

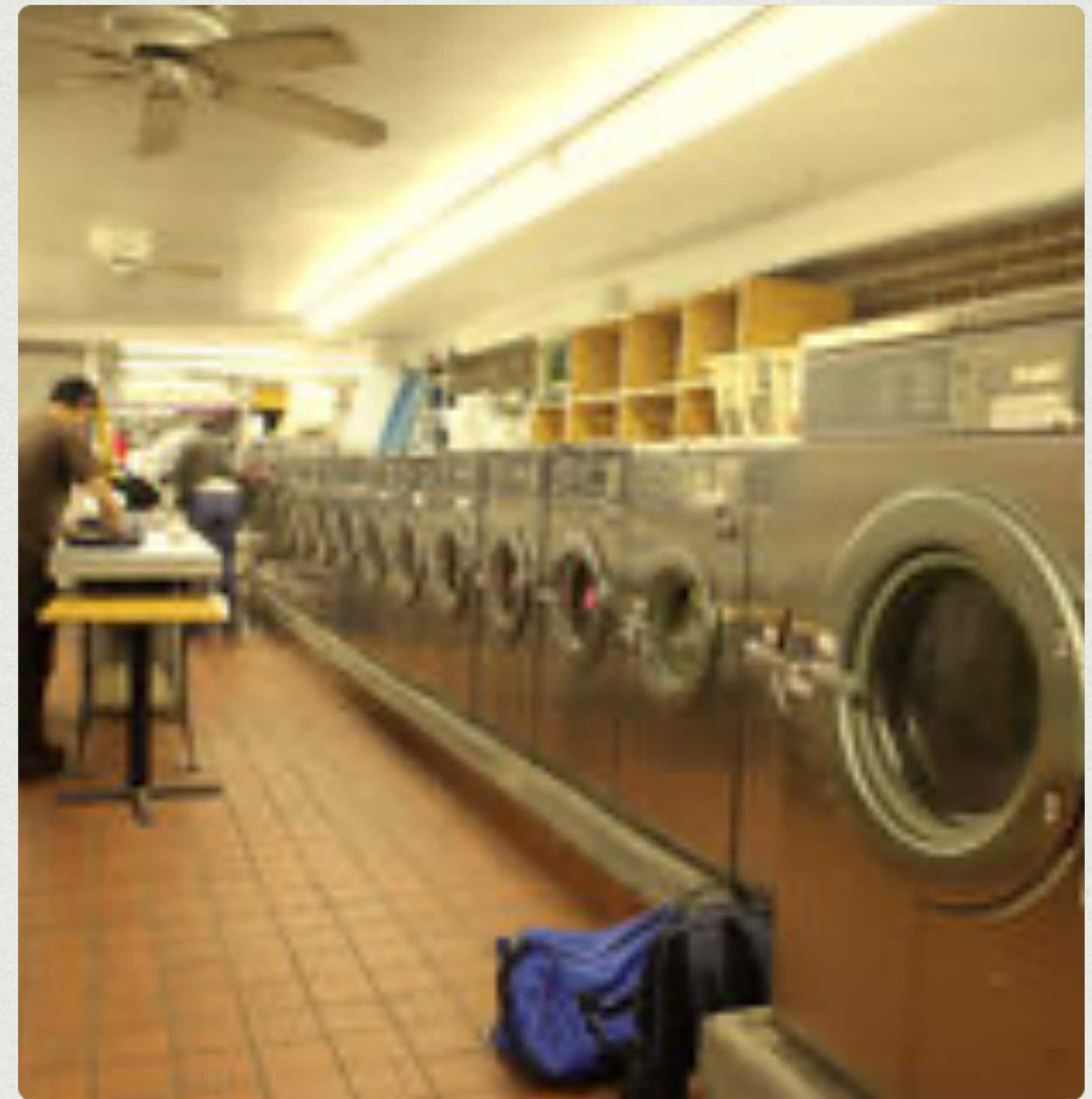
A NEW LAUNDROMAT IN  
WALLA WALLA

*Nathan Rathge*



# WHERE TO PUT A NEW LAUNDROMAT?

- A client would like a new laundromat in Walla Walla, WA
- What makes a laundromat successful?
- Find characteristics of neighborhoods where laundromats currently exist and find similar neighborhoods





