IMPROVING ACCOMMODATION SELECTION IN BROWARD COUNTY, FLORIDA, FOR AIRBNB THROUGH DATA VISUALIZATION.

PROJECT REPORT

Submitted by

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CHAPTER - 1

INTRODUCTION

In today's travel landscape, making informed decisions about accommodation, particularly within Broward County, Florida, is crucial—especially when utilizing platforms like Airbnb. Travelers aspire to find the ideal balance of comfort, affordability, and reliability. Our Data Visualization project is geared towards revolutionizing this experience by tackling key challenges encountered during the accommodation selection process, particularly within Broward County. The dashboard we've designed offers essential insights that Airbnb might not provide.

1.1 BROWARD COUNTY

Broward County not only showcases a wealth of attractions but also boasts an array of Airbnb accommodations that enhance the area's diverse appeal. These stays range from snug beachfront cottages to chic urban lofts, each offering a unique window into Broward County living. They're not just places to rest; they're an immersive part of the vacation experience. Whether nestled within historic neighborhoods or commanding stunning coastal views, these rentals provide a chance for visitors to intimately connect with the county's culture and lifestyle.

These Airbnb options add depth to the travel experience, delivering personalized and charming lodging alternatives. They're more than just accommodation; they're a way for guests to tailor their stay to their preferences, amplifying the allure of Broward County as an enticing destination for South Florida explorers.

CHAPTER – 2

DATA COLLECTION AND PROCESSING

2.1 DATA COLLECTION

We gathered our data from "Inside Airbnb" [1], a project with a clear mission to offer insights and advocacy regarding Airbnb's influence on residential areas. This platform serves as a reliable source, known for its accuracy in providing data. Through various stages and platforms, our data collection efforts culminated in sourcing our information from Inside Airbnb, ensuring a dependable and accurate dataset for our analysis.

2.2 DATA DESCRIPTION

For our project focused on Broward County, Florida, we utilized a dataset spanning from September 2023 to September 2024. This dataset was comprehensive, containing 56 different fields of information. However, for our analysis, we streamlined it to 35 fields and 1 million rows, focusing on crucial data points such as host information, precise latitude and longitude of properties, pricing, reviews, ratings, and more. One challenge we encountered was the absence of zip code information for each property in the dataset. To address this, we employed reverse geocoding (RGC) [4] techniques, which I'll elaborate on in the subsequent sections of this report. This method became essential to fulfill our project's requirements regarding the inclusion of zip code details for each property within Broward County.

2.3 DATA VARIABLES

The data set is huge, so we specified the majorly impacted variables from the project down below:

Serial No:	VARIABLES	DESCRIPTION	DATA TYPE	FIELD SIZE
1	ID	This is an ID of a Airbnb property which is a unique code that distinguishes it from other properties in their database, acting as its distinct digital fingerprint.	Long Integer	≈ 11000
2	listing URL	The listing URL of an Airbnb property is the web address that leads directly to the property's online listing page, showcasing its details and booking information. Though we never used this in the project directly, it helped us to verify the information	Character	≈ 11000
3	Name	The Name of an Airbnb property is the title or label that helps identify and distinguish it, often reflecting its character or location in a few words.	Character	≈ 11000
4	Review_scores_location	The Review Scores Location for an Airbnb property indicates how guests rate the property's neighborhood and its proximity to attractions, transport, and local conveniences on a scale, helping future guests assess its location.	Float	≈ 11000
5	Host name	The Hostname of an Airbnb property is the name of the person who owns or manages the property listed on the platform.	Character	≈ 11000

6	Neighborhood	The neighborhood of an Airbnb property is the local area or community where the property is situated, reflecting its surroundings and nearby amenities.	Character	≈ 11000
7	Latitude	The latitude of an Airbnb property specifies its north-south position on Earth, like a point on a vertical grid, helping pinpoint its exact location.	Float	≈ 11000
8	Longitude	The Longitude of an Airbnb property specifies its east-west position on the Earth's surface, helping pinpoint its exact location within a geographic coordinate system.	Float	≈ 11000
9	Zip Code	The Zip Code of an Airbnb property is its specific postal code, helping identify its location within a particular area.	Integer	≈ 11000
10	Property type	The Property type of an Airbnb property identifies the kind of lodging it is, whether it's a house, apartment, or another type of accommodation.	Character	≈ 11000
11	Room type	The room type of an Airbnb property specifies what kind of accommodation it is, like whether it's an entire home, a private room, or a shared space.	Character	≈ 11000
12	Bedroom	The bedroom field represent number of bedroom available in that particular property.	Integer	≈ 11000
13	Accommodates	Accommodates on an Airbnb property tells how many guests the place can comfortably host, like the max number of people it can accommodate.	Integer	≈ 11000

14	price	The price of an Airbnb property is the cost guests pay per night to stay at that location.	Float	≈ 11000
15	Calendar	The calendar listing date of an Airbnb property is the date when the property is available or unavailable for booking on the Airbnb platform.	Date	≈ 850,000

