COURSERA CAPSTONE

IBM APPLIED DATA SCIENCE CAPSTONE

A NEW SHOPPING MALL IN CEBU CITY, PHILIPPINES

JOHNRY B. MORALES

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I. INTRODUCTION

- Philippines is country with a population of approximately 108 million, with much of the working population concentrated on major metropolitan cities and territories (the National Capital Region, metro Cebu and metro Davao). Filipinos are known for its sociable culture and demeanor with much of the people spending most of their free time on parks, open spaces and shopping malls. This is supported by the fact that four of the largest shopping malls in the world are located in the country; the SM Megamall, SM Mall of Asia, SM Seaside Cebu and SM City North.

DEFINITION OF TERMS

- **Shopping Mall** - A shopping mall (or simply mall) is a North American term for a large indoor shopping center, usually anchored by department stores. The term originally meaning a pedestrian promenade with shops along it, but in the late 1960s began to be used as a generic term for the large enclosed shopping centers becoming common at that time.

- **Local Government Unit (LGU)** – there are two levels of governance in the Philippines; national governance and local governance. Local government unit oversee local governance in 81 provinces, 144 cities, 1,490 municipalities, and 42,028 barangays across the country. LGU officials are responsible for providing direct and basic services to the people and ensuring peace and order within communities.

II. PRESENTATION OF THE RESEARCH PROBLEMS AND DATA PREPARATION

Research Question/Problem: Considering the existence of large shopping malls like the Ayala Malls and the SM Malls, is there any location in Cebu City that would be suitable in opening a new shopping mall that could attract many people.

Objective of the Study: The objective of this capstone project is to examine, select and calculate the best locations in Cebu City, Philippines to open a new shopping mall.

II. PRESENTATION OF THE RESEARCH PROBLEMS AND DATA PREPARATION

Data

To solve the problem, we will need the following data:

- List of municipalities and cities in the province of Cebu. This defines the scope and limitations of this project which is confined to the city of Cebu and its nearby or adjacent municipalities and cities.

- Latitude and longitude coordinates of these municipalities and cities. This is required in order to plot the map and also to get the venue data.

- The population of each cities and municipalities of the province was utilized in order to present the status of each local government units

- The Annual Revenue Income of each local government units were also retrieved from the data of the Bureau of Treasury, specifically from the Bureau of Local Government Finance (BLGF)

- Area of each cities and municipalities were also obtained to understand the possibility and feasibility of the construction of this establishment

- Venue data, particularly data related to shopping malls. This data was used to perform clustering on the municipalities/cities.

II. PRESENTATION OF THE RESEARCH PROBLEMS AND DATA PREPARATION

Sources of Data:

❑ City Populations Web (https://www.citypopulation.de/php/philippines-visayas-admin.php?adm1id=0722)

❑ Foursquare API

❑ Geodata from PhilGis

❑ Philippine Statistics Authority

❑ Bureau of Treasury (BLGF)

III. METHODOLOGY

Gathering and filtering of sources for data gathering

Install and download notebooks to avoid reliance on the availability of internet connection

Structure studying and web scraping of data and table

Saving and storing of the obtained data

Verification and cleaning of the obtained data and building dataframe

Sorting and plotting of the dataframe to a mapping tool to provide visualization

Use Foursquare API tools and exploring other API tools

Sort and group data and project into a chart for data analysis

IV. DATA ANALYSIS AND PRESENTATION

- Cebu, Lapu-Lapu and Mandaue city enjoys the biggest revenue income among the cities in the Province of Cebu, this is due to Cebu city being the capital of the province being tagged as the queen city of the south. Adjacent to the city is the city of Lapu-Lapu which is home to Cebu's international airport (Mactan-Cebu International Airport) and Mandaue city in which some of the major factories are located,

- These three cities (Cebu, Lapu-Lapu and Mandaue) also has the top three largest population,

- Considering that these three has the highest annual revenue income, it is also conclusive that in terms of human development and purchasing power of the population, these three also has the highest,

IV. DATA ANALYSIS AND PRESENTATION

- Using the Foursquare API, Cebu city is a bit saturated in terms of the presence of shopping malls,

- Data in some of the venues given by the Foursquare API is not accurate and has to be verified and cleaned further by the administrators and the researcher has to manually clean the obtained data from Foursquare API through manual verification and cleaning using excel,

- Lapu-Lapu and Mandaue only ranks 39th and 48th respectively in terms of land area and only Cebu city sits on the top 10

V. CONCLUSION AND RECOMMENDATION

CONCLUSIONS:

- There are top three locations to choose from in which an investor or developer may put up a new establishment like a shopping mall; these are the cities of Cebu, Mandaue and Lapu-Lapu. These cities also are highly developed as shown in the figures of their Annual Revenue Income and this is further supported by the data taken from Foursquare that most of the large establishments in the province is located on these clusters.

- Population wise also, these three cities are largely populated, in fact, they occupy the top 3 populated areas in the province.

- Lapu-Lapu and Mandaue only ranks 39th and 48th respectively in terms of land area and only Cebu city sits on the top 10.

- Cebu city is the most suited to have another mall on their neighborhood.

- Inaccuracy of some of the data obtained from Foursquare

V. CONCLUSION AND RECOMMENDATION

RECOMMENDATIONS:

- Explore other nearby cities or municipalities to put up a mall, like the city of Talisay or in Consolacion.

- For purposes of future studies to explore other the same API service and to engage in verification of data obtained from these sources.

- Update geographical data of the Philippines