# DATA ACQUISITION FROM FOURSQUARE

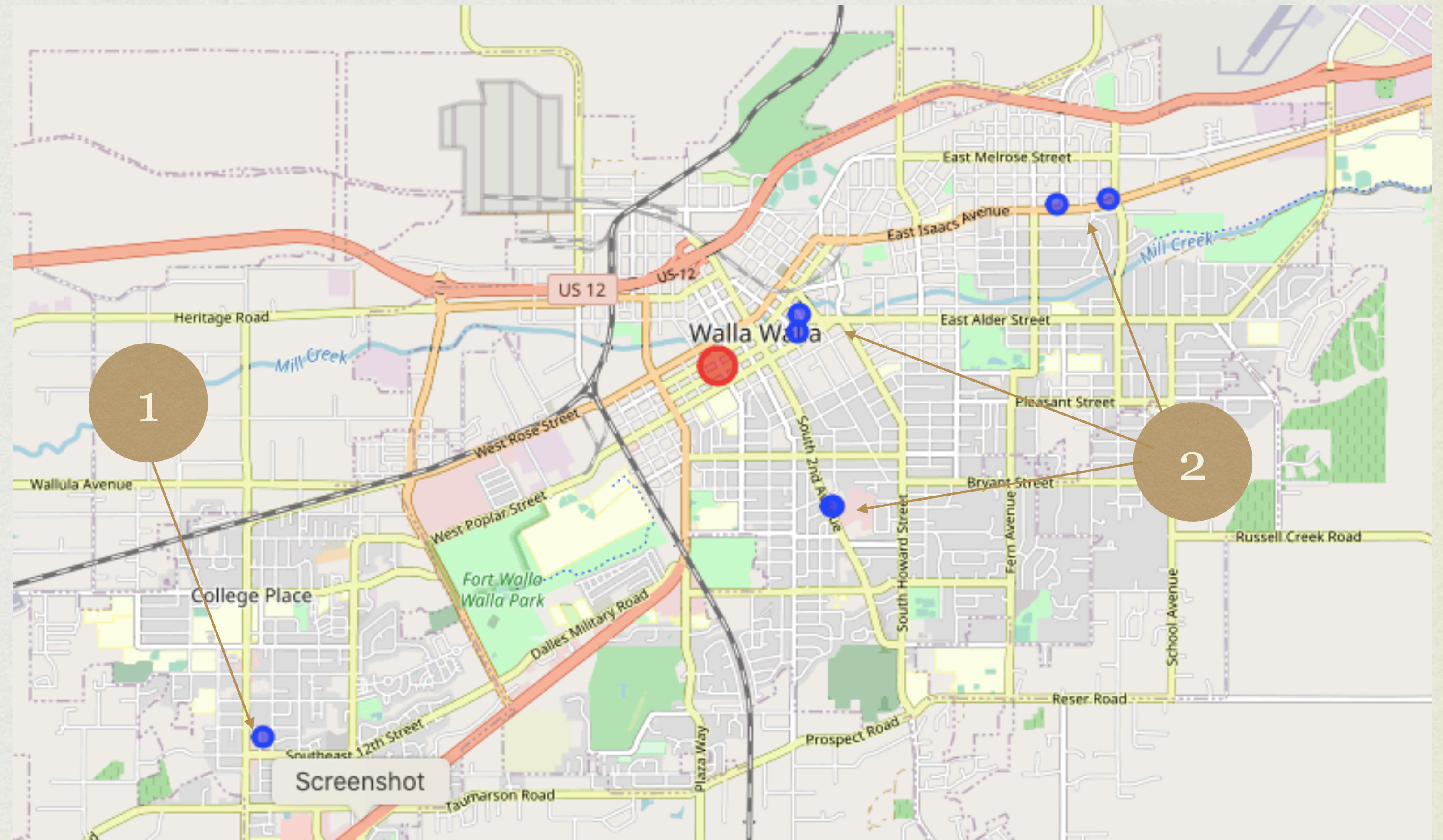


- Use the Foursquare API
- Input the data "Walla Walla, WA" for location and laundromat type categories, and retrieve the latitude & longitude coordinates for the city center and the laundromats.
- Use K-means to create clusters of "laundromat" locations



# CURRENT LAUNDROMATS

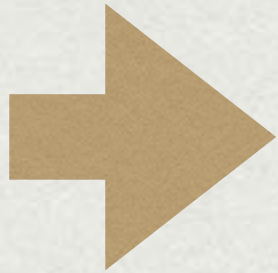
- There are currently 7 laundromats in Walla Walla
- There are 4 clusters of laundromats (Three clusters of two and one by itself)
- These clusters are used to find characteristics of neighborhoods with laundromats





# RETRIEVE DATA FOR EACH CLUSTER

1. For each cluster, collect all the venues within 0.5 miles.



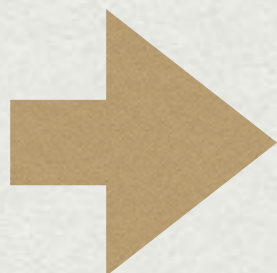
Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Neighborhood Coords	Venue Category
46.075538	-118.307703	Fancy Nails & Tanning	46.076621	-118.305277	46.075538, -118.3077025	Tanning Salon
46.075538	-118.307703	Dutch Bros Coffee	46.075244	-118.311226	46.075538, -118.3077025	Café
46.075538	-118.307703	Taqueria Mi Pueblito	46.074990	-118.313206	46.075538, -118.3077025	Mexican Restaurant
46.075538	-118.307703	Green Lantern	46.074726	-118.313956	46.075538, -118.3077025	Bar
46.075538	-118.307703	Modern Restaurant	46.078121	-118.305479	46.075538, -118.3077025	Chinese Restaurant

2. Count the number of venues in each cluster.



Neighborhood Coords	
46.03961569112464, -118.38701039135303	11
46.05516179797363, -118.33192727514648	5
46.06742819762553, -118.33520471888028	48
46.075538, -118.3077025	31

3. For each group, normalize the data and display the top five venues in each cluster to look for patterns. (There didn't seem to be any!)



```
----46.03961569112464, -118.38701039135303----
      venue  freq
0  Pizza Place 0.09
1  Big Box Store 0.09
2  Coffee Shop 0.09
3  Post Office 0.09
4  Sandwich Place 0.09
```

```
----46.05516179797363, -118.33192727514648----
      venue  freq
0  Bakery 0.2
1  Grocery Store 0.2
2  Mexican Restaurant 0.2
3  Credit Union 0.2
4  Convenience Store 0.2
```

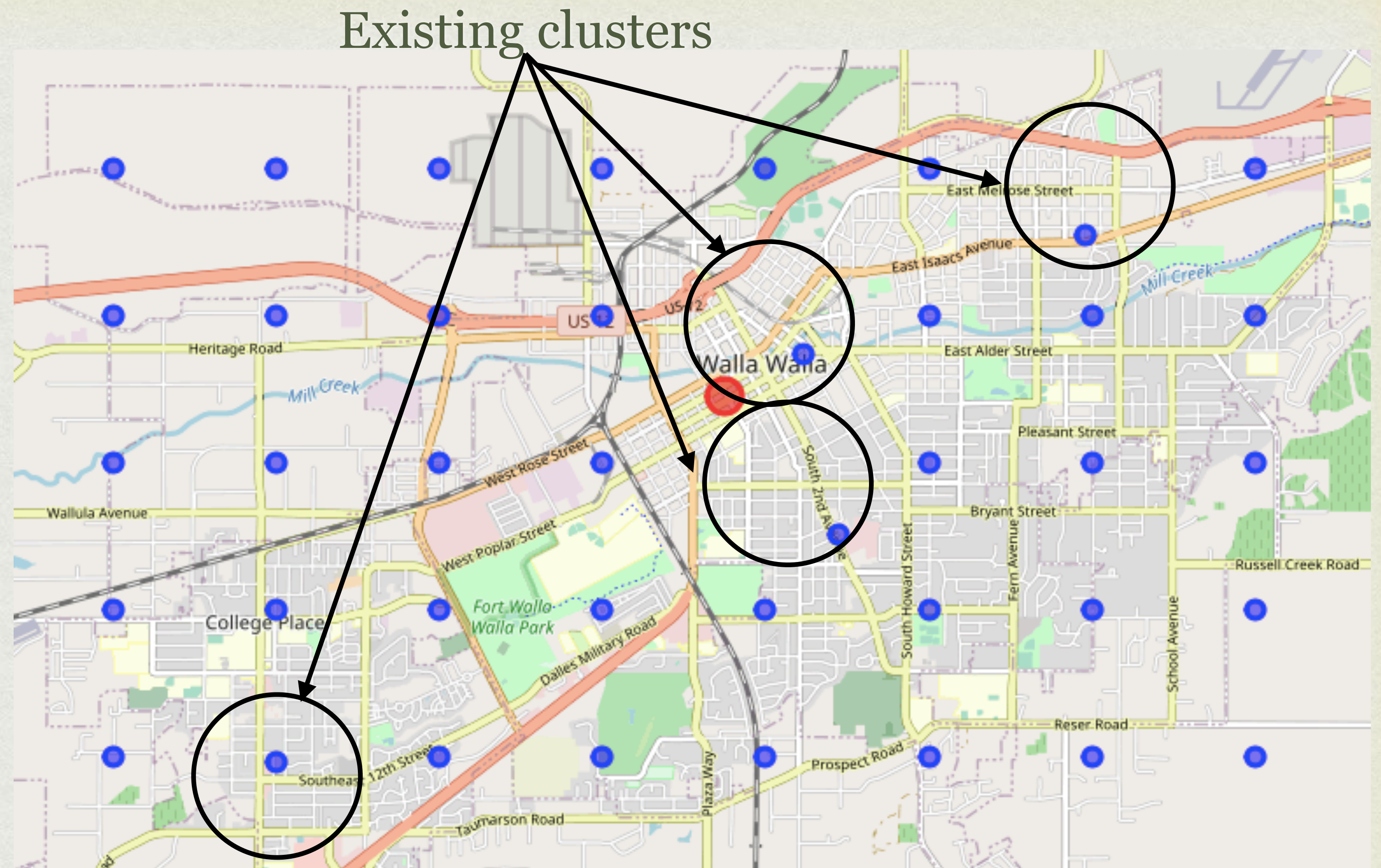
```
----46.06742819762553, -118.33520471888028----
      venue  freq
0  American Restaurant 0.08
1  Hotel 0.08
2  Lounge 0.04
3  Winery 0.04
4  Wine Shop 0.04
```

```
----46.075538, -118.3077025----
      venue  freq
0  Fast Food Restaurant 0.13
1  Coffee Shop 0.06
2  Chinese Restaurant 0.06
3  Mexican Restaurant 0.06
4  Sandwich Place 0.03
```



