates information and time spent from coworking to housing.

Housing_Coworking_place.html

Map information of housing and coworking, interactive

restaurants.csv

All nearby restaurants. Within 1000mm, rating higher than 4.5, suitable for dinner.

schedule_restaurants_info.csv

Detailed information of scheduled restaurants, and the scheduled date.

scheduled_events.csv

Detailed information of scheduled events, and the scheduled date.

time_spent_subplot.png

Four plots for time spent from coworking to events, restaurants, housing, and total time spent.