2.4 DATA PRE – PROCESSING

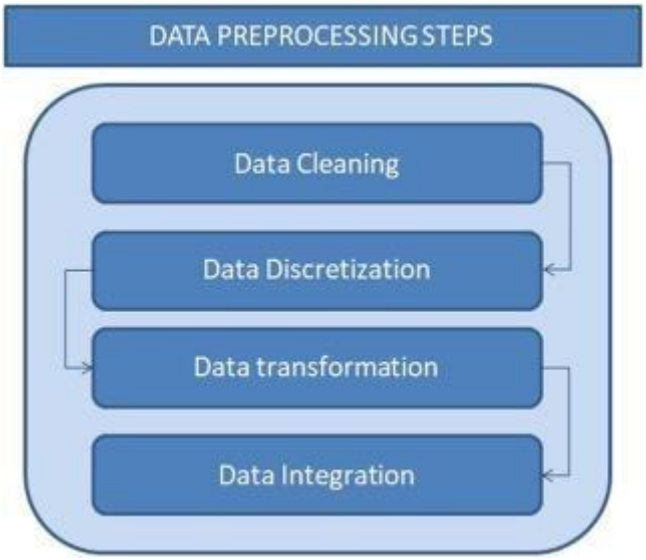

Fig 2.4 Data Pre-Processing Steps

1. **Handle Missing Values:**
    - Find and fix any missing information in the dataset.
    - Either remove incomplete data or fill in missing values where possible.
2. **Compare with Original Listings:**
    - Double-check our processed data against the original Airbnb information.
    - Spot any differences between our dataset and the actual Airbnb listings.
3. **Add Zip Codes:**
    - Use special techniques to figure out and include zip code details for each property.
    - Make sure these added zip codes are accurate and make sense.
4. **Check Data Quality:**
    - Confirm that our dataset is complete, accurate, and consistent.
    - Look out for anything strange or unusual that might affect our analysis.

5. **Make Data Uniform:**
    - Ensure all the data looks the same way and follows the same rules.
    - If needed, adjust numbers to a standard format for better comparison.
6. **Create New Useful Info:**
    - Think about making new details from the ones we already have.
    - See if these new details could help us understand things better.
7. **Split Data for Different Uses:**
    - Divide our dataset into parts for training, checking, and using it for analysis.
8. **Write Down What We Did:**
    - Keep a record of all the things we did to change the data.
    - Explain why we made those changes and how it might affect our analysis.

By doing these steps one by one, we can turn this complex Airbnb data into something simpler and easier to use for our analysis or studies, As mentioned above in the introduction, we have used reverse geocoding for our project, reverse geo coding is the process of converting the latitude and longitude to zip code with help of python we developed a code which helped us achieve the result.

2.5 DATA TRANSFORMATION:

After finishing the pre-processing, we brought together information from two separate CSV files into a single worksheet using Excel's developer tools. This helped merge the data from both files into one place, making it easier to work with and analyze as a unified dataset.

CHAPTER - 3

TOOLS USED

Our visualization project utilized a combination of powerful tools to ensure efficient data processing, cleaning, and visualization. Each tool has been strategically employed to contribute to the seamless flow of the project, from data cleaning to the creation of insightful visualizations.

Tableau Prep:

Tableau Prep played a crucial role in data preparation and cleaning. Its intuitive interface facilitated seamless manipulation and transformation of raw data, ensuring that the dataset was refined and structured optimally for visualization. We employed Tableau Prep to remove unnecessary fields, change data types, eliminate null data and split the Name of Listing into more useful fields such as rating, number of bedrooms, and bathrooms to enhance data quality. Additionally, we performed data integration by joining the main dataset with listing calendar data to obtain the 2024 price for listings, aligning with our visualization objectives.

Tableau Desktop:

Tableau Desktop served as the primary tool for visualizing our cleaned and prepared data. Its rich set of features enabled the creation of interactive, informative, and visually appealing dashboards.

Python:

Python scripting played a specific role in the project, focusing on converting latitude and longitude data into zip codes for cities in Broward County, FL. We crafted scripts to automate the conversion process, enhancing efficiency and reproducibility.

By leveraging a combination of Tableau Prep, Tableau Desktop, Python and Excel this comprehensive approach ensured that data was not only cleaned and prepared effectively but also transformed into visually compelling and insightful representations that aligned with the project objectives. The integration of these tools reflects our commitment to delivering a high-quality and impactful visualization solution.

CHAPTER- 4

RESEARCH PROBLEM

1. Choosing Room Type by Reviews:

- Issue: Users often face challenges in identifying the ideal room type based on reviews.
- Objective: Our project aims to simplify this process by visualizing review data. Users will be able to identify the top-rated neighborhoods based on Location Rating Scores and discover the most popular cities by Room Type, utilizing Total Number of Reviews as a metric.

2. Choosing Rental Space Based on Price:

- Issue: Making accommodation decisions based on price can be challenging for visitors.
- Objective: Our Data Visualization tools will empower users with a user-friendly search interface, providing insights into average prices for every city and the distribution of bedroom numbers. This information will facilitate easier decision-making for visitors seeking affordability.

3. Property Type Options:

- Issue: Tourists often find it challenging to decide among the numerous property type options available in the area.
- Objective: Through intuitive visuals, our platform aims to assist users in easily navigating and selecting property types such as entire homes, private rooms, shared rooms, tents, etc., with a focus on Broward County. Accommodation will be presented alongside average prices for informed decision-making.

4. Cities with Accommodations:

- Issue: Understanding the distribution of total listings in every city of Broward County is crucial for travelers.
- Objective: Our project includes visualizations that highlight the total number of listings in each city of the area. This information provides invaluable insights for travelers, especially those looking for last-minute bookings.

5. Optimal Travel Time for Better Packages:

- Issue: Travelers in Broward County seek cost-effective accommodation deals.
- Objective: By visualizing pricing data specific to this region, our platform will help users identify the optimal times to travel for cost-effective accommodation packages in Broward County. This feature will enhance decision-making for travelers seeking the best deals.

The outlined research problems and objectives showcase our commitment to providing users with a comprehensive and visually engaging platform for informed decision-making in the realm of accommodation selection.

4.1 OUR IDEA

Through this project, we aim to provide not only a comprehensive tool for tourists to gain an overview before booking accommodation in Broward County, FL but also an opportunity to extend this platform to other locations worldwide with similar Airbnb datasets. This initiative is designed to empower tourists to make more informed decisions when traveling to specific destinations.

CHAPTER - 5

TARGET AUDIENCE

We have targeted the tourists for Airbnb stay in Broward County, Florida. For this project we've executed offers consists of a diverse group of population who seeks not only a good touristic place for holiday vacations but for travelers from the northern side of continent who would like to find a warm scape from harsher weathers of north.