# CREATE GRID FOR OTHER NEIGHBORHOODS

- Create a grid of 40 neighborhoods, including the four laundromat clusters.





# RETRIEVE DATA FOR EACH NEW NEIGHBORHOOD

1. For each cluster, collect all the venues within 0.5 miles.



Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Neighborhood Coords	Venue Category
46.040000	-118.40300	R & G Lawn Care & Irrigation	46.046406	-118.398312	46.04, -118.403	Construction & Landscaping
46.039616	-118.38701	Andy's Market	46.039552	-118.387003	46.03961569, -118.38701039	Grocery Store
46.039616	-118.38701	GameStop	46.034210	-118.380885	46.03961569, -118.38701039	Video Game Store
46.039616	-118.38701	Papa Murphy's	46.033749	-118.380979	46.03961569, -118.38701039	Pizza Place
46.039616	-118.38701	Papa Murphy's	46.033749	-118.380979	46.03961569, -118.38701039	Pizza Place

2. Count the number of venues in each cluster.



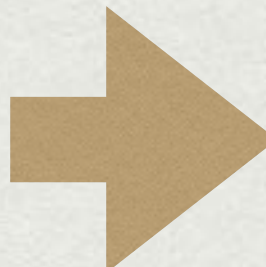
Neighborhood Coords	
46.03961569, -118.38701039	11
46.04, -118.307	4
46.04, -118.323	3
46.04, -118.339	1
46.04, -118.355	8
46.04, -118.371	4
46.04, -118.403	1
46.05, -118.391	1

3. For each group, normalize the data and display the top five venues in each cluster to look for patterns. (Again, there didn't seem to be any!)

```
----46.03961569, -118.38701039----
      venue  freq
0      Post Office  0.09
1      Video Store  0.09
2      Sandwich Place  0.09
3      Gas Station  0.09
4  Vegetarian / Vegan Restaurant  0.09
```

```
----46.04, -118.307----
      venue  freq
0      Hotel  0.25
1      Resort  0.25
2      Track  0.25
3      Farm  0.25
4      ATM  0.00
```

```
----46.04, -118.323----
      venue  freq
0      Bar  0.33
1      Track  0.33
2      Theater  0.33
3  Mobile Phone Shop  0.00
4      Pizza Place  0.00
```

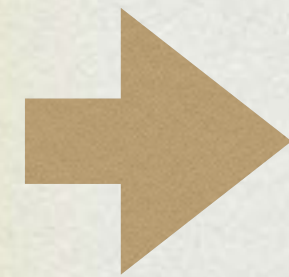


```
----46.04, -118.339----
      venue  freq
0  Construction & Landscaping  1.0
1      ATM  0.0
2  Health & Beauty Service  0.0
3      Playground  0.0
4      Pizza Place  0.0
```



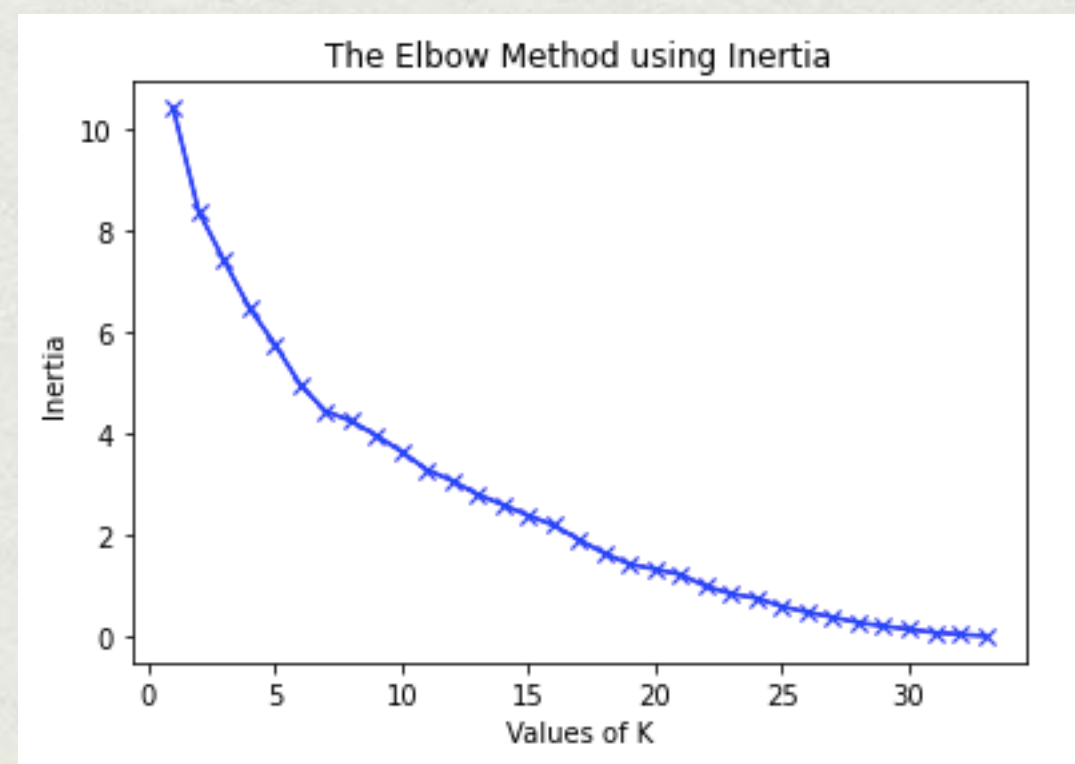
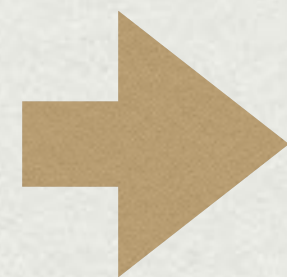
# MORE DATA ANALYSIS

