

## Report on Airbnb Visualization

### **Introduction:**

With the rise and development of sharing economy, there is another option for customers to book accommodation before a trip: Airbnb (Air Bed “n” Breakfast). Nowadays, most people are migrating from booking hotels to Airbnb depending on several factors like economy, social, comfort and experiments. Due to the success and popularity of Airbnb, the statistics show that there are more than 81,000 cities having Airbnb and each night 2 million people book properties through this platform. Sometimes, it becomes difficult for the customers to select the right property under their conditions. To solve this problem, we have created a dashboard by which customers can find multiple options in the area they want with the wide range of patron counts in Cape Town (South Africa). Customers can also compare nearby properties and choose what suits best for them. Properties have been classified according to different types of rooms available and customers can select the number of people who are about to stay to check the number of options they have. Some of them are concerned about the prices of the rooms, so they can get a wide range of prices accordingly.

### **Dataset and cleansing of data:**

Customers are facing a wide range of problems while selecting the perfect Airbnb. To overcome this, I have undertaken the Airbnb data of Cape Town from the official website, Insideairbnb, to visualize and make a dashboard for customers. The data consist of several attributes like the name of the property, prices, who is the host of that property, latitude and longitude by which we can locate the property, property type, room type, and many more which are important for visualization. On the other hand, the dataset also had some useless attributes which doesn't make much effect and some of them don't have any values. Moreover, the dataset was filtered and cleaned by undertaking data ethics and with the help of R Studio. For example, as mentioned earlier, some columns were having n/a value which was removed by the following code (Fig.01):

```
25 # Dropped the columns with N/A vlaues:
26 capetown_new <- capetown[ , colSums(is.na(capetown)) < nrow(capetown)]
27 View(capetown_new)
28 Capetown_01 <- capetown_new %>% discard(~all(is.na(.) | . == ""))
29 View(Capetown_01)
```

Fig.01: Screenshot from R Studio 01

Afterwards, we have also dropped some of the columns which were not useful for the creation of the dashboard (Fig.02):

```
30 # Dropping columns wich are not useful:
31 col_remove <- c("neighborhood_overview", "host_neighbourhood", "picture_url",
32               "host_about", "host_is_superhost",
33               "neighbourhood")
34 CapeTown <- Capetown_01 %>%
35   select(- one_of(col_remove))
36 View(CapeTown)
```

Fig.02: Screenshot from R Studio 02

Finally, the dataset was left with essential attributes which are necessary for the users at the initial level.

The dashboard design which we created contains a map, bar chart and area graph which is validated effectively with all the four-level. The four-level includes domain situation, task and data abstraction, visual encoding and interaction idiom, and algorithm.

#### **Domain Situation:**

It incorporates a group of users and their areas of interest. Each domain has its own way of describing its problems, data and how to solve those problems with relevant information. The issues faced by customers are clearly defined and the dataset containing proper attributes will help customers to find the perfect area to live with their conditions satisfied. The provided dashboard will solve the customer issue and can be validated by the reviews and research about the targeted users.

#### **Task and data abstraction:**

The objective is to figure out which information type would uphold a visual representation of it that resolves the customer's concern. We have altered the dataset from the original to make better visualization which can give the results of the customer's problem. Moreover, the enquiries from the different domain situations can be guided to similar abstract vis tasks. The abstract tasks include browsing- users can browse the entire dashboard and get all the information about the different Airbnb available across Cape Town, comparing- afterwards, they can compare them based on price, occupancy, and type of rooms available, and summing up user can get to know the differences between different Airbnb's.

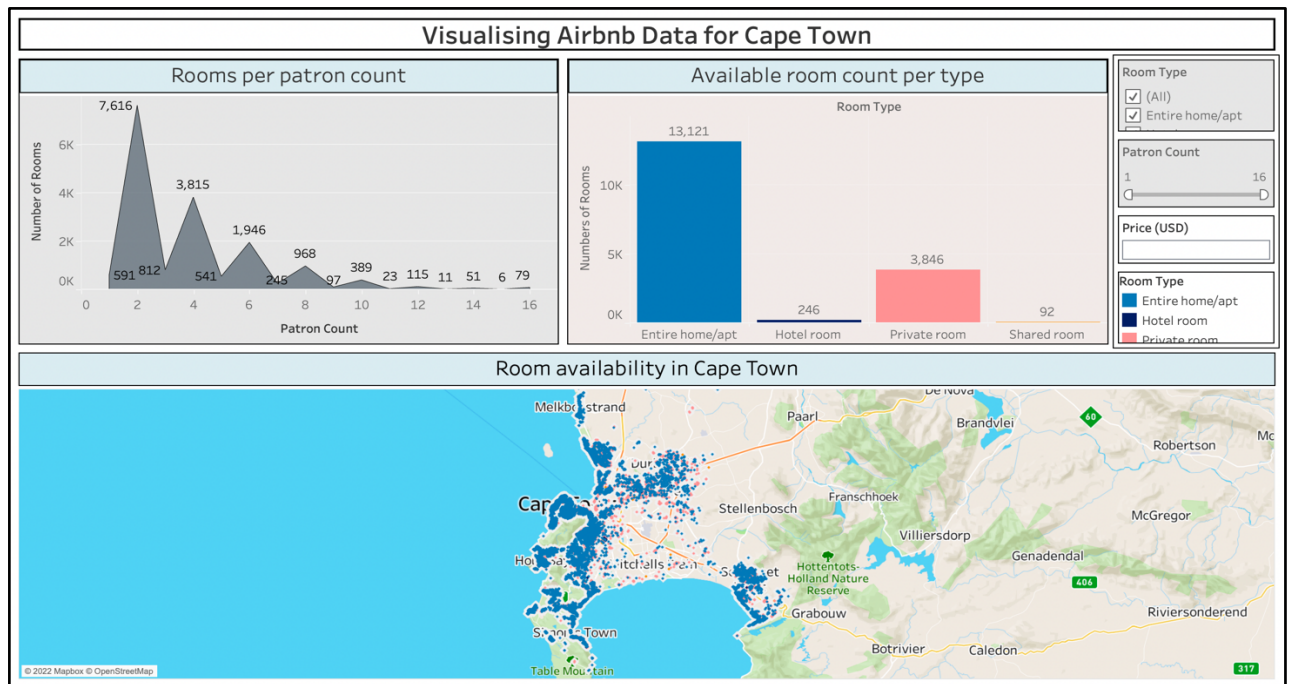
#### **Visual encoding and interaction action:**