5.1 UNDERSTANDING THE TARGET AUDIENCE

1. **Family groups:**

Tourists are formed by families who have members range from 3 to 10. We have tried through our project to get them the best accommodation option possible.

2. **Group of friends:**

At times friends are the perfect group if you want to have fun or make memories to cherish for your whole life. Our project is designed for them as well, where they can find famous places to stay.

3. **Solo travelers:**

Those who desire to experience the world, people, culture, and life typically travel alone with very few demands but economical options. Our report has got these groups included as well.

5.2 PERSONAL TOUCH

1. **Curated Experiences:**

We have tried to let our project be open of customization for some curated experience the customers might want, something which is personally important for them, the best ratings.

2. **Engagement Through Feedback:**

We have always encouraged customers' feedback and are always open to customers feedback so we could improve our project.

3. **Vast applicability:**

This project of ours can be used for the data of any part of the world. Target customers can use this dashboard for their ease with any data they could get. By using this amazing dashboard of ours, you can captivate and attract tourists seeking an immersive and authentic exploration of Board County, Florida.

CHAPTER –6

VISUALS USED

We have used multiple visuals to make this project a one window operation for every tourist's needs.

Bar charts:

Visualizes categorical data with rectangular bars proportional to the values, making it easy to compare different categories briefly. This visual is the best of comparisons and we have used it multiple times to compare different house types, room numbers, price, location, and ratings etc. In this project there are charts that uses different color schemes like hues and palettes.

Donut graphs:

A circular chart resembling a pie chart with a hole in the center, illustrating data proportions and relationships in a visually appealing manner. The donut graph is one of the most engaging graphs we have used; it not only gives you an idea of the whole and what part of the whole one aspect covers but also makes it easier for viewers eyes to understand the data in just one glance.

Maps:

Utilizes geographical data to plot locations or regions on a map, providing spatial context and allowing for geographic analysis. Getting this part done was the challenging part of our project as we had to get the data for geographical location through a third source and had incorporate it with our data, but it was extremely necessary in order to make our project effective and easier to interact and understand.

Tree maps:

Hierarchical representation of data using nested rectangles, allowing for the visualization of hierarchical structures and the comparison of proportions within each level. Tree maps were used for a more convenient way to compare among top ten rated neighborhoods. We can use tree maps for more top ten or top five comparisons or on the contrary tree maps could be used to avoid neighborhoods, hosts, or accommodation types.

Line charts:

Shows data trends over time or continuous categories, plotting points connected by lines to visualize changes and patterns. Line charts are used to give a historical perspective to the data

to compare data with the perspective of time. Our line chart shows the off seasons and seasons of tourism in Broward County Florida. Again, line charts could have been used for comparing which neighborhood to go to for a particular season.

Packed bubbles:

Visualizes hierarchical data using circles of varying sizes within a confined space, representing proportions and relationships between categories. Packed bubbles are a very interesting and interactive graph to compare the Total number of
Reviews by signifying the data's size with a bubble. We have used bubble package to compare Top 10 Host with highest total number of reviews.

Highlight table:

We used a Highlight Table to present the data, organize values in rows and columns for detailed analysis and comparison. This format provides essential data information, and the integration of colors allows for easy differentiation and comparison of the number of reviews between various places, enhancing the visual impact and insights derived from the table.

Stacked Bars:

Visually represents data using vertical bars stacked next to each other. Each bar segment represents a proportion of each bedroom type in the whole, allowing for a clear depiction of the composition and distribution of data categories. This format facilitates easy comparison and analysis based on the number of bedrooms.

CHAPTER – 7

CONCLUSION

1. Our project simplifies vacation planning by guiding users to choose accommodations using factors like price, reviews, and listings through an easy-to-use interface.
2. The dashboard reveals key insights: for example, "Hollywood" offers a plethora of lodging options, perfect for spontaneous trips in Broward County, with fantastic deals thanks to its abundant listings.
3. We highlight average prices per bedroom for effective budgeting and showcase the best value, like an entire villa for approximately $300/night, through interactive graphs.
4. Our tool identifies the best prices based on Zip code and city, noting that "Fort Lauderdale" tops the chart at an average of $876/night, while "Tarmac" sits as the most affordable at just $30/night.

With these features and more, our project becomes an all-inclusive tool for selecting the perfect Airbnb in Broward County, FL, ensuring an exceptional vacation experience.

The scope of this project is far greater than just one county in Florida. This project can be used for far greater implications like for the Airbnb data of the whole world or one could use data for any place he or she wants to take a tour.

We are also planning to form a dashboard for the perspective of host in our winter breaks which could help the supplier in the market with one place to get all the information for their business very easily and conveniently. This project could improve the whole tourism industry which is responsible for 7.7 trillion dollars of contribution to world GDP and there is room for gigantic improvements.

CHAPTER – 8

RECOMMENDATIONS

Our Data Visualization project aspires to transform the accommodation selection process in Broward County, Florida. By leveraging the power of data visualization, we aim to empower users with insightful, easily digestible information specific to this region, enabling them to make informed decisions tailored to their preferences in Broward County.

Tourists who would like to book accommodation in Broward County, Florida can visit our user-friendly dashboard to gain a comprehensive overview of Airbnb options. These visual graphs will empower you with insights into top-rated hosts, diverse property types, and the top affordable neighborhoods. By utilizing this tool before navigating to the Airbnb website, you'll embark on your search with informed expectations, making it easier to pinpoint the best deals and tailor your stay to your preferences. Maximize your travel experience by leveraging our platform for insightful and efficient accommodation selection.

