Coursera Capstone Project
The Battle of Neighborhoods

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Abril, 2020

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1. Introduction

In Porto Alegre, if you are looking for a bar or a cafeteria, usually you use the internet to find the best choice for you. But if you want a coffee and a friend wants a beer? This is hard to choose the best place. The background of the problem is the best place where booth people gets satisfied.

Let us explore the 'Centro Histórico de Porto Alegre' and found the available places where you can drink coffee and a   beer.

2. Data

A description of the data: the data used to solve this problem is geolocation data collected from FourSquare. Adequate explanation and discussion, with examples, of the data is the following. Data is a single dataframe, containing at least a location of the cafeteria/bar. Explanation of the location data is a standard tuple (lat, lng), where lat stands for latitude and lng for longitude. Example of the data used in analysis is shown in table 1.

	name	categories	address	lat	lng	labeledLatLngs	distance	cc	city	state	country	formattedAddress	crossStreet	postalCode	neighborhood	id
0	Cafeteria Algo a Mais	Café	Subsolo Malcon	-30.029743	-51.226115	[{'label': 'display', 'lat': -30.0297426212004...	271	BR	Porto Alegre	RS	Brasil	[Subsolo Malcon, Porto Alegre, RS, Brasil]	NaN	NaN	NaN	4d4c542d7929594187064fc7
1	Cafeteria Fênix	Café	Galeria Lamberts	-30.026341	-51.225702	[{'label': 'display', 'lat': -30.0263412365417...	255	BR	Porto Alegre	RS	Brasil	[Galeria Lamberts (Loja 31/33), Porto Alegre, ...	Loja 31/33	90030-000	NaN	511558d8e4b0ce6dc580cddd
2	Cafeteria do Hospital Santa Rita	Café	Hospital Santa Rita	-30.030656	-51.220473	[{'label': 'display', 'lat': -30.0306562320857...	773	BR	Porto Alegre	RS	Brasil	[Hospital Santa Rita, Porto Alegre, RS, 90035-...	NaN	90035-074	NaN	4eb3e5d8be7bfc28499cdd75
3	Cafeteria Mezanino	None	Centro Cultural CEEE Érico Veríssimo	-30.029709	-51.227869	[{'label': 'display', 'lat': -30.0297089711154...	216	BR	Porto Alegre	RS	Brasil	[Centro Cultural CEEE Érico Veríssimo, Porto A...	NaN	NaN	NaN	51cf2865498ee1b893cebded
4	Cafeteria Santa Helena	Coffee Shop	R. dos Andradas, 1560, Lj. 16	-30.029786	-51.225947	[{'label': 'display', 'lat': -30.0297855693904...	285	BR	Porto Alegre	RS	Brasil	[R. dos Andradas, 1560, Lj. 16 (Galeria Malcon...	Galeria Malcon	NaN	NaN	54de4e7b498e49208265aa4c
5	Cafeteria - 5 andar	Café	Rua Caldas Júnior 108	-30.029111	-51.232381	[{'label': 'display', 'lat': -30.0291110996504...	468	BR	Porto Alegre	RS	Brasil	[Rua Caldas Júnior 108 (Siqueira Campos), Port...	Siqueira Campos	NaN	NaN	4e5e186ad1640a5975c4b9f2
6	Cafeteria Universitaria	Snack Place	Rua Vigário José Inácio	-30.027983	-51.223101	[{'label': 'display', 'lat': -30.0279825751354...	451	BR	Porto Alegre	RS	Brasil	[Rua Vigário José Inácio (Avenida Voluntários ...	Avenida Voluntários Da Pátria	NaN	NaN	564f7959498e86dce30d2d1c
7	Cafeteria e Tabacaria TC 35	Café	R. Senhor dos Passos, 241	-30.029189	-51.222866	[{'label': 'display', 'lat': -30.0291893149861...	498	BR	Porto Alegre	RS	Brasil	[R. Senhor dos Passos, 241, Porto Alegre, RS, ...	NaN	NaN	NaN	4f565ee7e4b0861b32b03740
8	Cafeteria Factum	Coffee Shop	Lg. João Amorim de Albuquerque, 60	-30.032100	-51.229465	[{'label': 'display', 'lat': -30.0321, 'lng': ...	508	BR	Porto Alegre	RS	Brasil	[Lg. João Amorim de Albuquerque, 60 (Faculdade...	Faculdade Factum	90010-250	Centro Histórico	5591409b498ec31df9b70cd4
9	Cafeteria Assembleia	Café	NaN	-30.033112	-51.231334	[{'label': 'display', 'lat': -30.0331122260256...	686	BR	Porto Alegre	RS	Brasil	[Porto Alegre, RS, Brasil]	NaN	NaN	NaN	511e6006e4b058afc3a92b95
10	Cafeteria Madri	Coffee Shop	NaN	-30.028100	-51.222093	[{'label': 'display', 'lat': -30.0281, 'lng': ...	548	BR	Porto Alegre	RS	Brasil	[Porto Alegre, RS, Brasil]	NaN	NaN	NaN	58f1fe410868a239e6dcdfb1

Figure 1: Ten first rows of data used in the machine learning algorithm.