4. Count the number of venues in each cluster and arrange from first most common to fifth.

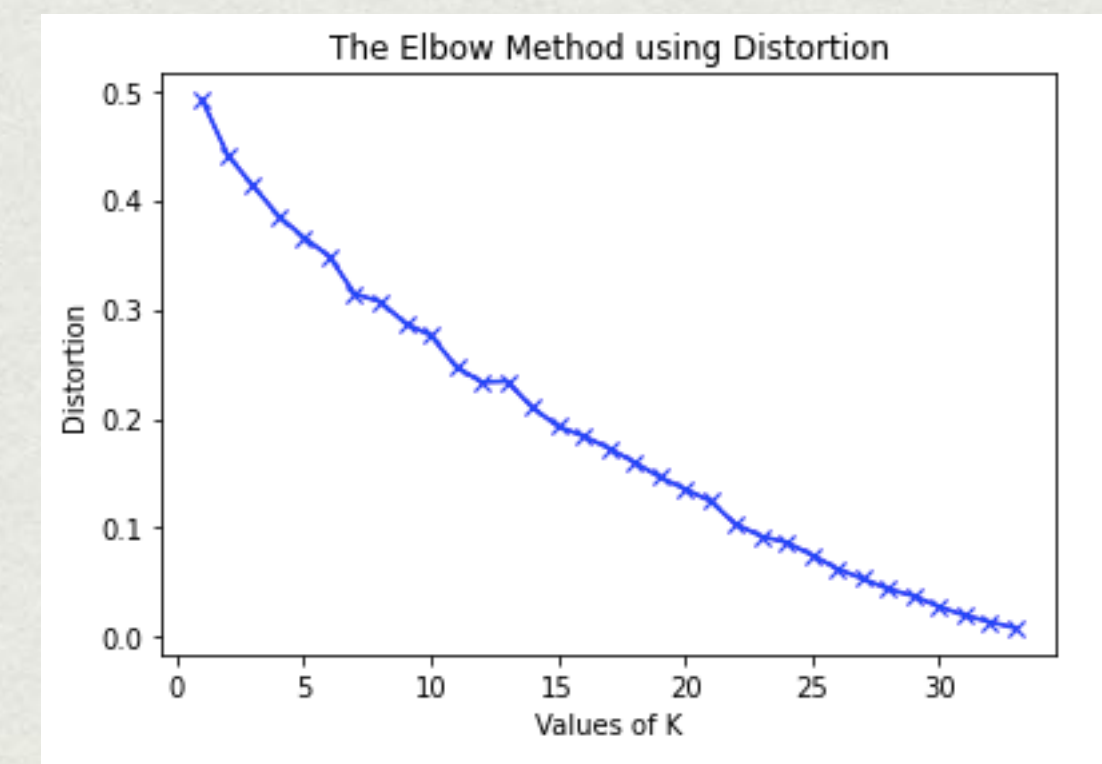


Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
46.03961566, -118.33701039	Grocery Store	Vegetarian / Vegan Restaurant	Sandwich Place	Big Box Store	Coffee Shop
46.04, -118.307	Resort	Hotel	Track	Farm	Zoo
46.04, -118.323	Track	Theater	Bar	Zoo	Dog Run
46.04, -118.339	Construction & Landscaping	Zoo	Farm	Coffee Shop	Convenience Store
46.04, -118.355	Dog Run	Pet Store	Hotel	BBQ Joint	Bank
46.04, -118.371	Pet Store	Brewery	BBQ Joint	Sporting Goods Shop	Zoo
46.04, -118.403	Construction & Landscaping	Zoo	Farm	Coffee Shop	Convenience Store
46.05, -118.291	Brewery	Zoo	Chinese Restaurant	Coffee Shop	Construction & Landscaping

5. Attempt to analyze with K-means, and hope to find an "elbow point" with errors.



There was no clear "elbow"!