CHAPTER – 9
APPENDIX -A

9.1 DATA VISUALIZATIONS

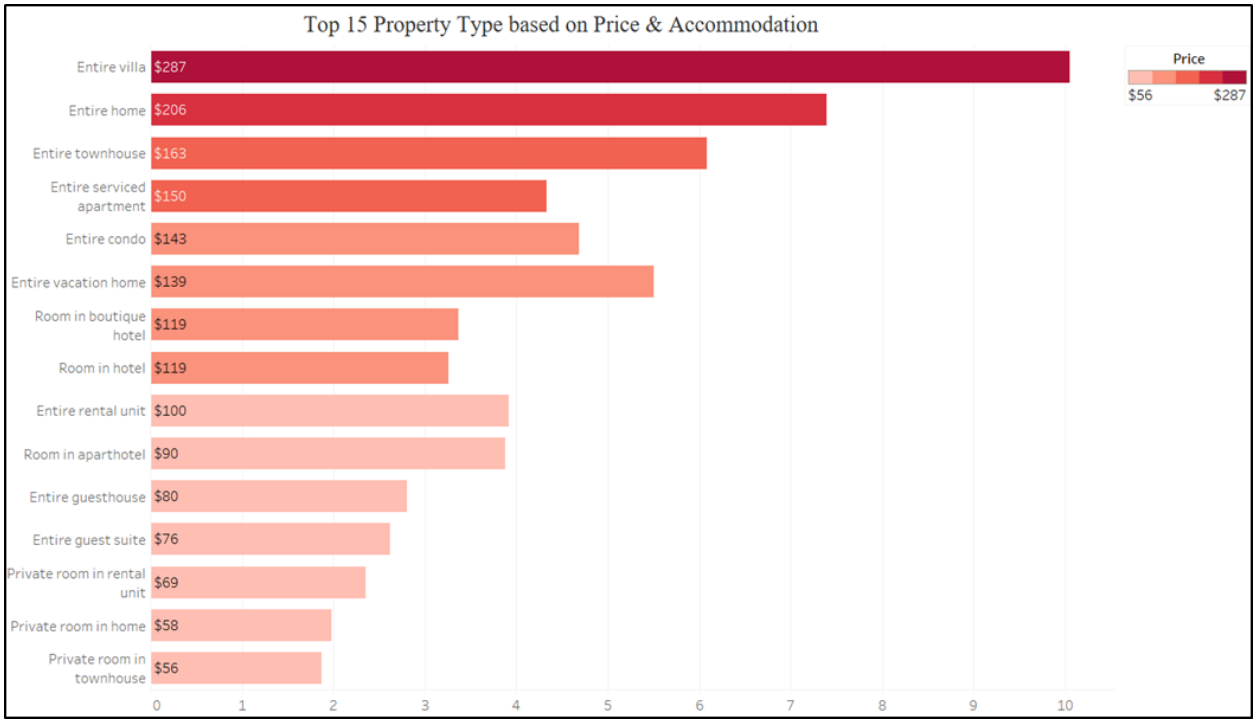

Fig 9.1.1 Top 15 "Property Type" based on Price & Accommodation

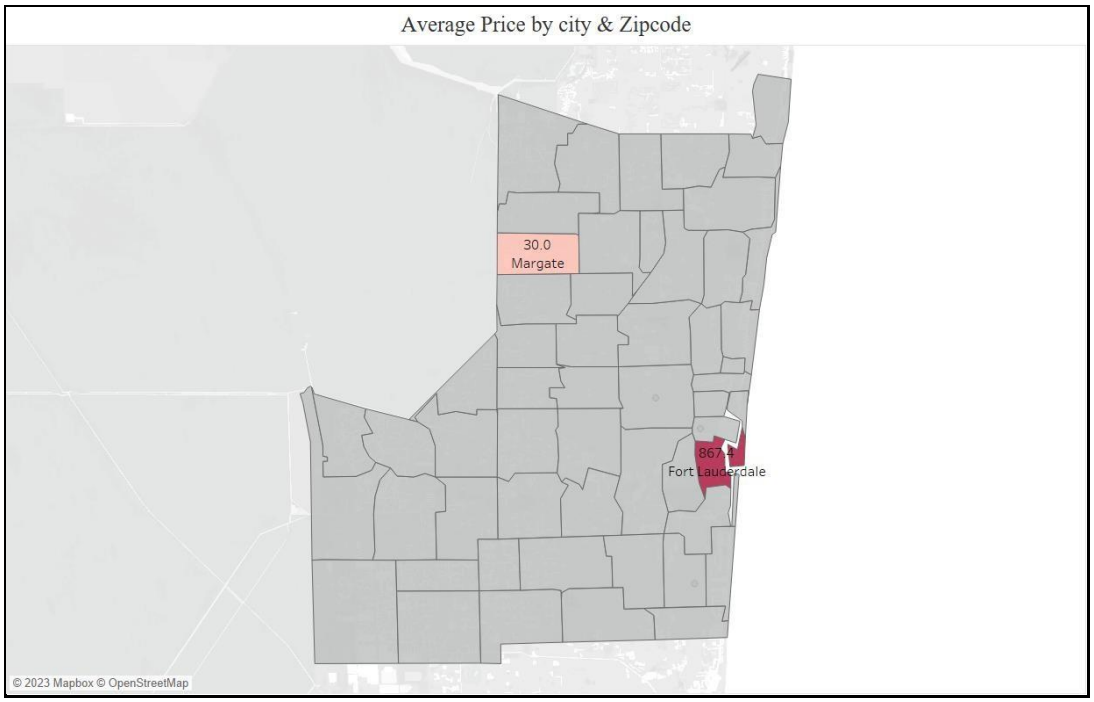

Fig 9.1.2 Average Price by city & Zip Code

