

Finding the best neighbourhoods
in Rio de Janeiro to help retail
pharmacy business

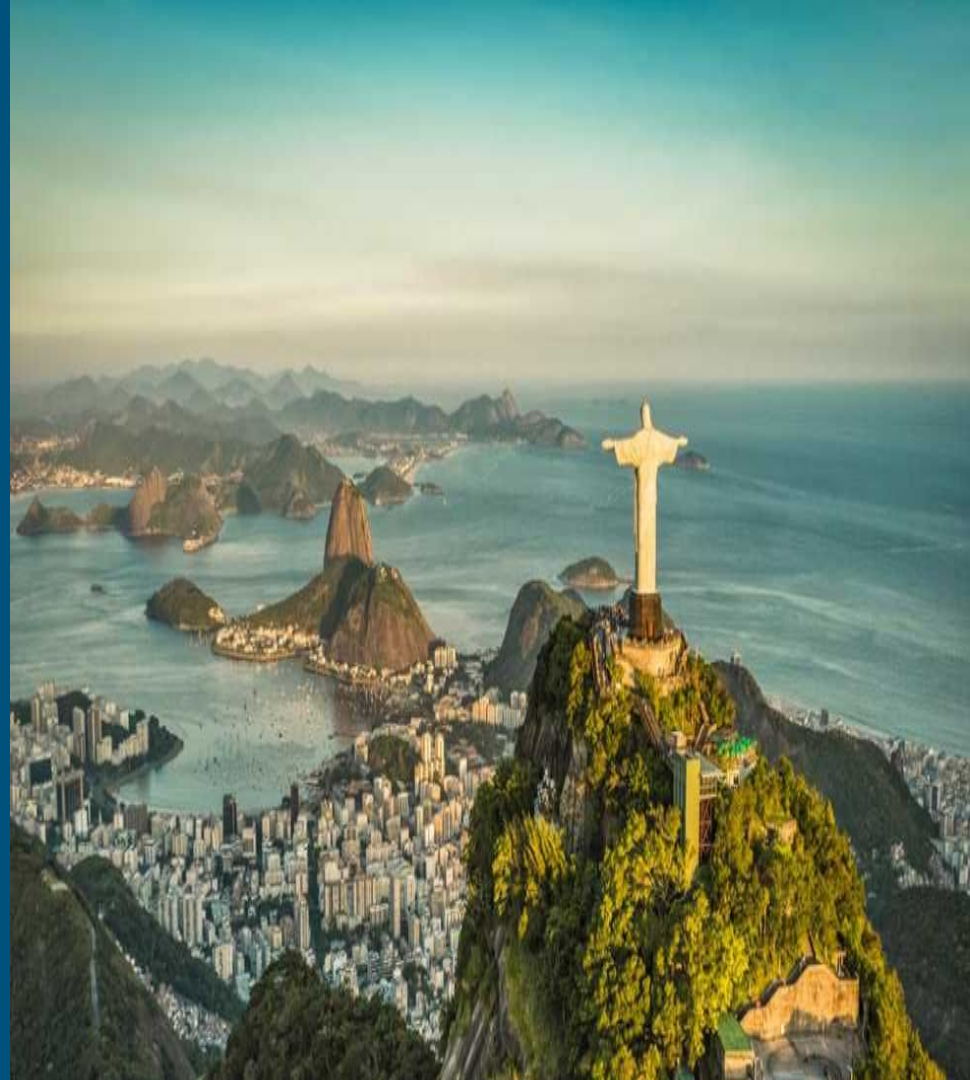


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Introduction



Background / Problem



Brazilian political-economic crisis

- Widespread negative views about Brazilian economy
- Large unemployment rate
- Operation Car Wash: The largest corruption scandal of the Country
- The country's Gross Domestic Product (GDP) fell by 3.5%
- Investor uncertainty regarding Brazil's economic future

But ...