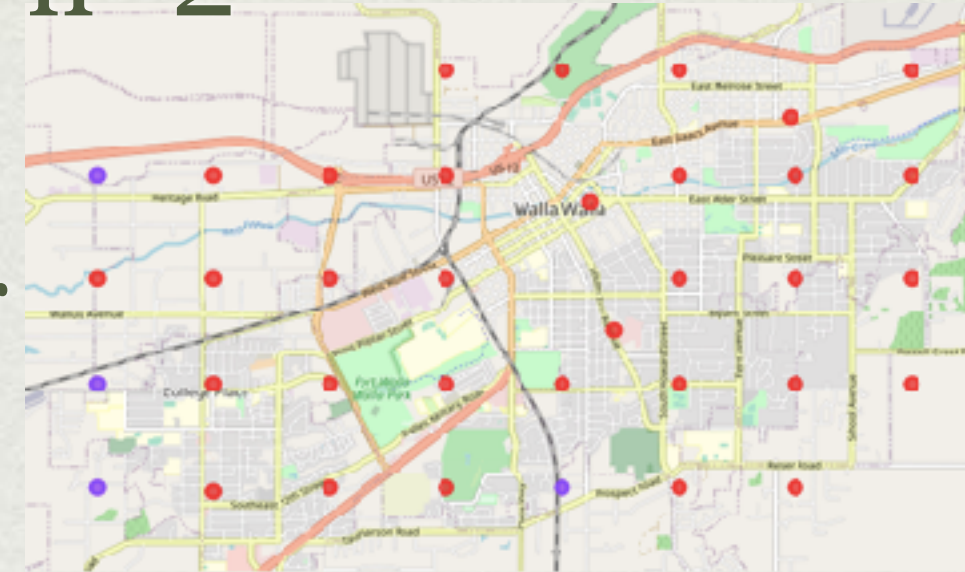




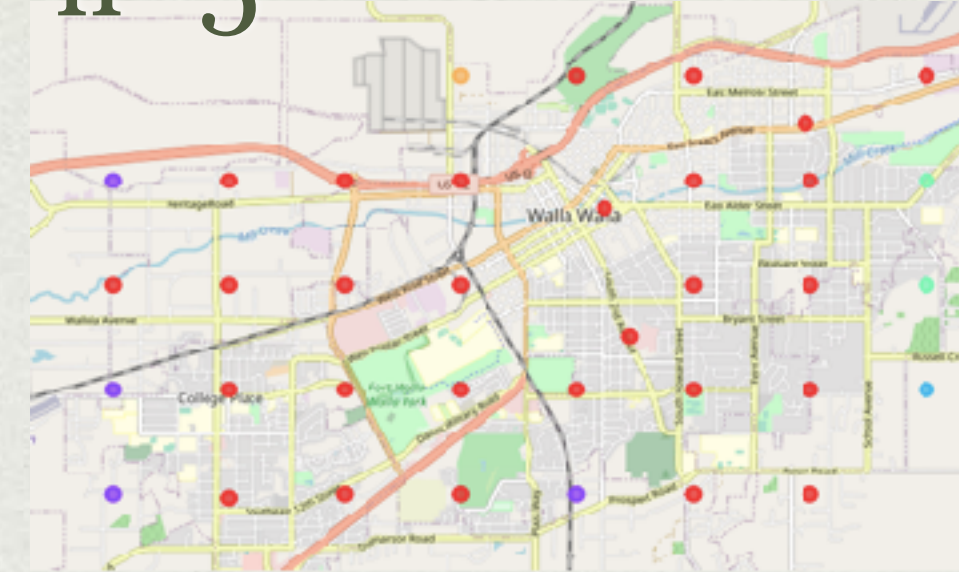
# CLUSTER VISUALIZATIONS

Neighborhoods were plotted for each K-means value 1-30 with different colored dots for similar clusters.