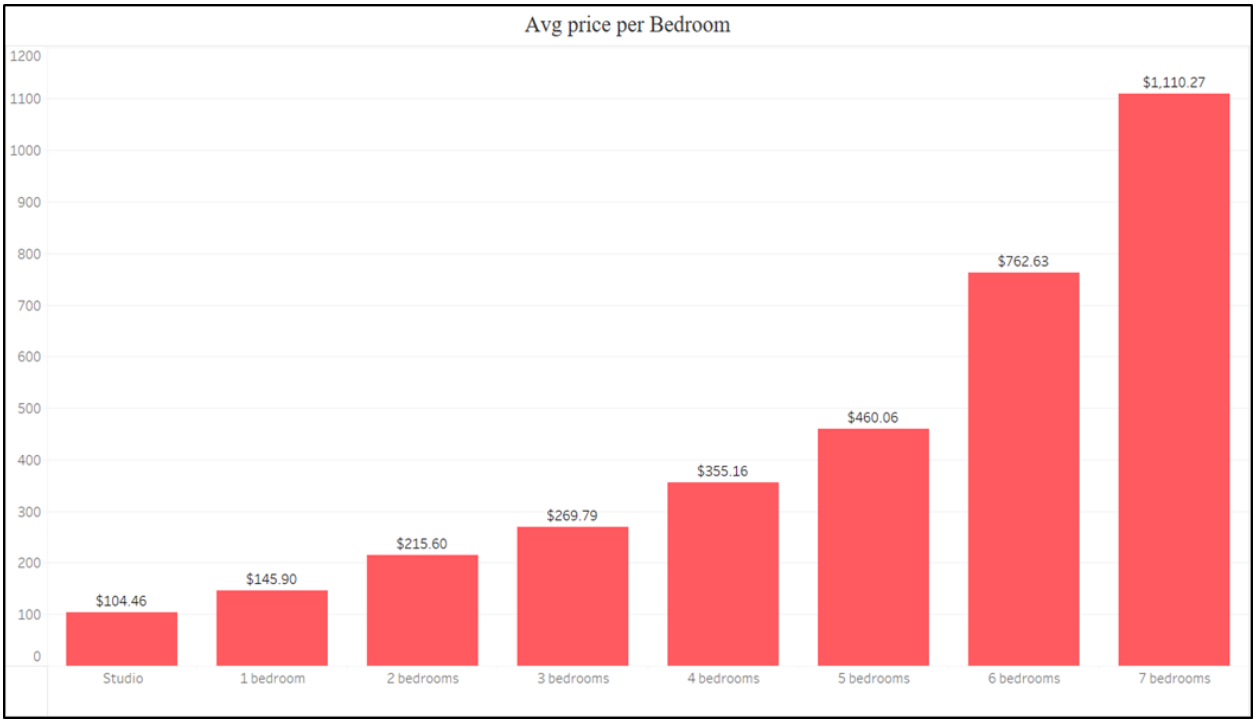

Fig 9.1.3 Avg Price per Bedroom

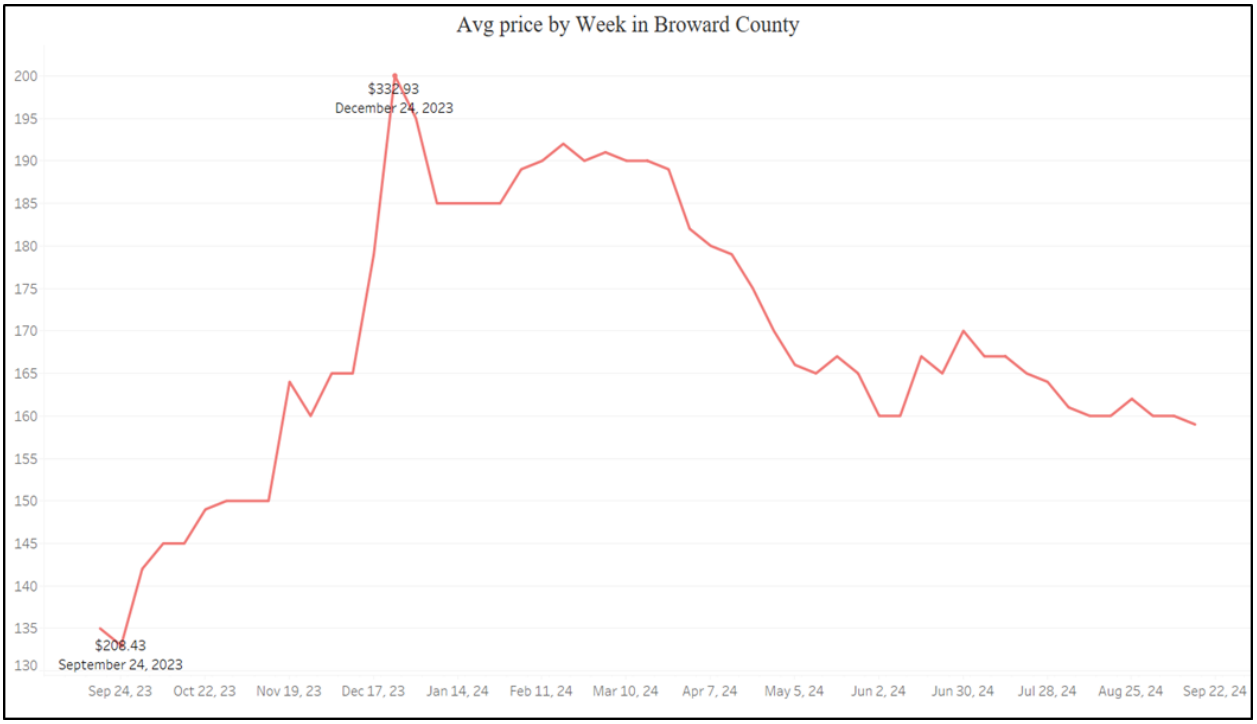

Fig 9.1.4 Avg Price by "Week" in Broward County

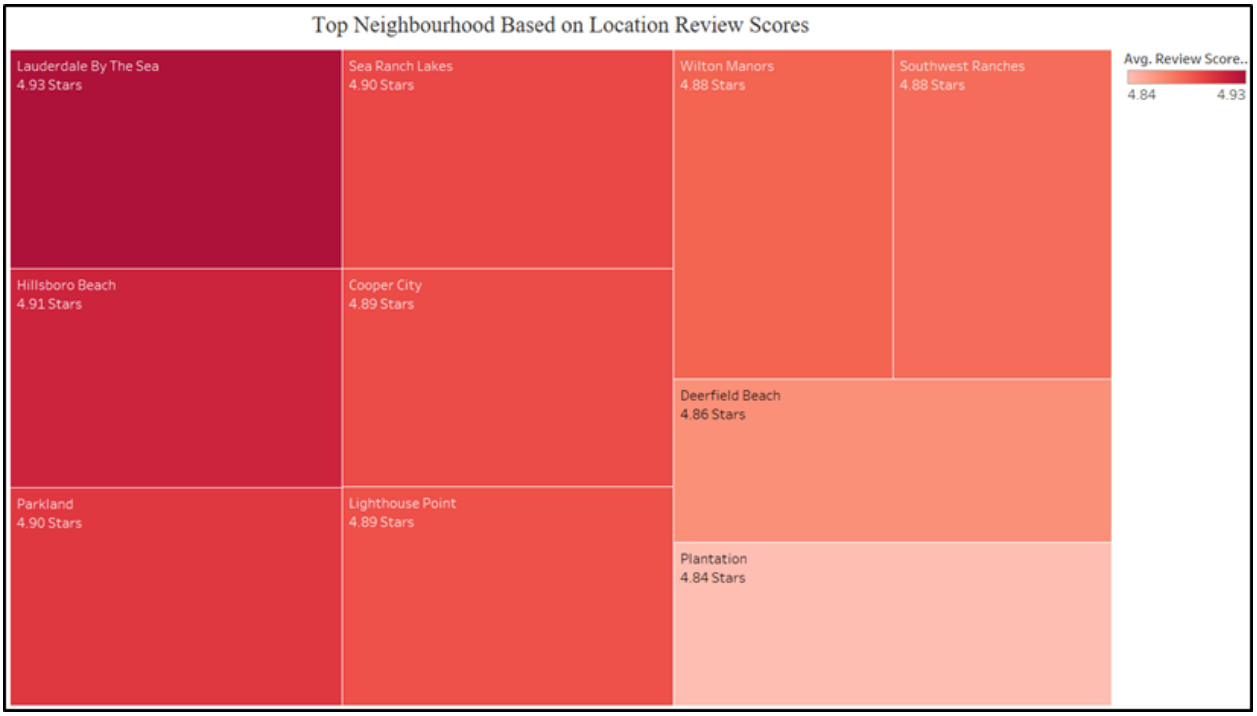

Fig 9.1.5 Top Cities Based on "Location Rating