Brazilian Retail Pharmacy

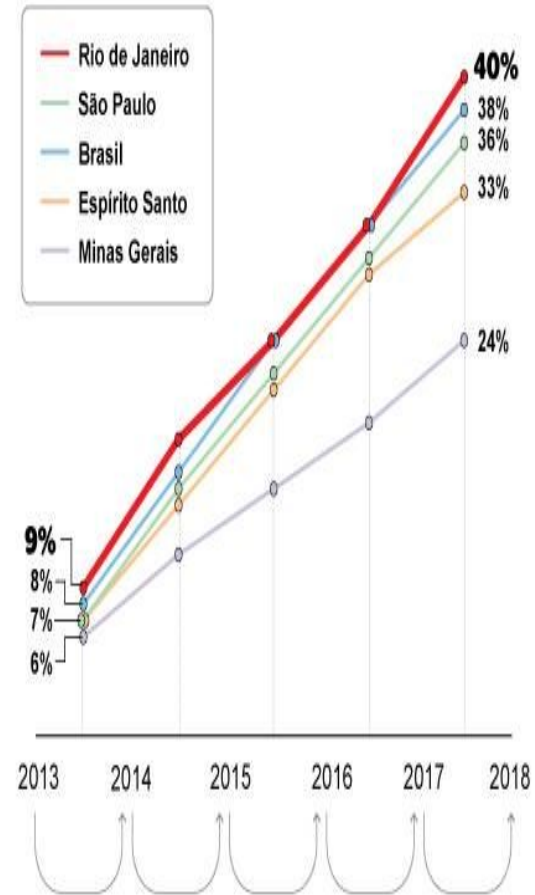
- One of fastest recovering Sector.
- Projection says medications sales in Brazil will be US\$ 42 billions in 2022.
- Aging of the Brazilian population and growth of life expectancy.
- Brazil became the sixth largest pharmacy market in the world and in 2022 will become the fifth.
- The number of pharmacy around the country growth exponentially.
- Coronavirus triggers the sale of pharmacies.



Rio de Janeiro

- Rio de Janeiro has the highest pharmacy growing rate in southern region of Brazil.
- Also has the second largest number of pharmacies in its territory.
- But the competition between The Pharmacy retail business is non stopping

CRESCIMENTO ACUMULADO, ANO A ANO



Problem

Find the best neighbourhoods to establish a new
pharmacies in Rio de Janeiro



Data used



Background / Problem



Data Acquisition / Cleaning

The Data used in this project is composed of four datasets that were extracted and downloaded from the internet :

- Rio de Janeiro Neighbourhoods (Wiki)
- Neighbourhoods Demographics (Wiki)
- Human Development Index Rio de Janeiro (Wiki)
- Hospitals and Clinics in Rio de Janeiro (OpenData)

After the extraction we clean the datasets (Uppercase, Remove nulls and Format Data) and later merge the four datasets into one 'Result Dataset'



Introduction



Background / Problem



Result DataSet

	BAIRRO	SUB	ZONA	LAT	LON	Hab	Area	Den	ESPER	RENDA	IDHL	IDHE	IDHR	IDH	HOS
0	SAO CRISTOVAO	CENTRO HISTÓRICO E ZONA PORTUÁRIA	CENTRAL	-22.90020	-43.23024	26510.0	4.1056	6457.034295	72.27	412.39	0.788	0.933	0.778	0.833	2.0
1	BENFICA	CENTRO HISTÓRICO E ZONA PORTUÁRIA	CENTRAL	-22.88989	-43.24562	25081.0	1.7364	14444.252476	73.59	376.65	0.810	0.901	0.763	0.825	3.0
2	CAJU	CENTRO HISTÓRICO E ZONA PORTUÁRIA	CENTRAL	-22.87992	-43.22218	20477.0	5.3475	3829.266012	68.90	236.59	0.732	0.843	0.685	0.753	1.0