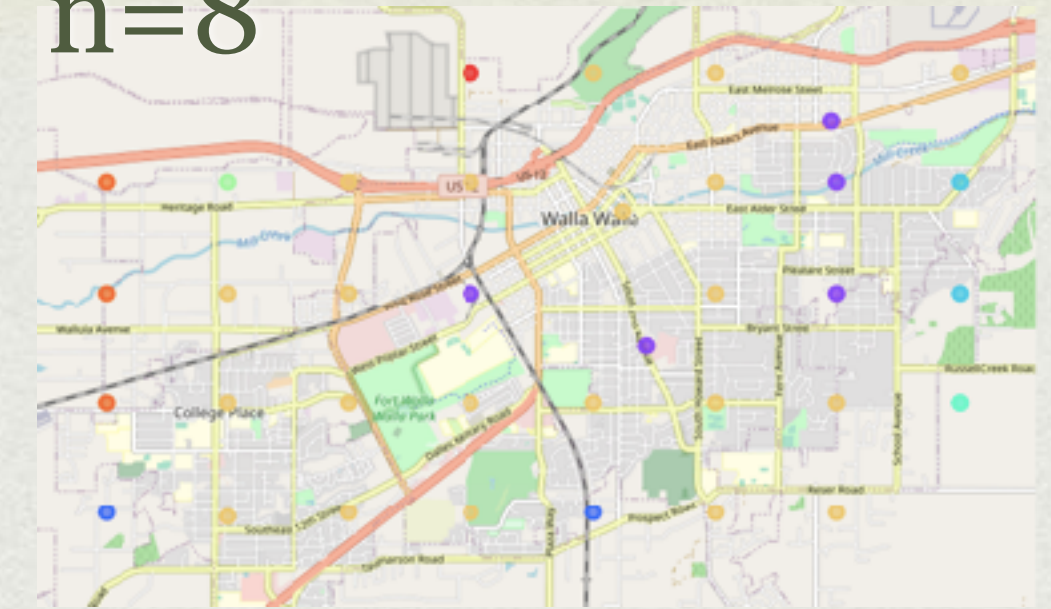
n=2



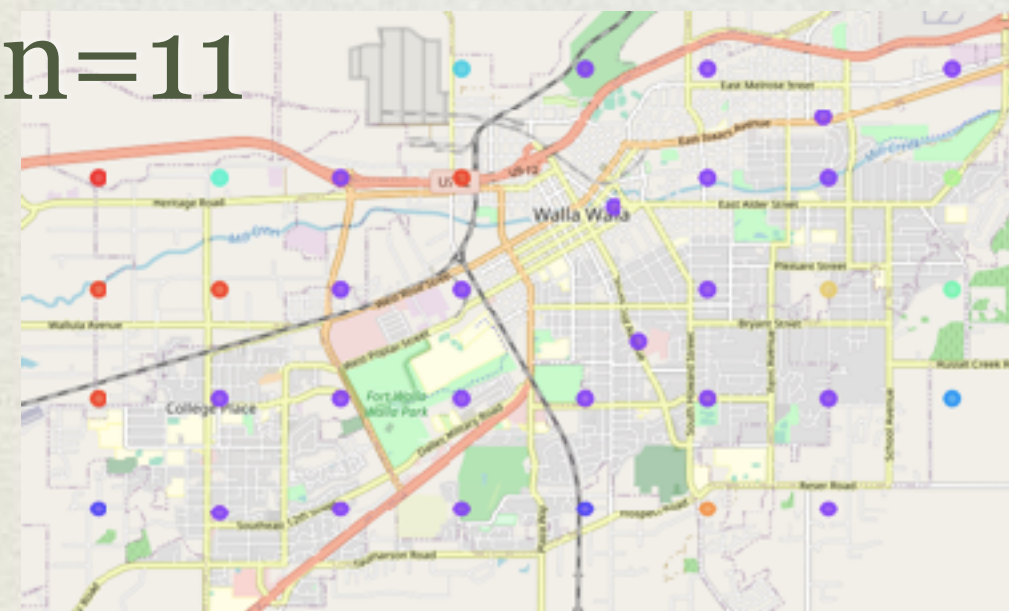
n=5



n=8



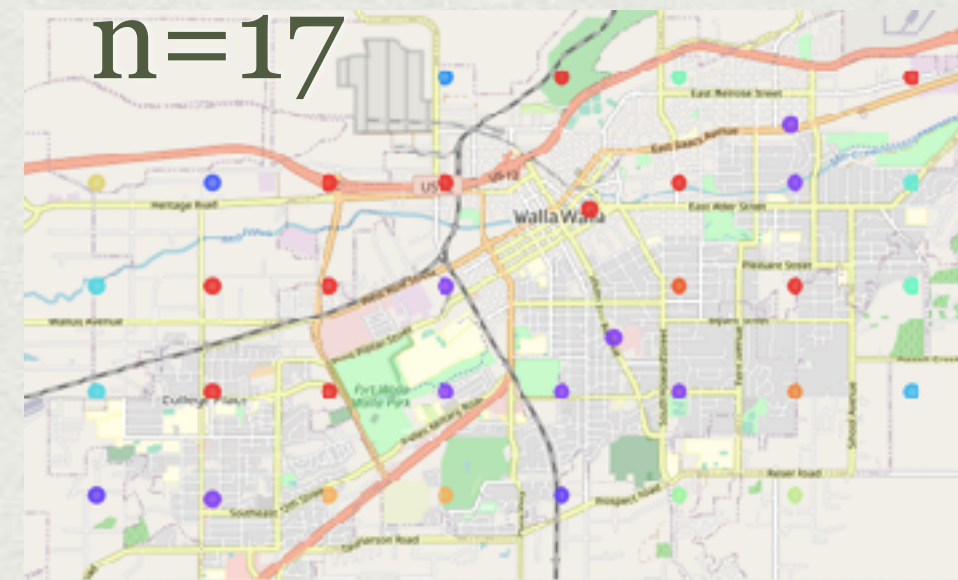
n=11



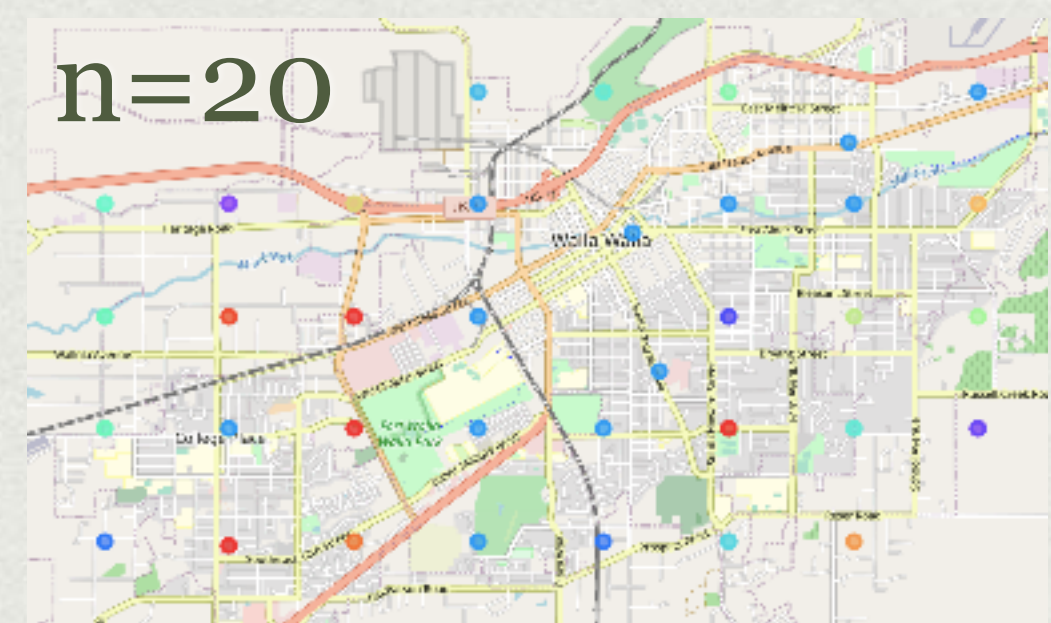
n=14



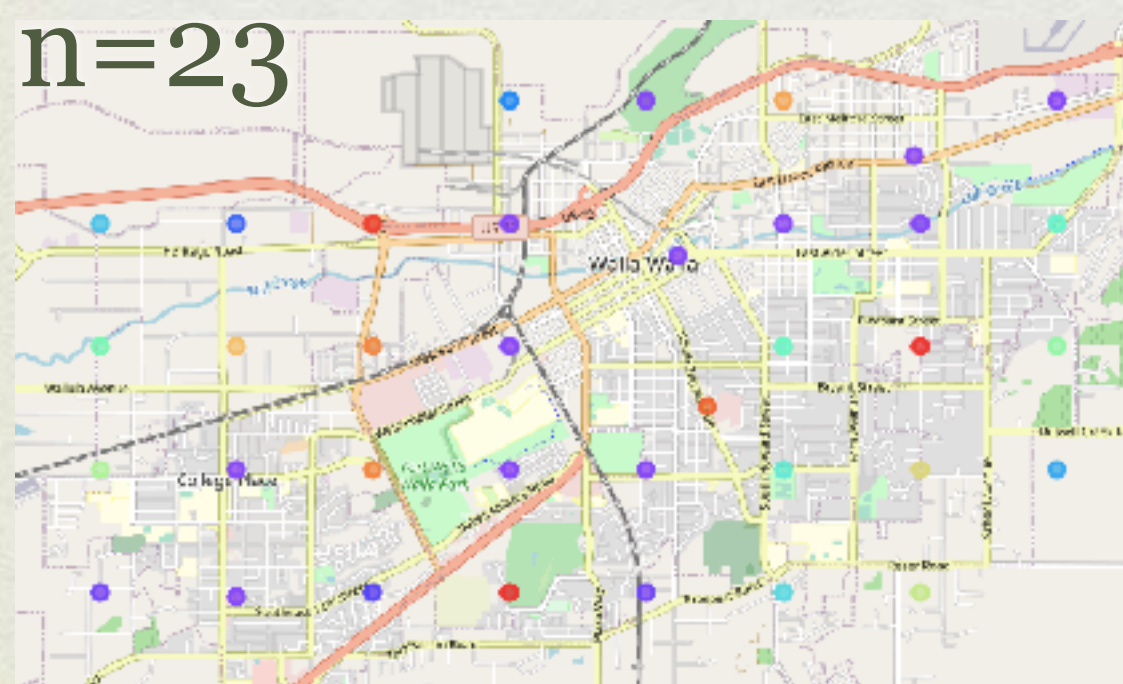
n=17



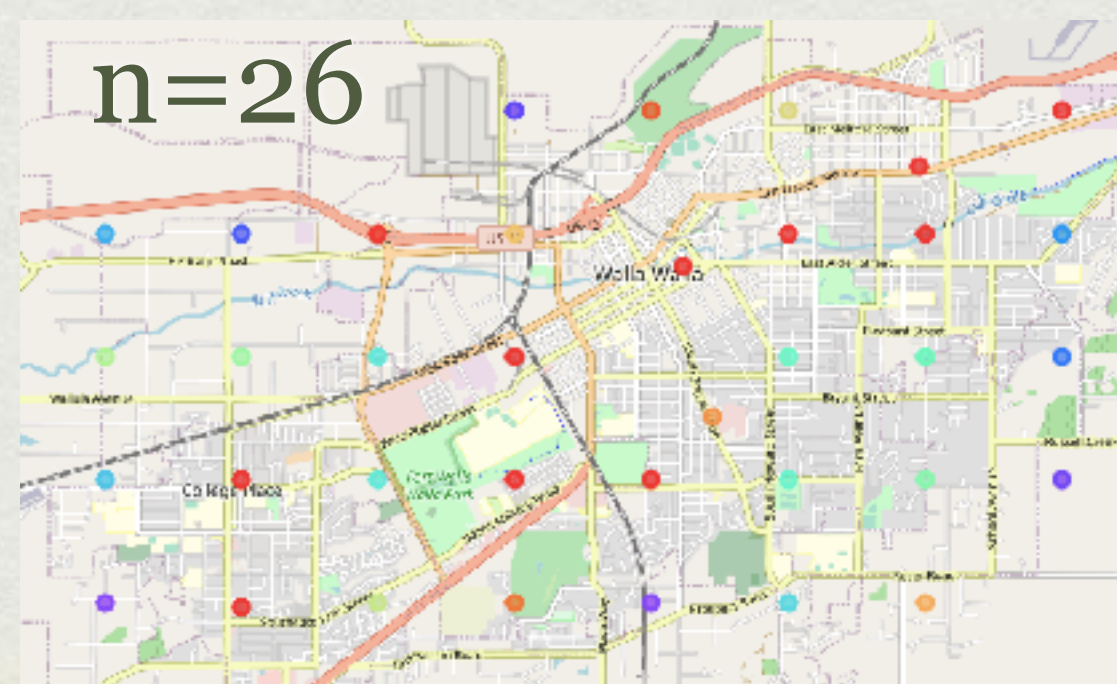
n=20



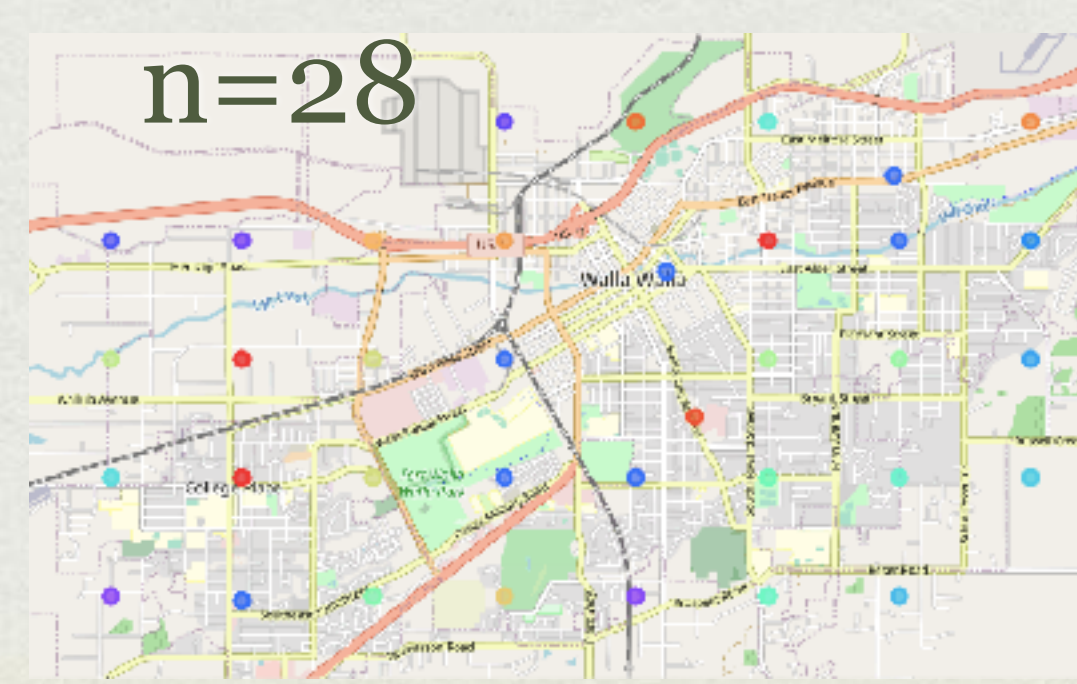
n=23



n=26



n=28



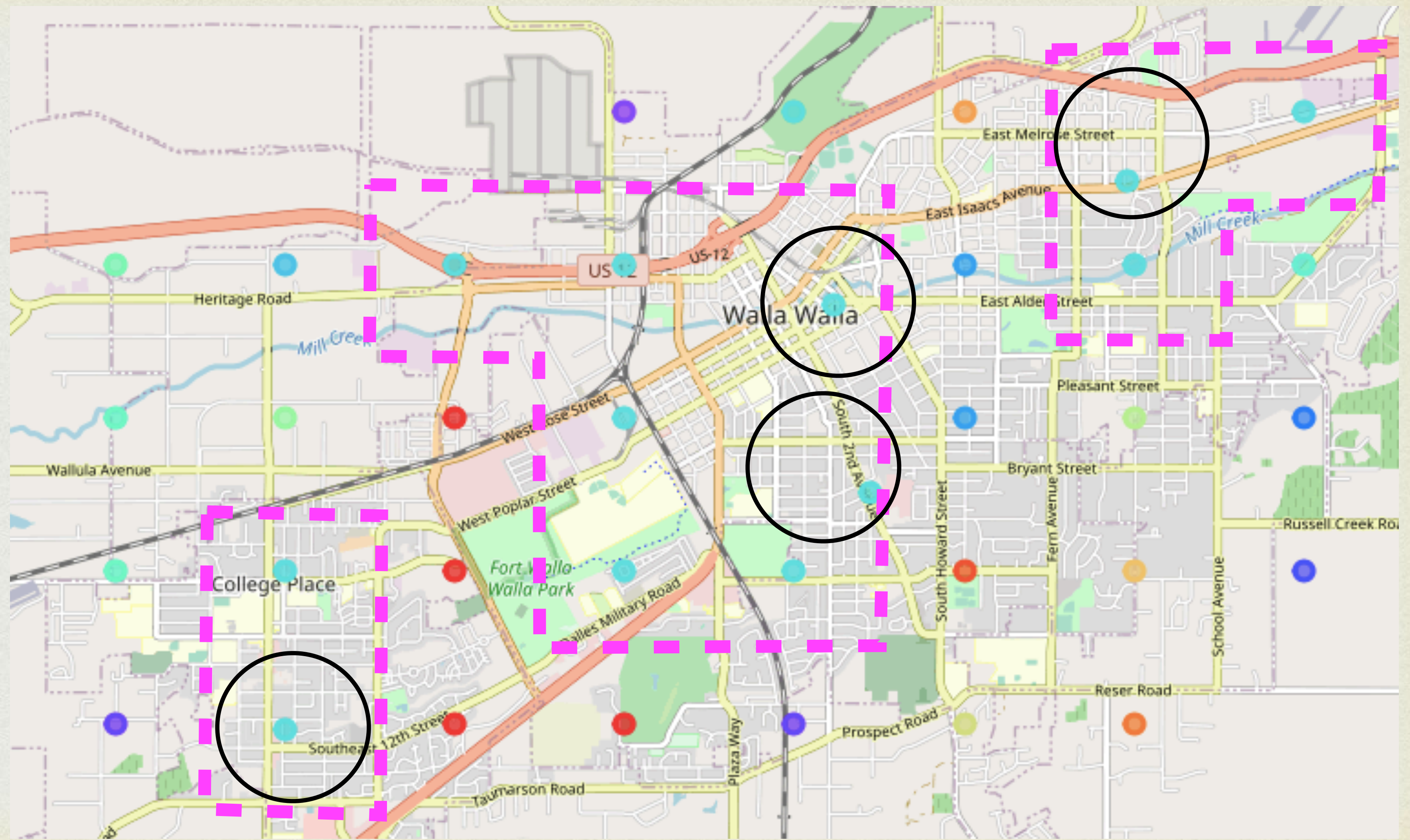
n=30