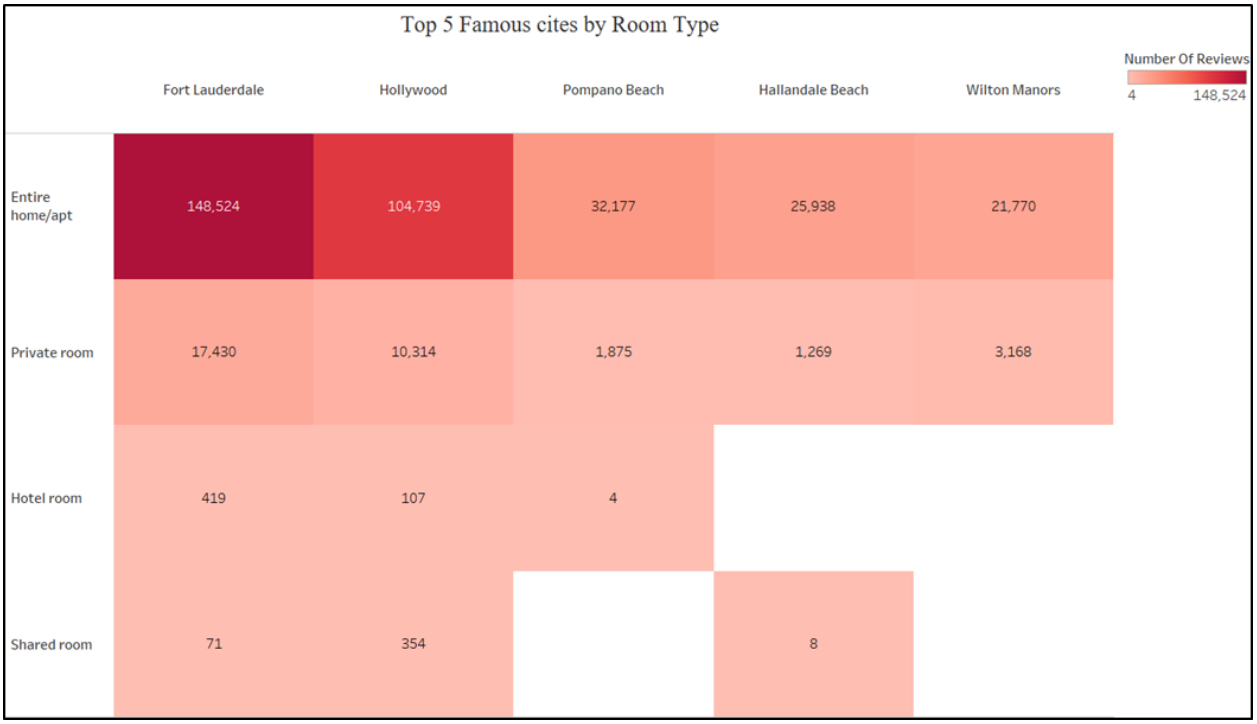

Fig 9.1.6 Cities with higher Accommodation density

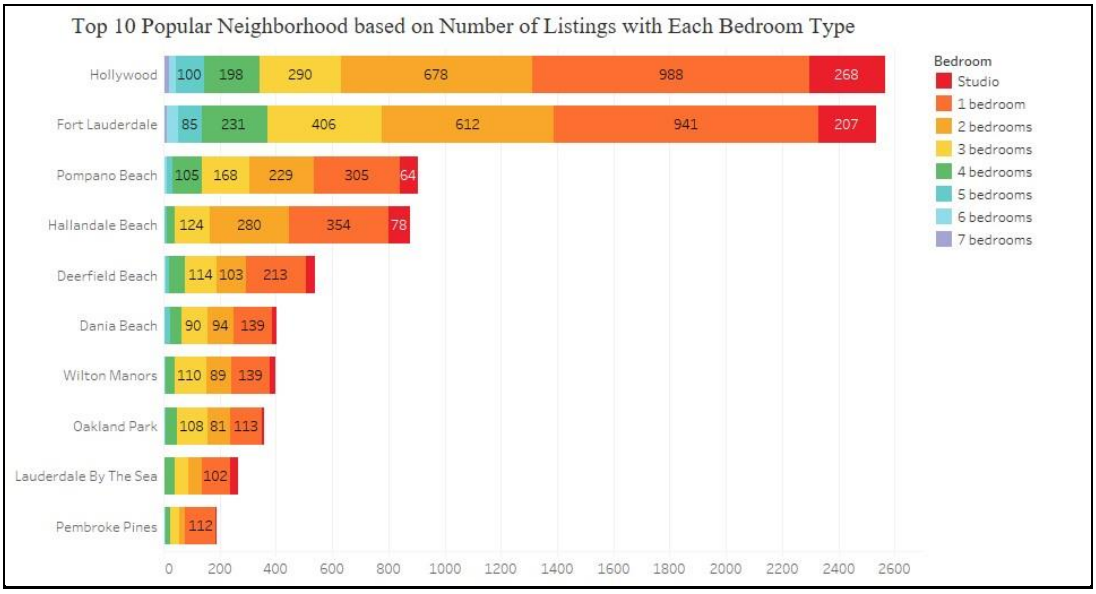

Fig 9.1.7 Top 10 Popular Neighborhood based on Number of Listings with Bedroom Type