Methodology

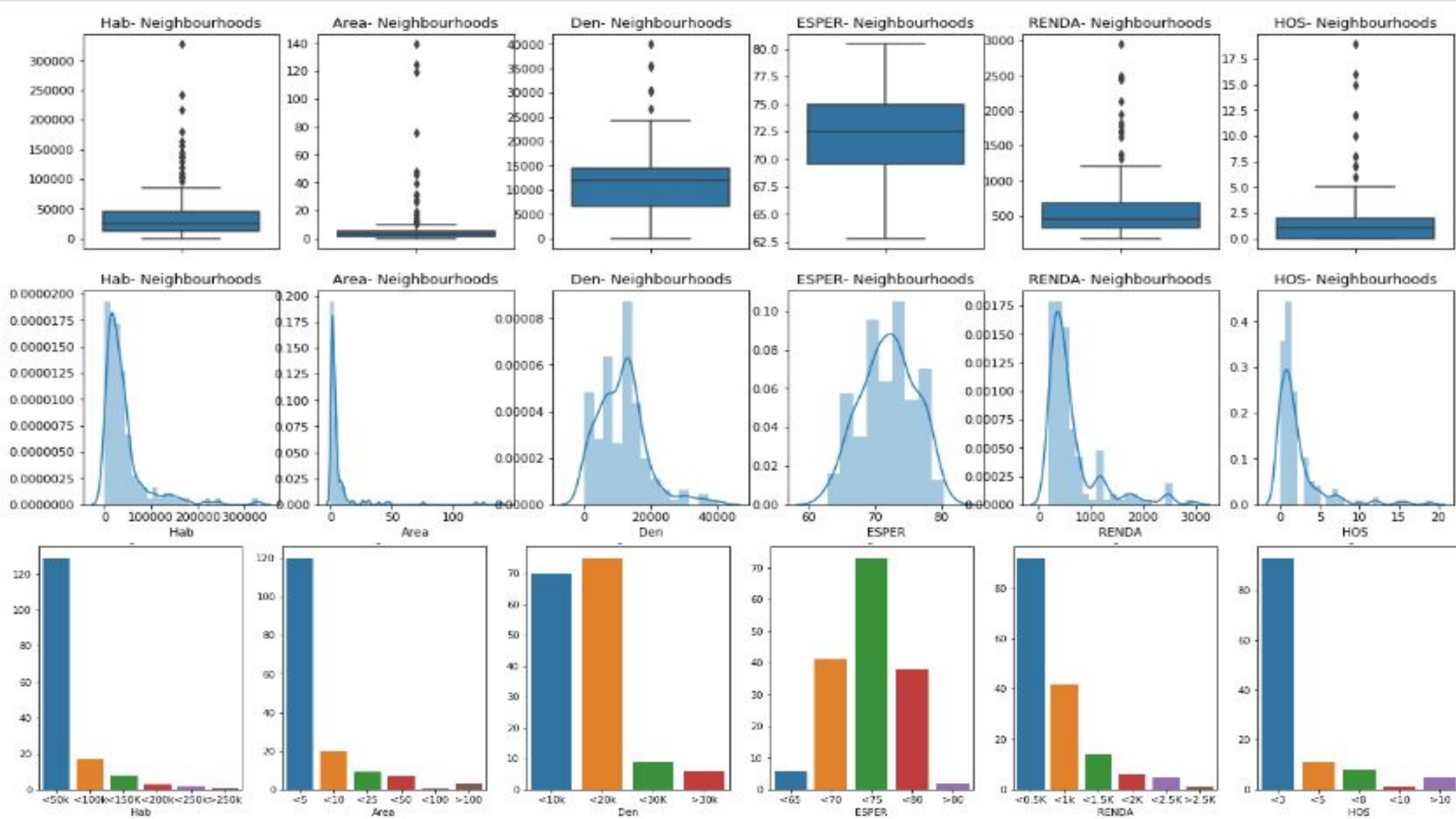


Analysis / Clustering



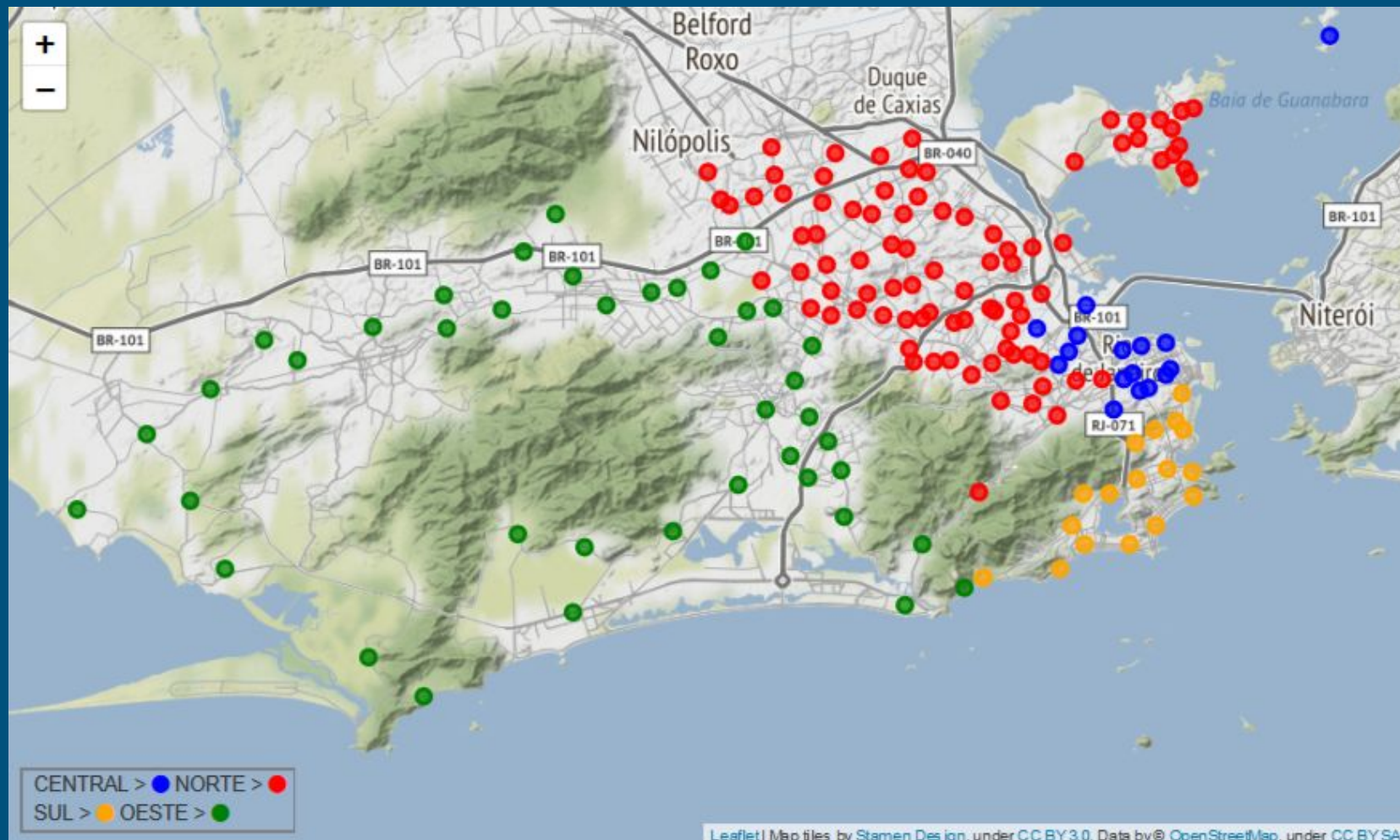
Rio de Janeiro City Analysis