# K=19

K-means value of  $K=19$  was chosen because it included all four laundromat locations in one grouping and narrowed the value to the least amount of remaining locations, which is 8.



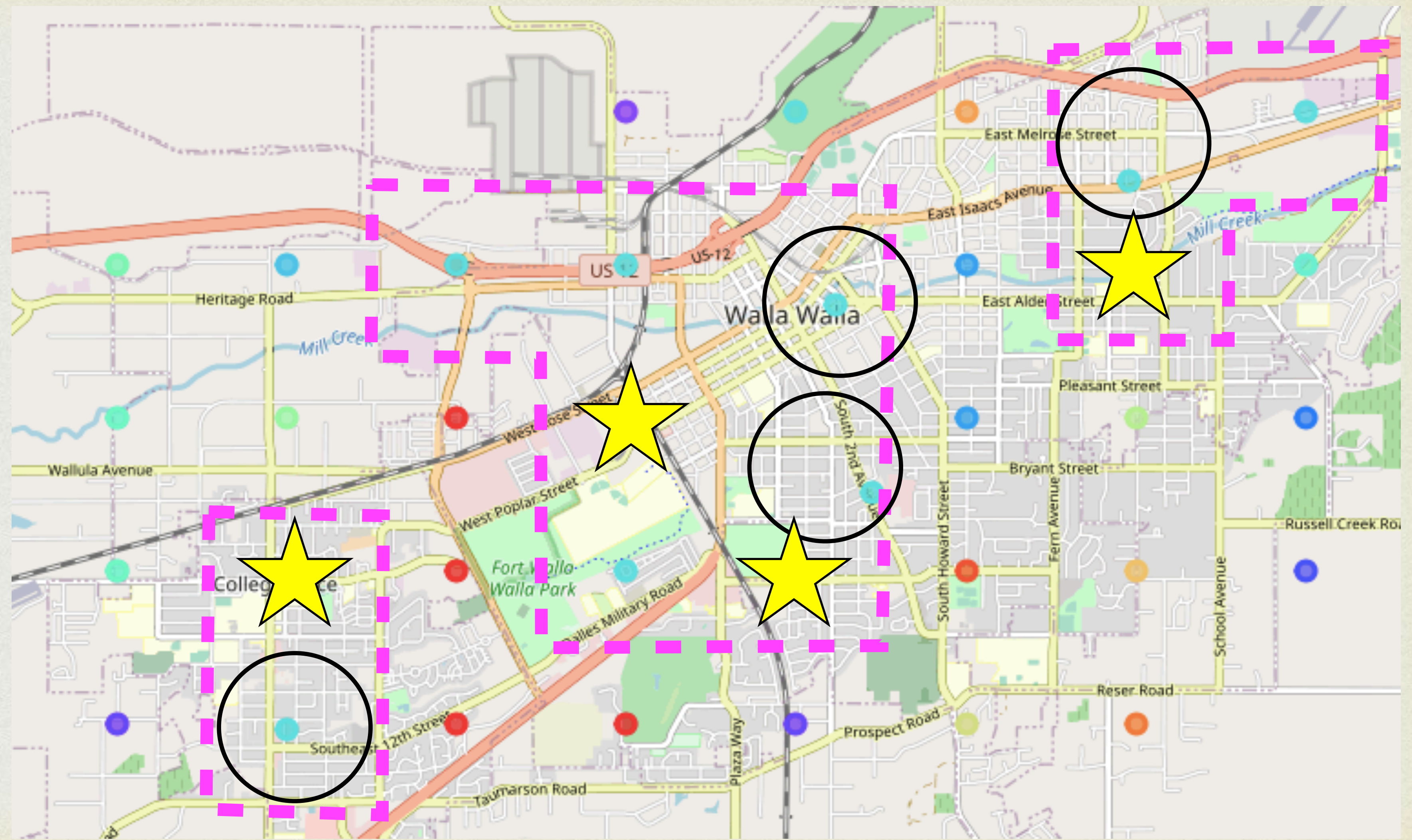


# CHOSEN AREAS

Of the eight locations, four were chosen. These were all in areas with close-together streets, similar to the other laundromat locations.

Three of the excluded locations were near the major highway, US-12.

The other excluded location was near a large park.





# CONCLUSION

- Locating a new laundromat in Walla Walla, WA should be done within one half mile of the following four locations:
  - College Park (46.05, -118.387)
  - Downtown West (46.06, -118.355)
  - Jefferson Park (46.05, -118.339)
  - Mill Creek (46.07, -118.307)
- These locations are located at a sufficient distance away from other laundromats, and are located in areas that have been determined to be similar to the locations of current laundromats.