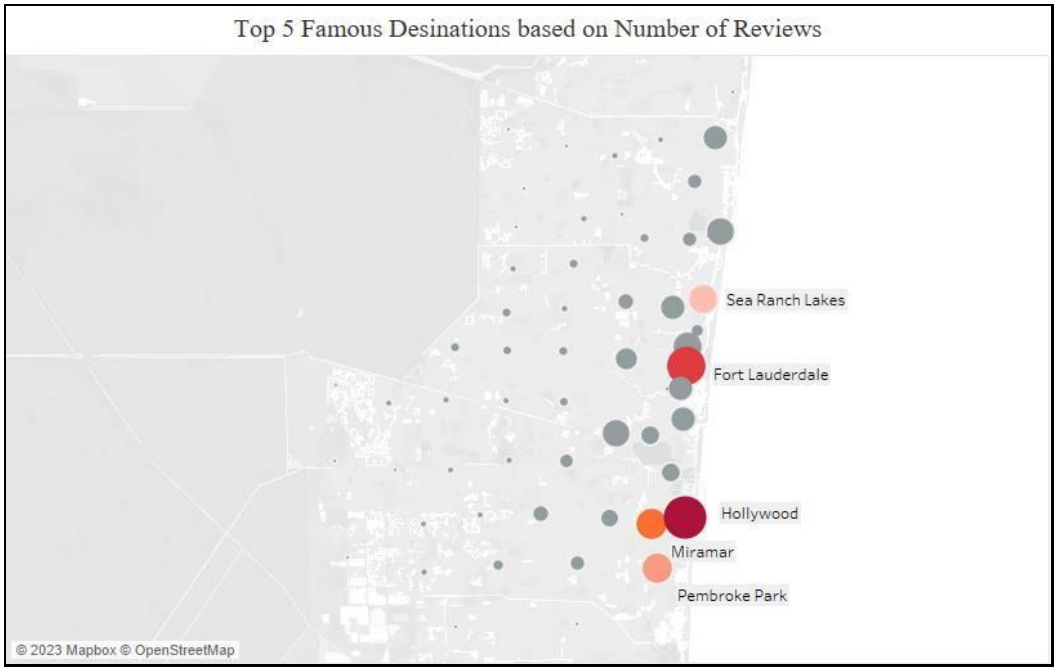

Fig 9.1.8 Top 5 Famous Designations based on Number of Reviews

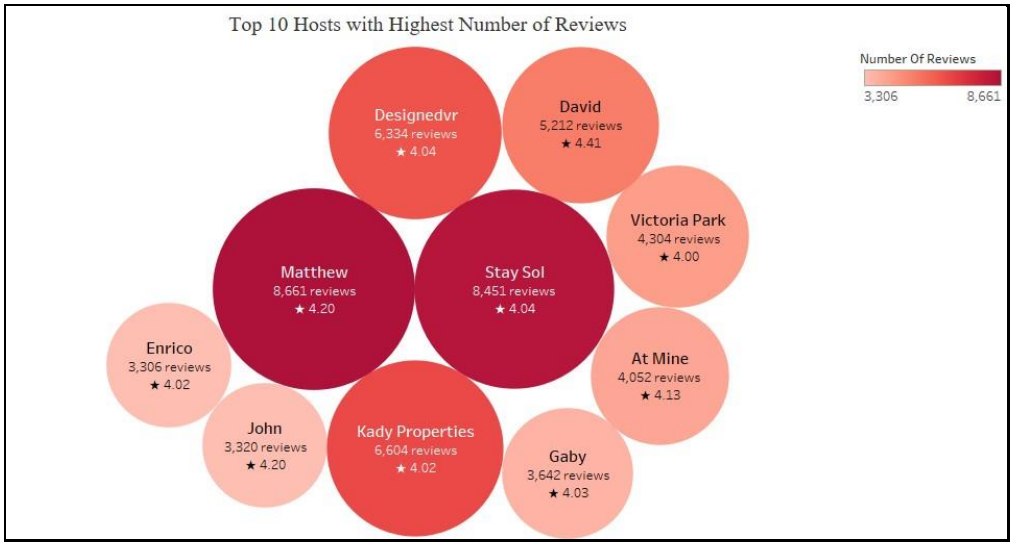

Fig 9.1.9 Top 10 Hosts with Highest Number of Reviews

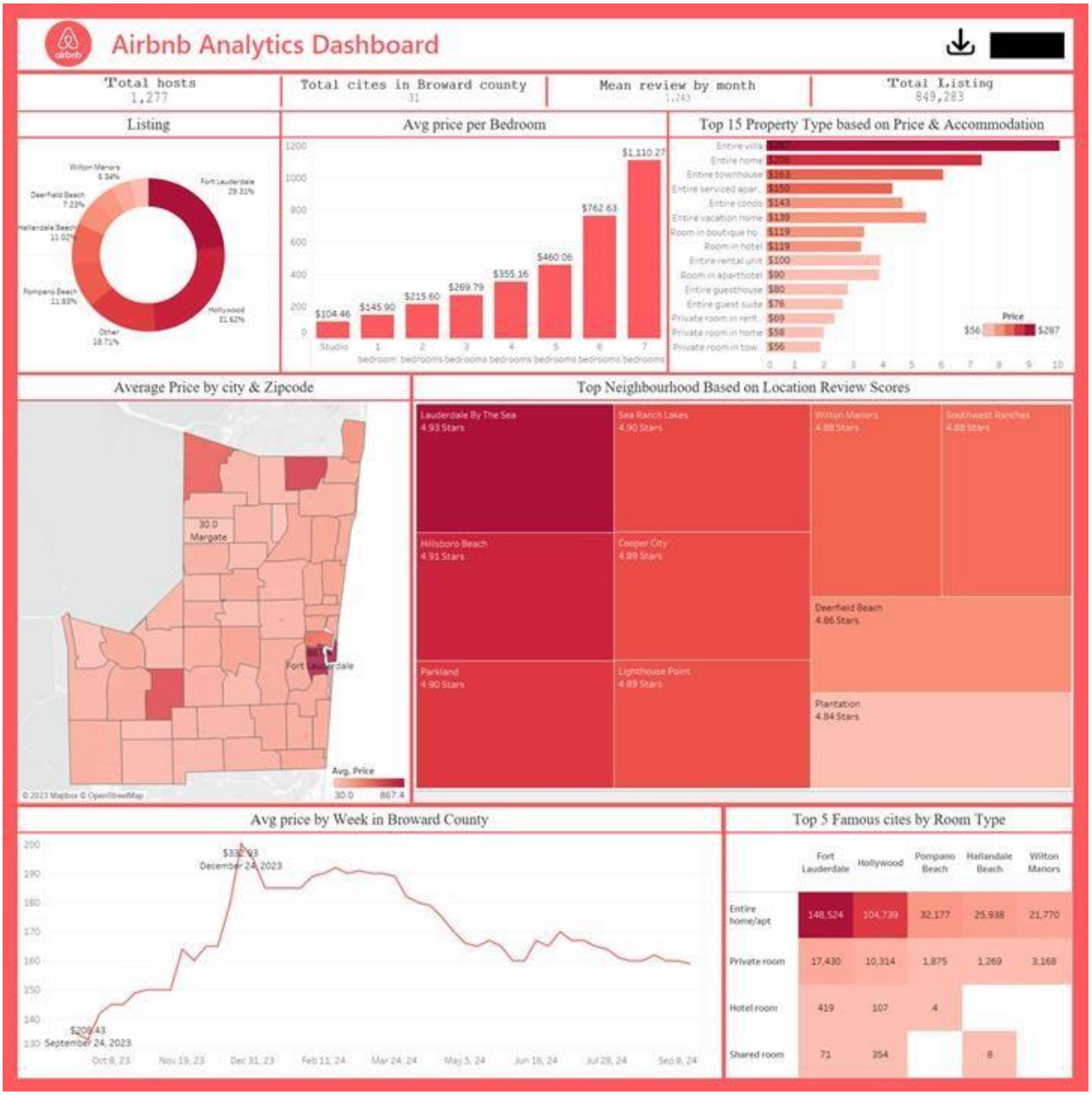

Fig 9.1.10 Dashboard

CHAPTER-10
APPENDIX – B

10.1 REFERENCES:

[1] Data sources - http://insideairbnb.com/get-the-data

[2] Visual Idea - https://public.tableau.com/

[3] Donut Chart- https://kb.tableau.com/articles/issue/creating-donut-charts

[4] Grouping small slices of Pie chart - https://help.tableau.com/current/pro/desktop/en-gb/sortgroup_sets_topn.htm?_gl=1*1rvipbr*_ga*MTQxMDIxNDU5Ni4xNjk3ODMwNDc4*_ga_8YLN0SNXVS*MTcwMjU2ODg4MS4yNS4xLjE3MDI1NjG5NzAuMC4wLjA.

[4] Reverse Geocoding - https://www.geoapify.com/tools/reverse-geocodingonline

[5] Airbnb website - https://www.airbnb.com/broward-county-fl/stays

[6] Statistical facts - https://www.statista.com/topics/962/global-tourism/