The Battle of Neighborhoods – Hospitals & Covid19 in Rio de Janeiro, Brazil - Report

1. Introduction
1.1. Background

The current global pandemic caused by the Covid-19 virus has changed the way our world works. New challenges arise as mankind tries to understand and deal with this virus that has caused the loss of so many lives worldwide. The high contagion rate of this virus created chaos in most countries, as they tried to slow it down. One of the biggest issues that such an elevated infection rate causes is related to resources allocation. Most, if not all countries, do not have a medical infrastructure readily available for such an event. Thus, it becomes crucial to for a country to properly allocate its resources in order to have the most efficient counter measure to this crisis. This major problem becomes even more pressing in underdeveloped countries, where resources are scarcer and healthcare system is less developed.

Brazil, as one of the underdeveloped countries, is currently struggling in the fight against Covid-19, clocking over 100,000 fatalities with one of the highest numbers of confirmed cases. The country also goes through an economic crisis, which shorten the amount of resources that the government can utilize. Lastly, due to a political clash, there is a lack of coordination between federal government and the mayors of part of cities in the country, which increases the difficulty of the situation.

1.2. Business Problem

Our goal is to use the available data to improve the management of the resources dedicated to deal with this pandemic. By knowing the distribution of Covid-19 cases, it is possible to decide where medical resources, such as more testing, hospitals bed and workforce, and others, should be allocated to. For this project, we will use the city of Rio de Janeiro as a test case.

1.3. Target Audience

The target audience of this project is both the common people as well as government personnel. For the first, having knowledge of the hotspots of cases in the city can better their awareness of places that should be avoided, while for second group it can help in strategical choices which can optimize resource management while improving the results in the fight against Covid-19.

2. Data

For this project, two main sources of data were used. The first one is related to the total number of confirmed cases of Covid-19 in the city of Rio de Janeiro and its distribution across the neighborhoods. This was obtained from the website below. It is important to highlight that the information displayed is updated daily, so the actual numbers are in always changing. The data used was obtained on 04/08/2020.

https://experience.arcgis.com/experience/38efc69787a346959c931568bd9e2cc4

From this website, an excel file was downloaded and later, uploaded into IBM database for treatment. This excel file contains information on each case reported, such as date, neighborhood, postal code, and status. Figure 1 shows an example of the data.

NOTIFIC	INICIO	BAIRRO	RESID	EVOLUCAO	OBITO	CEP	ATUALIZACAO
01/04/2020	28/03/2020	PACIENCIA	5.3	�bito	06/04/2020	23585800	03/08/2020
01/04/2020	01/04/2020	COSTA BARROS	3.3	recuperado		21531991	03/08/2020
01/04/2020	28/03/2020	RAMOS	3.1	recuperado		21060330	03/08/2020
01/04/2020	28/03/2020	CAMPO GRANDE	5.2	recuperado		23013630	03/08/2020
01/04/2020	22/03/2020	LEBLON	2.1	recuperado		22441030	03/08/2020

Figure 1 - Data on Covid-19 cases in Rio de Janeiro uploaded into IBM database

More information on the treatment of this data will be described in the next section.

Lastly, Foursquare database was used to obtain the location of the main hospitals in the city. A query was used to find the location of the hospitals inside each neighborhood. Figure 2 below displays an example of the results. Additionally, more details will be discussed in the Methodology section.

	NEIGHBOURHOOD	NEIGHBOURHOOD LATITUDE	NEIGHBOURHOOD LONGITUDE	HOSPITAL	HOSPITAL LATITUDE	HOSPITAL LONGITUDE
0	abolicao	-22.886161	-43.299846	Hospital Psiquiatrico	-22.887598	-43.304885
1	andarai	-22.929084	-43.253486	Hospital Federal do Andaraí	-22.927836	-43.252607
2	andarai	-22.929084	-43.253486	Associação Dos Veteranos do Hospital Do Andarai	-22.927926	-43.253674
3	andarai	-22.929084	-43.253486	Centro Cirúrgico	-22.927771	-43.252309
4	andarai	-22.929084	-43.253486	Ambulatório	-22.927190	-43.252167

Figure 2 - Hospital information retrieved from Foursquare database