Let's take a look at some demographics about Rio de Janeiro City



Rio de Janeiro Regions Analysis

Let's take a look at some demographics about Rio de Janeiro Regions



Exploratory Analysis Rio de Janeiro Regions

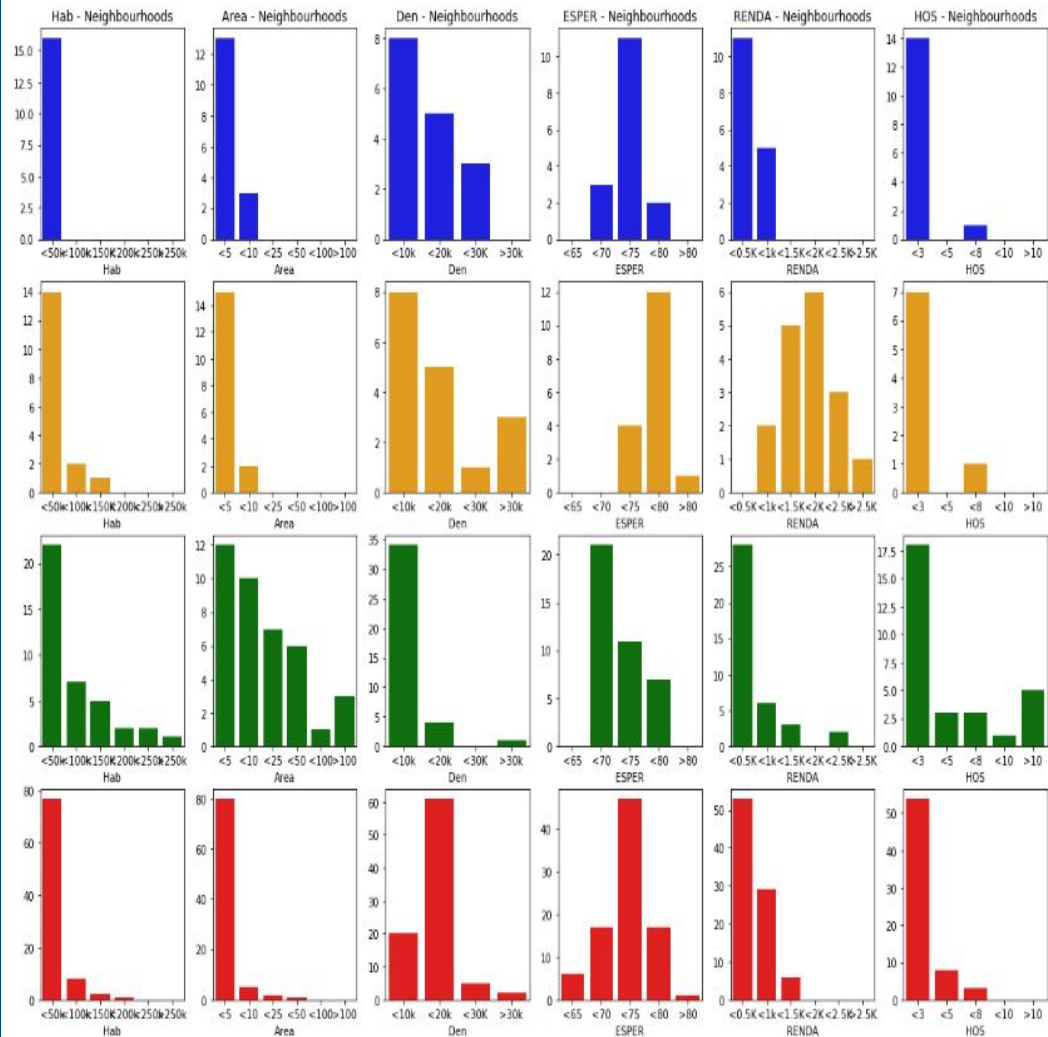
Rio de Janeiro is composed of Four regions:

South (Sul) with 17 neighbourhoods

North (Norte) with 88 neighbourhoods

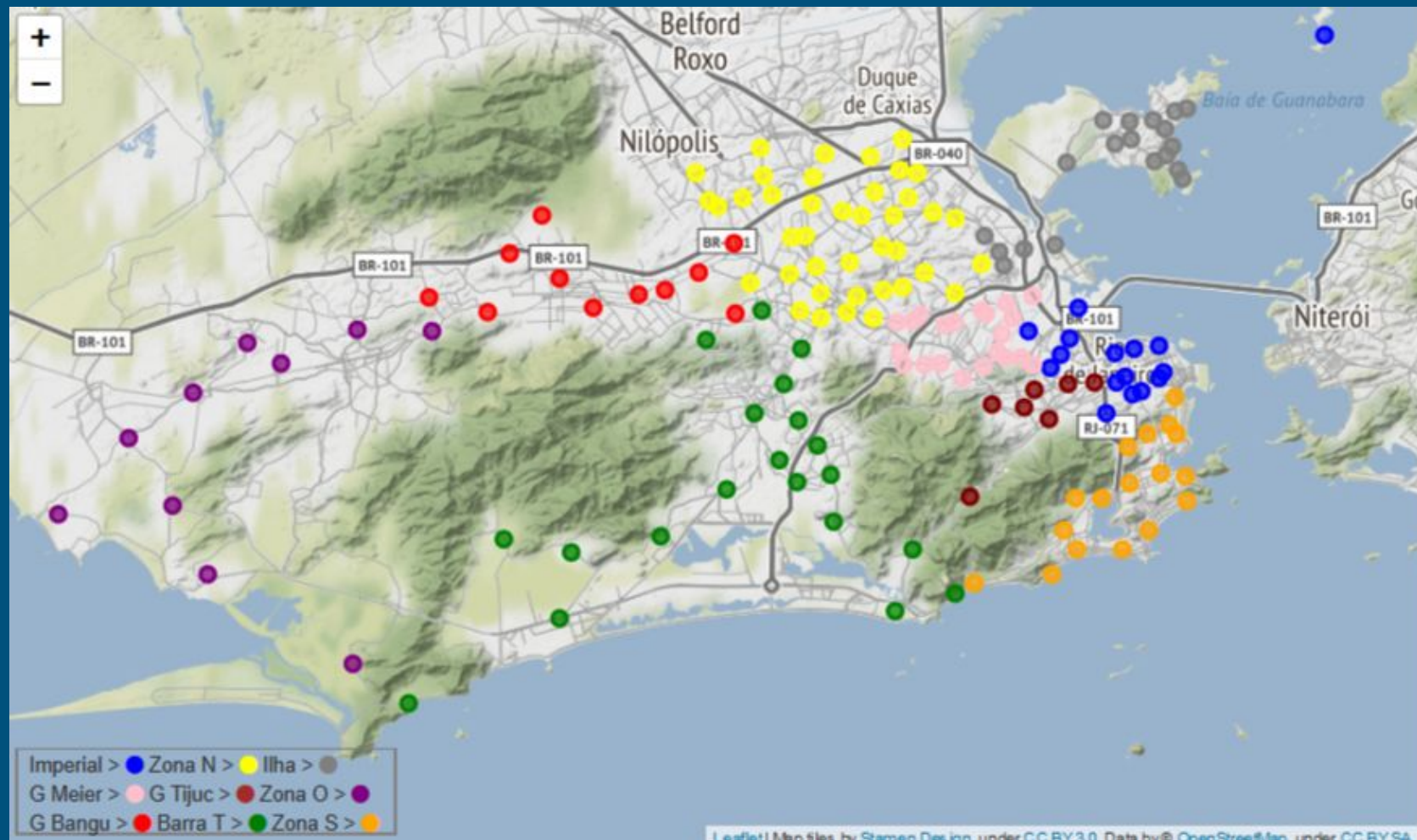
West (Oeste) with 36 neighbourhoods

Central (Central) with 16 neighbourhoods



RIO Subprefectures Analysis

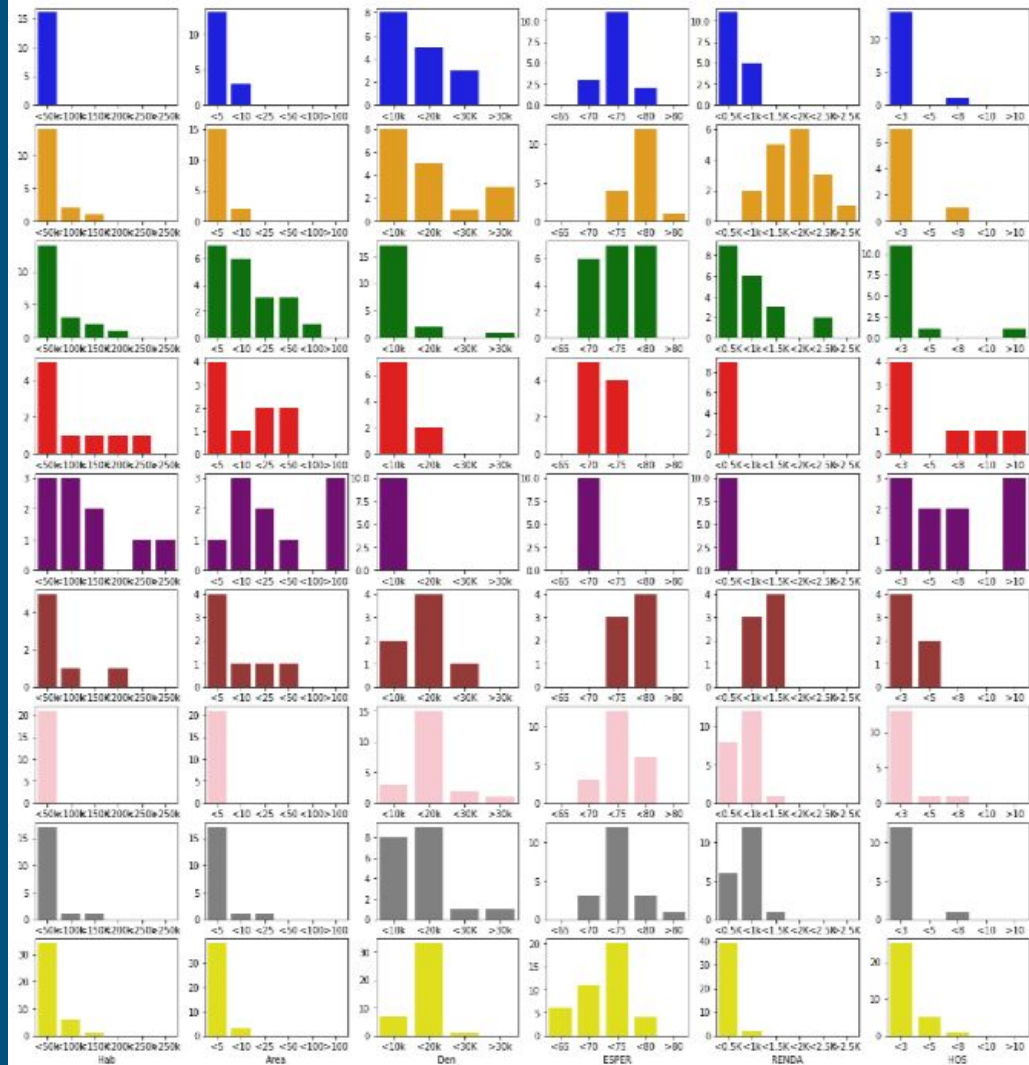
Let's take a look at some demographics about Rio de Janeiro Subprefectures



Exploratory Analysis Rio de Janeiro Regions

All regions of Rio de Janeiro are subdivided into smaller Subprefectures and they are :