Data will be used in the following way: by knowing the locations of already existings cafes/bares. It is possible to apply many techniques of unsupervised learning technique, but the kernel density estimation (KDE) will be used to looking for the área of influence of the current cafes/bares.

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3. Methodology

A density estimation was used to measure the proximity of the cafés and bares, Folium was used to print and visualize the map. Most data were picked using Foursquare API, the positions of bares and cafeterias are in Figure 2, the blue circles are the cafeterias and the green one are the bares. Data used to test the kernel was generated manually using some coordinates from Porto Alegre. It is possible to see the generated test data in Figure 3.

Figure 2: Distribution of bares and cafeterias in Porto Alegre.
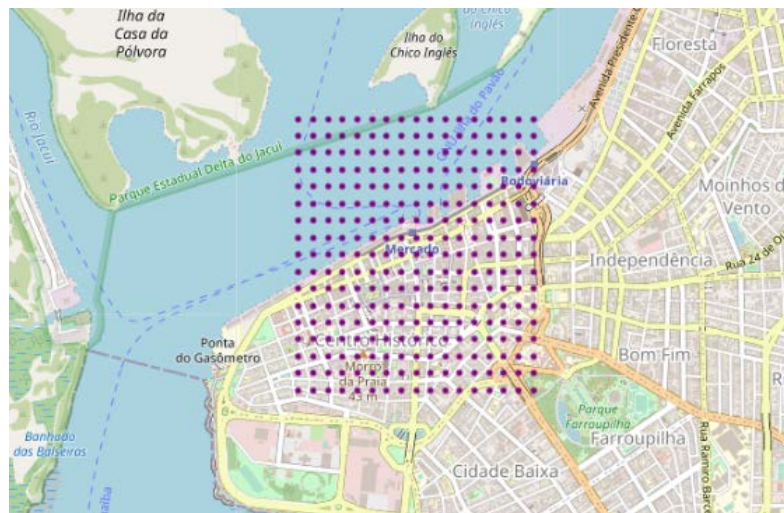

Figure 3: Data generated to test the kernel density estimation.

After the test was done, it is possible to look in Figure 4 where are the region with most bares and cafeterias. Where the circle is small, most cafeterias and bares are present in the region. Where the circle is bigger there is no cafeteria and bares near the spot.
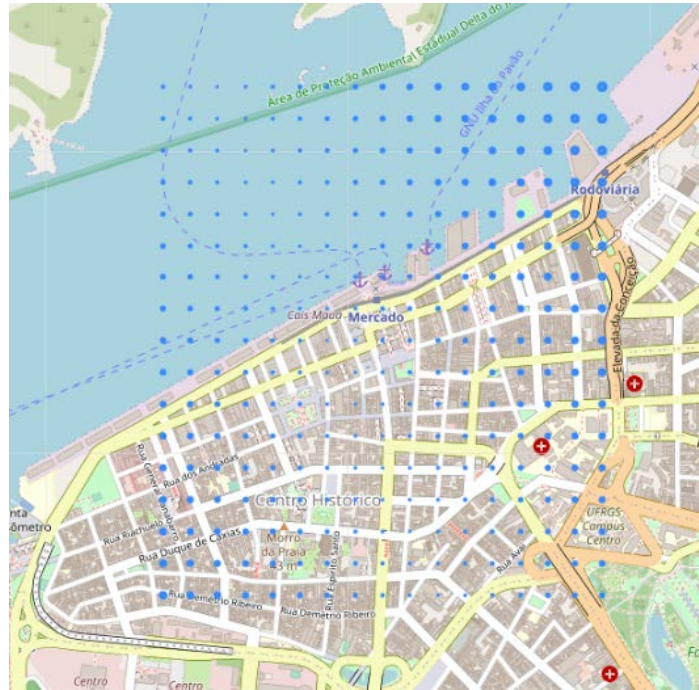
Figure 4: Evaluation of the density distribution kernel.

4. Results

Looking the Figure 5, you can take some assumption. If you want to go near the 'Rio Guaiba' probably you will not find a good spot to have a happy hour. Going through 'Borges de Medeiros' you will find a few bares and cafeterias, because in this region are many companies.

Figure 5: Good spots to drink a coffee/beer.

5. Discussion

If you want to get a beer or a coffee in 'Centro Histórico', you should look at region near 'Andradas' or near 'Cidade Baixa', as we can see in Figure 5 these part of the map concentrate the most bar/cafeterias. These recommendations must be previously evaluated, many places do not have their Foursquare updated and containing useful tips.

6. Conclusions

If you do not know Porto Alegre and want to go out to visit some places, take a drink or maybe eat something, it is very recommended to visit 'Centro Histórico'. In this region you can find anything you want.