**Project Report**

**Introduction**

Initially, I would like to present the reasons to led me to select this dataset:

* When I was thinking about to move to Canada, I read a lot of information related to quality of life, security, economics, and, of course, nature. Regarding to this last aspect, I saw many photographs with an infinite variety of colours, and kept imaging the great biodiversity, even in the cities. I know that the huge colour variation is a reflect of biodiversity, so I would like to know how much this biodiversity is.
* The other motivation was as I am a cartographic engineer and I had worked in many urban projects, including revitalization of poor areas and urbanism. In this kind of project, we need to study the genus and species that the best adapts in a specific region. Of course, a specialized technician (botanist) was hired, but I needed to know because I was in charge of mapping. At that time, I saw in real situation how difficult it is to decide what type of tree, where to plant, and the most important, how to care.
* The last reason is I lived in the “ecologic capital” of Brazil, called due to its ecologic planning, and I liked to “see and feel” how the closest microclimate to parks and botanical gardens influenced the evolution of trees and plants.

Regarding to the choice of visualization tool, I decided to use the Tableau (version 2020.2.2) because beyond it was included in the course, it is very used in professional works and I think that the improvement of my skills in this tool can help me to get a job in the future. According to Forbes and PC Magazine, Tableau is within the best data visualization tools, thus, to know this tool can be a competitive advantage.

**The Story**

As the theme of my dataset is related to trees and its characteristics, I wanted to know the answers to the points/questions listed below:

* Calculate the approximated value of the biomass in each region.
* Check that the distribution of the trees is equal on both sides of the streets.
* Check the evolution of tree planting over time.
* Identify if there is the predominance of a specific genus and/or species.
* Identify which neighbourhoods have the most trees and which have the least.
* Try to localize neighbourhoods with “holes”, i.e., areas without threes.

My visualization is divided in two dashboards with these characteristics:

* The Main Dashboard presents a general view of all neighbourhoods with total of genus and species, as well as the total of trees. It is presented the "BioValues" and two bar charts with the top 10 of genus and species by quantity of trees. From the central table is possible to navigate to the Detail Dashboard after select a neighbourhood and click on the link.
* The Detail Dashboard presents a summary of planted trees by period in that neighbourhood, as well as 3 bar charts with the top 10 streets, genus, and species by quantity of trees (in that neighbourhood). In the center has a map with the geographic position of each tree. If a tree is selected, it is possible to choose between two external links, one opening the browser/tab to show more information about the species of that tree, and the other link opening another tab to present the actual position of the tree in an aerial photograph. To come back to Main Dashboard, just click on the green arrow or on the link on the center left.

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Description automatically generated A close up of a map

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**Figure 1 – Screenshots of Main and Detail Dashboard**

The next sequence of screenshots presents the analysis and insights from the dashboards.

* Calculate the approximated value of the biomass in each region: the table below presents three examples (Vancouver city, and Downtown and Fairview neighbourhoods). This result is an important indicator of ecological process in the vegetation (can influence in hydrologic properties, potential fuels, reflect the amount of energy stored, etc.).

TABLE 1 – Biovalues of Vancouver city and two neighbourhoods

|  |  |
| --- | --- |
| Vancouver City |  |
| Downtown |  |
| Fairview |  |

* Check that the distribution of the trees is equal on both sides of the streets: analysing the figure below, it is possible to verify that both sides, in general, have the same quantity of trees.

A screenshot of a cell phone

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**Figure 2 – Comparison the total of tree by side**

* Check the evolution of tree planting over time: it is possible to see that the tendency of tree planting is decreasing over time.

TABLE 2 – Variation of quantity of trees over time

|  |  |
| --- | --- |
| Downtown |  |
| Fairview |  |
| Hastings-Sunrise |  |
| Kerrisdale |  |
| Refrew-Collingwood |  |
| Sunset |  |

* Identify if there is the predominance of a specific genus and/or species: we can see that 46% of the trees belong to only 2 genus and almost one-third belong to only 4 species.

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**Figure 3 – Top 10 Genus and Species by total of trees**

* Identify which neighbourhoods have the most trees and which have the least: the top 3 neighbourhoods with the most and the least trees are shown below.

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**Figure 4 – Top 3 Neighbourhood with the most and the least trees**

* Try to localize neighbourhoods with “holes”, i.e., areas without threes: it was identified some areas with “holes”, mainly in Arbutus-Ridge, Fairview and Mont Pleasant. These cases could be checked why are no trees and the most important, if there were, why they died. Maybe the species did not adapt in the region, or the traffic or some kind of disease attacked the plants.

|  |  |
| --- | --- |
| Arbutus-Ridge | A picture containing text, map  Description automatically generated |
| Fairview | A close up of a map  Description automatically generated |
| Mount Pleasant | A close up of a map  Description automatically generated |

**Figure 5 – Samples of “holes” in some neighbourhood**

As suggestion derived from the observations or problems of the analysis, I can indicate:

* Analyze the possibility to replace old trees by new ones using a genus/species more adapted to each region.
* Fix the coordinate problems, as well as the neighbourhood attribute.
* Include in the data set the grow up rate of each species to allow to plan the pruning. It is very important due to the huge volume of wire in the city (power supply, cable, phone, internet, etc.).
* Verify if there is a study about the volume of biomass in Vancouver to compare with the values showed in the dashboard.
* Verify why is the volume of tree planting decreasing significantly? No areas available? Disease? No adaptation?
* Verify why there are “holes” in some areas, while others are perfectly filled?