- Zona Portuária
- Zona Sul
- Barra da Tijuca e Baixada Jacarepaguá
- Grande Bangu
- Zona Oeste
- Grande Tijuca
- Grande Méier
- Ilha Governador
- Zona Norte

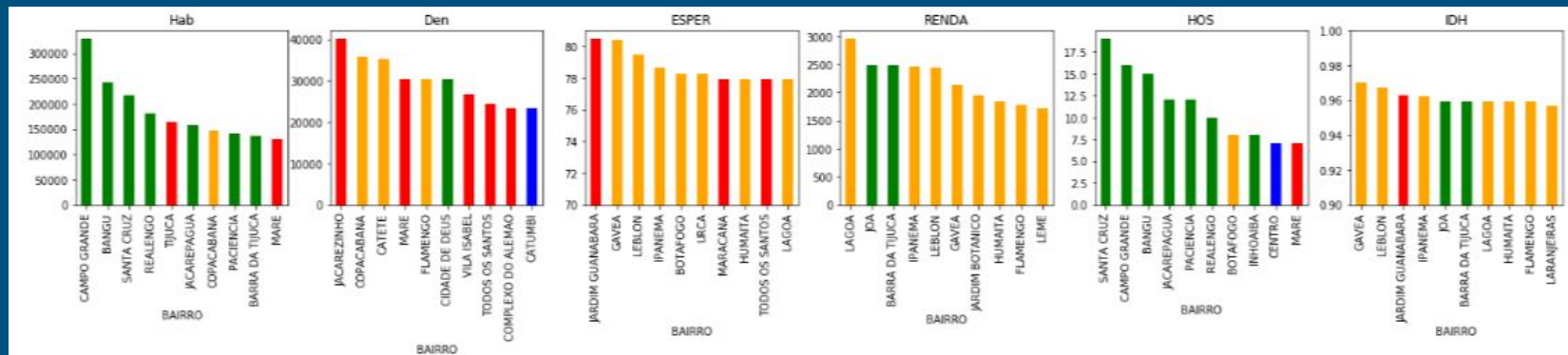


Top Neighbourhoods Analysis

Exploratory Analysis Top neighbourhoods Rio de Janeiro

Since we are working with a large group of data to analyse our team decided to analyse only the neighbourhood belonging to the top 15 'important values'.

