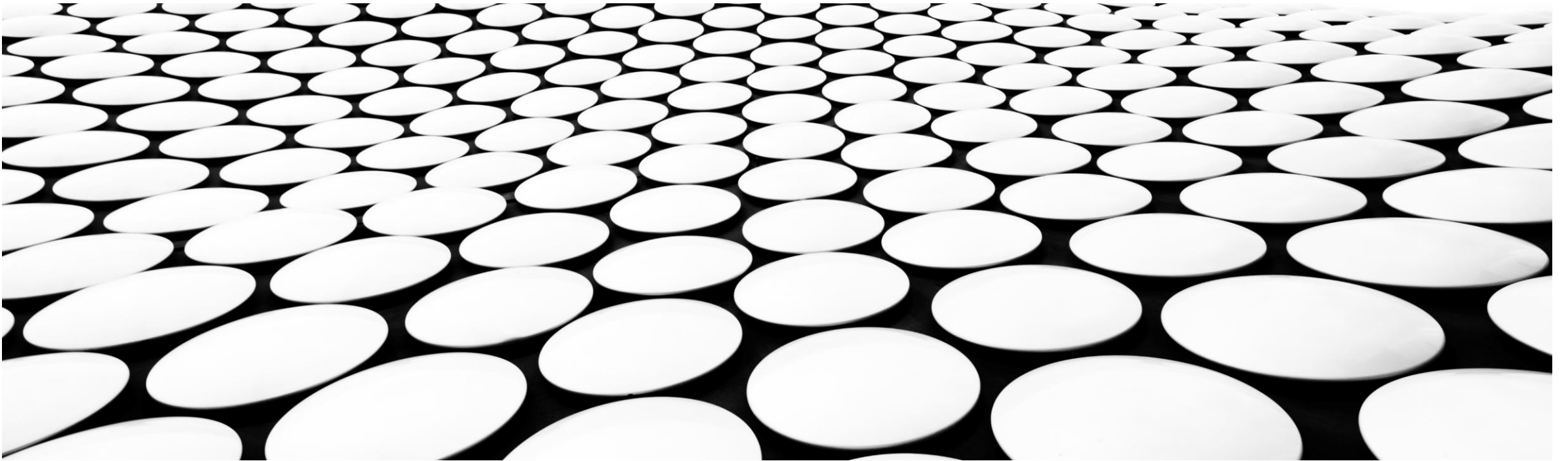


---

# BUSINESS LOCATION RECOMMENDER

RAFAEL DE SANT'ANNA CHAGAS



# INTRODUCTION

An application that helps entrepreneurs find the best location for their new business has been developed for this final project.



---

## DATA

- Venues data is provided by Foursquare;
- Coordinates data is provided by Nominatim.



**FOURSQUARE**

Nominatim



## APPLICATION

- The application functionalities will be explained and tested;
- São Paulo will be used as the business location city, and the business category will be “Theater” in this simulation.