The colors correspond to each region (South, North, West and Central)



Clustering Top neighbourhoods

To facilitate our analysis, The team decide to use clustering algorithms (K Means) to find hidden patterns and similar neighbourhoods aiding our research.





Results



Regions / Subp / Cluster



Results : Best Region

If our team was to decide the best place to establish a pharmacy based only on Regions we would choose the **Southern Region**.

	South	North	East	Central
Avg Den	14512	13194	5626	11429
Avg Esper	76.9	71.7	70.5	72.0
Avg Renda	1665	490	536	446
Avg IDH	0.93	0.83	0.81	0.82
Avg Hos	1.17	1.63	3.69	1.75

Results : Best SubPr

If our team was to decide the best place to establish a pharmacy based only on Subprefectures we would choose Two Subprefectures **Zona Sul** and **Grande Tijuca** .

	Zona portuaria	Zona sul	Barra da Tijuca e Baixada jacarepagua	grande bangu	zona oeste	grande tijuca	grande meier	ilha do governador	Zona Norte
Avg Den	11429	14512	6444	5876	3765	13519	14848	12096	12801
Avg Esper	72.0	76.9	72.1	70.6	67.1	75.1	72.7	73.3	70.0
Avg Renda	446	1665	767	348	244	1031	530	544	351
Avg IDH	0.82	0.93	0.84	0.81	0.76	0.91	0.85	0.85	0.80
Avg Hos	1.7	1.1	1.7	4.1	7.3	2.4	1.5	1.3	1.6

Results : Best Cluster

If our team was to decide the best place to establish a pharmacy based only on the Clusters we would choose the
Cluster 0 and Cluster 6

	Cluster 0	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Avg Den	3538	8689	14875	29910	26027	3403	11197
Avg Esper	77.8	69.3	77.2	76.7	69.8	67.8	78.5
Avg Renda	2471	428	1003	1519	377	277	1651
Avg IDH	0.95	0.81	0.92	0.93	0.79	0.77	0.95
Avg Hos	1.2	6.1	6.3	2.2	2.6	14.8	0.7
Avg Phar	8.0	8.1	48.3	45.2	8.2	5.0	27.5

Best Neighbourhoods Cluster 0 and 6

	Avg Den	Avg Esper	Avg Renda	Avg IDH	Avg Hos	Avg Phar
JARDIM BOTANICO	6696	77.8	1952	0.95	0	5
LAGOA	4148	77.9	2955	0.95	0	10
BARRA DA TIJUCA	2822	77.8	2488	0.95	5	17
JOA	484	77.8	2488	0.95	0	0
GAVEA	6774	80.4	2139	0.97	1	28
HUMAITA	12598	77.9	1830	0.95	0	36
IPANEMA	13855	78.6	2465	0.96	0	40
LARANJEIRAS	18269	77.8	1679	0.95	0	30
LEME	15144	77.4	1713	0.95	1	15
URCA	3044	78.2	1376	0.95	0	31
GRAJAU	6738	77.8	1134	0.93	2	16
MARACANA	15147	77.9	1206	0.94	3	22
JARDIM GUANABARA	9204	80.4	1316	0.96	0	30



Conclusion



Best Neighbourhoods

After analysing all neighbourhood with their possibilities and variables. Our team have chosen these neighbourhoods

	Region	Subprefecture	Population	Area	Avg Den	Avg Esper	Avg Renda	Avg IDH	Avg Hos	Avg Phar
LAGOA	Sul	Zona Sul	21198	5.1	4148	77.9	2955	0.95	0	10
GAVEA	Sul	Zona Sul	17475	2.5	6774	80.4	2139	0.97	1	28
LE ME	Sul	Zona Sul	14799	0.9	15144	77.4	1713	0.95	1	15
JARDIM BOTANICO	Sul	Zona Sul	18009	2.6	6696	77.8	1952	0.95	0	5
BARRA DA TIJUCA	Oeste	Barra da tijuca baixada jacarepagua	135924	48.1	2822	77.8	2488	0.95	5	17
JOA	Oeste	Barra da tijuca baixada jacarepagua	818	1.6	484	77.8	2488	0.95	0	0