---

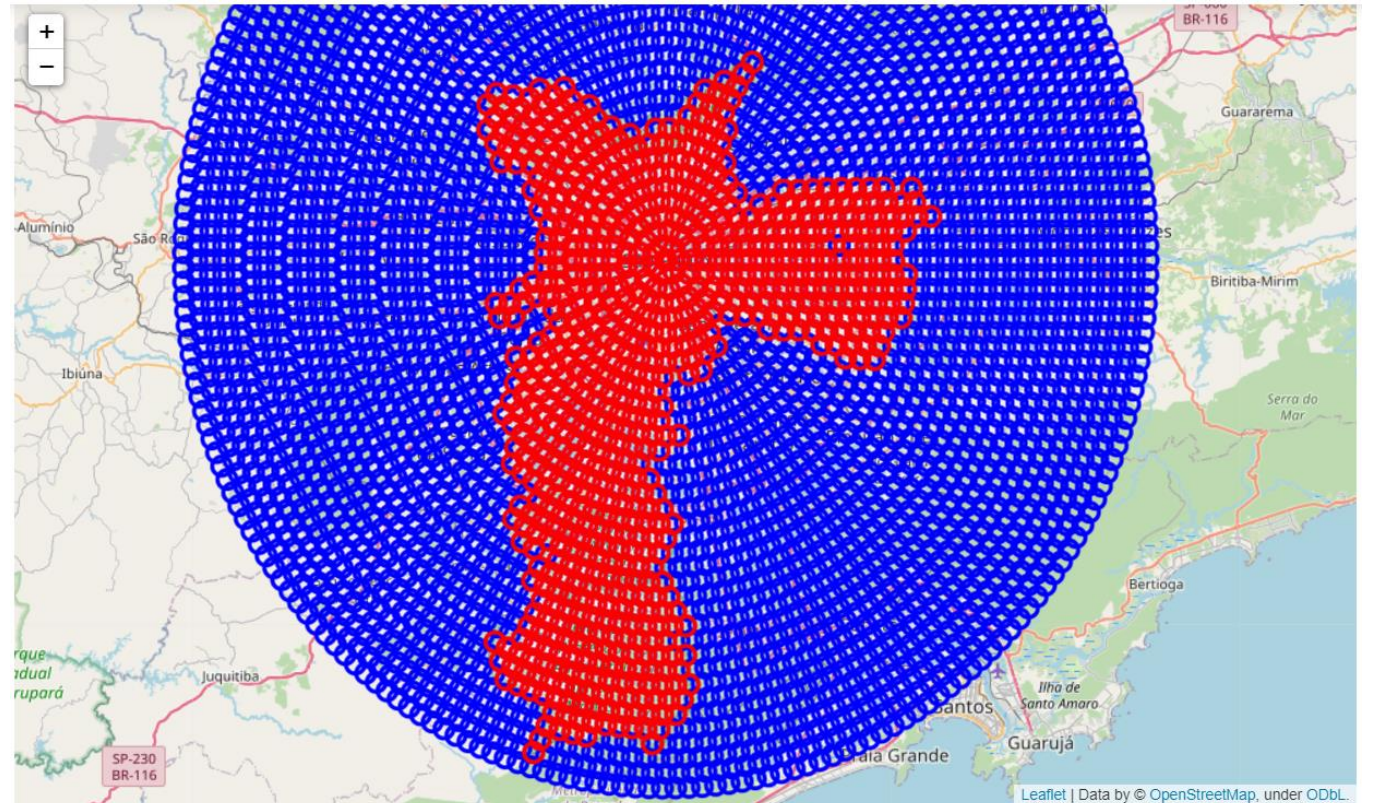
## MAPPING REGION AREAS

- Cities are mapped using a circular pattern to identify which coordinates belong to the city where the business must be located.
- Accomplished with the use of Nominatim API.



## CITY – SÃO PAULO

- The city is represented by the red circles.



---

## FETCHING CITY VENUES

- The application fetches the most important venues for each area.
- Then, it deals with the duplicated venues fetched due to the necessary overlapping areas.

# VENUES

	id	category	dist	loc_area
0	573dab3f498e4e0d56c67f4e	Music Venue	0.002363	-23.5506507, -46.6333824
1	4b642bb8f964a52057a22ae3	Art Gallery	0.001377	-23.5506507, -46.6333824
2	4ed4fe4699119575fec2ce45	Art Museum	0.002369	-23.5506507, -46.6333824
3	4b17eb00f964a520a1c923e3	Cultural Center	0.003327	-23.5506507, -46.6333824
4	4cf7c0f964e3721e845028c8	Chocolate Shop	0.002275	-23.5506507, -46.6333824
...	...	...	...	...
18010	5a9c6bee2db4a965fcdf1797	Waterfall	0.003781	-23.9418585, -46.6367404
18011	5020057ae4b09ee4dfa766d3	Furniture / Home Store	0.003144	-23.9297927, -46.7749582
18012	4e68189718a8bf0571e45b4a	Pizza Place	0.002908	-23.9649386, -46.6904728
18013	5da1b7b5ff733200086ff709	Campground	0.008293	-23.9688402, -46.6367511
18014	56e78709498ee00a976e9908	Nature Preserve	0.009090	-23.991598, -46.7596663

18015 rows × 4 columns





## LOCATIONS' PATTERNS VECTORS

- Each location is analyzed according to its venues' categories' count.
- Then, these counts are used to create locations' vectors.
- These vectors contain the number of venues pertaining to each category.

# LOCATIONS' PATTERNS VECTORS

	Location	ATM	Acai House	Accessories Store	Adult Boutique	...	Wings Joint	Women's Store	Yoga Studio	Zoo	Zoo Exhibit
0	-23.5571076, -46.6595792	0.0	0.0	1.0	0.0	...	0.0	0.0	0.0	0.0	0.0
1	-23.5635646, -46.6857761	0.0	0.0	0.0	0.0	...	0.0	1.0	1.0	0.0	0.0
2	-23.6220184, -46.6952228	0.0	0.0	0.0	0.0	...	0.0	1.0	0.0	0.0	0.0
3	-23.5864339, -46.6737733	0.0	0.0	0.0	0.0	...	0.0	0.0	2.0	0.0	0.0
4	-23.5441938, -46.6595792	0.0	0.0	0.0	0.0	...	0.0	1.0	1.0	0.0	0.0
...	...	...	...	...	...	...	...	...	...	...	...
581	-23.9223808, -46.7004499	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
582	-23.3681271, -46.5460142	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
583	-23.8641288, -46.7577856	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
584	-23.4303877, -46.6167058	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0
585	-23.9098658, -46.693684	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.0	0.0

586 rows × 469 columns



## **GROUPING CITY AREAS INTO CLUSTERS**

- All areas are grouped into different clusters;
- Based on their locations' patterns vectors.

# CLUSTERS

	Location	labels
0	-23.5571076, -46.6595792	7
1	-23.5635646, -46.6857761	7
2	-23.6220184, -46.6952228	7
3	-23.5864339, -46.6737733	7
4	-23.5441938, -46.6595792	7
...	...	...
581	-23.9223808, -46.7004499	1
582	-23.3681271, -46.5460142	1
583	-23.8641288, -46.7577856	1
584	-23.4303877, -46.6167058	1
585	-23.9098658, -46.693684	1

586 rows × 2 columns



## IDENTIFYING THE BEST LOCATIONS

- The application identifies the cluster where the chosen business category fits the best, meaning that this business category will likely thrive in areas with this cluster's pattern.
- Then, it chooses the areas within this cluster where the business has the highest chances of success.

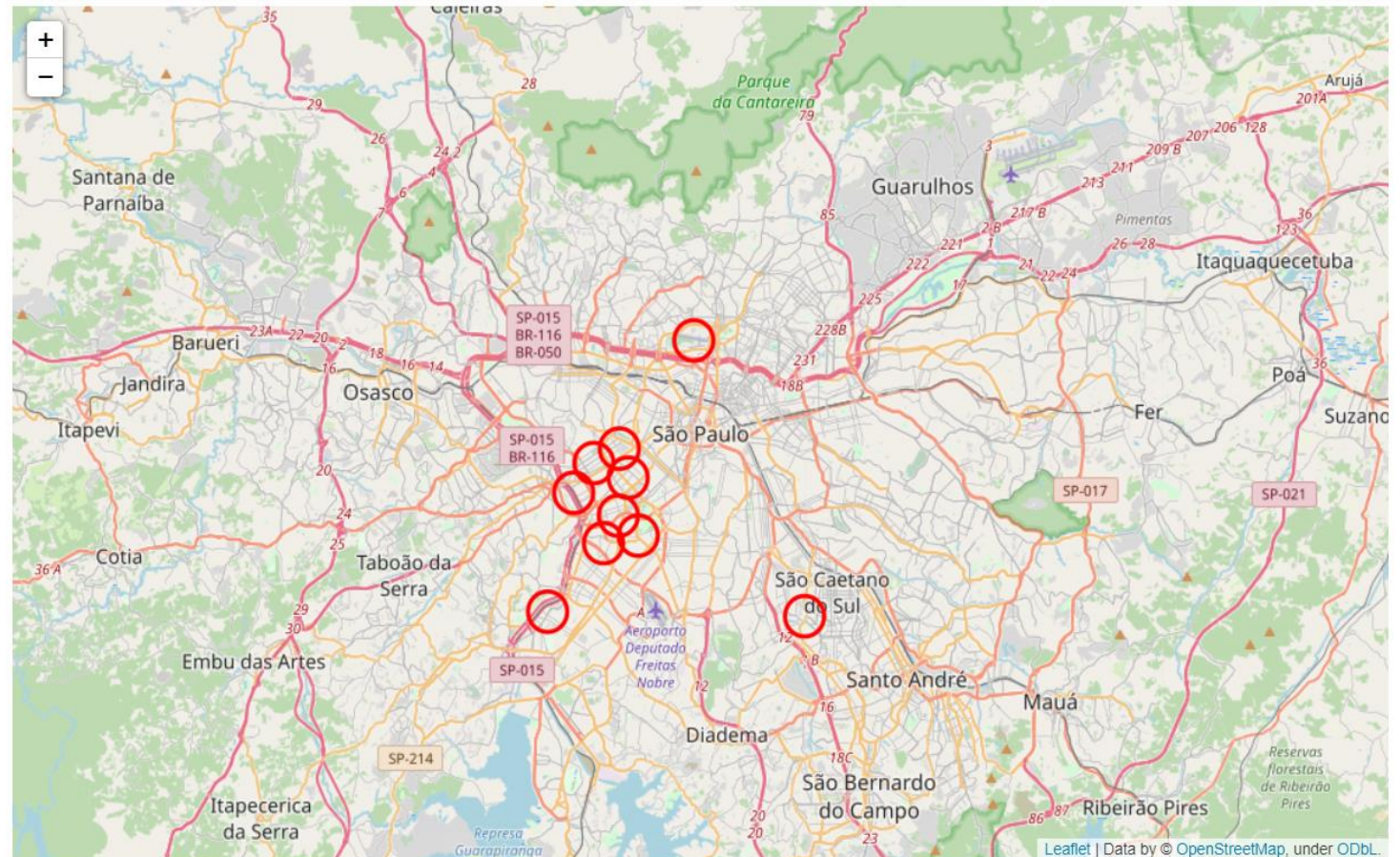
# BEST LOCATIONS

	Location	supported Theater quantity
0	-23.5950603, -46.6640361	1.0
1	-23.6300928, -46.5823281	1.0
2	-23.6281302, -46.7085115	1.0
3	-23.5699129, -46.6689758	1.0
4	-23.5573121, -46.6733017	1.0
5	-23.5764635, -46.6957	1.0
6	-23.5983465, -46.6810782	1.0
7	-23.5635646, -46.6857761	1.0
8	-23.5864339, -46.6737733	1.0
9	-23.5103177, -46.6367245	1.0



# RESULTS

- These are the best locations to open a Theater.



---

## CONCLUSION

- This type of data analysis can provide every entrepreneur the necessary support, so they can choose the right spot for their business.
- It gives them an opportunity to move forward, reducing the risk of failure.