At this level, the goal is to decide the specific way to create and manipulate the visual representation of the abstract data block. We have confronted some issues during the process, for example, how can we create a single picture data by which the user's issue can be solved or how can we manipulate the representation dynamically.

We choose to make a dashboard with multiple charts for our users. This dashboard consists of a map which shows the exact location of the property with the help of latitude and longitude, and it shows the price of the property as well while hovering onto it. The bar chart shows the different types of rooms available in different properties like Entire homes or apartments, hotel rooms, private rooms, or shared rooms. Besides, it is also provided with a filter, which gives liberty to the user to choose the right room depending on the number of accommodates in provided location as well. Also, the area graph is also mentioned for getting the info about the total rooms per patron count. So, by this interactive dashboard, users can get information about the price, location and number of occupancy available in different types of rooms.

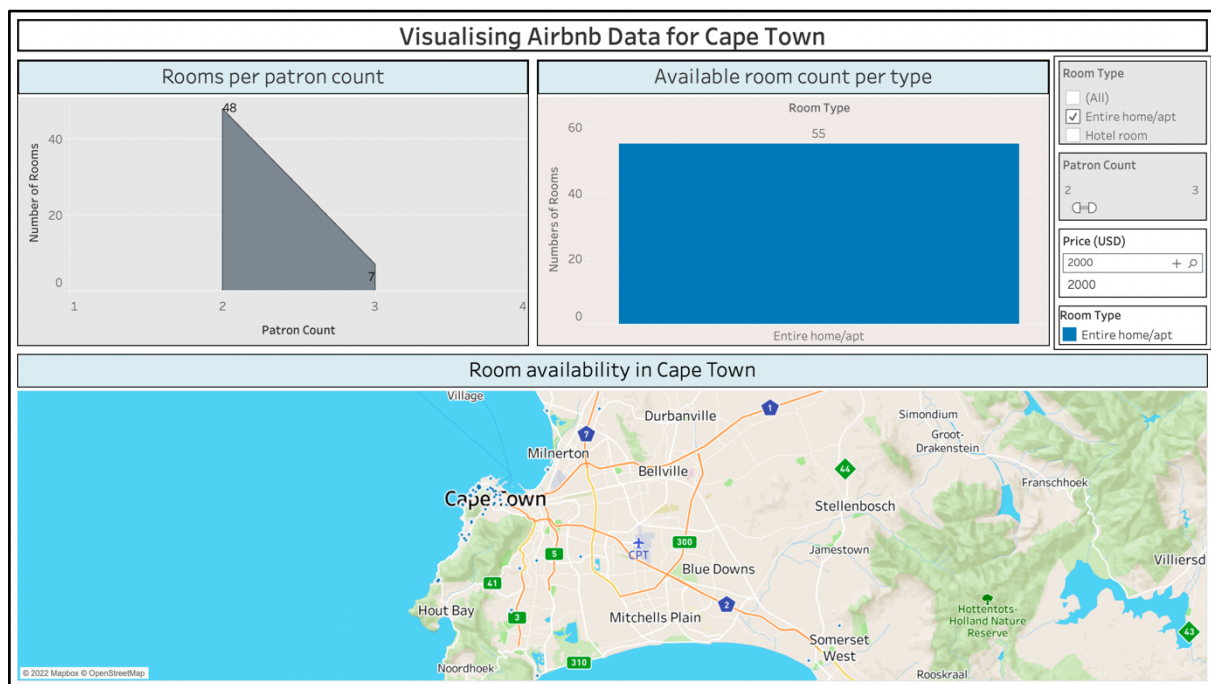
#### **Algorithm:**

This is the innermost level. Our fundamental undertaking was to create an algorithm that can deal effectively without any complications and solve the problem of the user (Fig.03).



**Fig.03: Screenshot of Final Dashboard of Airbnb Cape Town**

After undertaking all the essential attributes, we finalised the dashboard which is easy to understand and visualise. All the important features which a customer looks at before booking any Airbnb like price, area and the type of room they want can filter and get the results. They can also compare the prices between different areas. The Airbnb prices range from 114 USD to 150,000 USD and if we talk about types of rooms, people choose more homes or apartments rather than any other type. Users can apply multiple filters as well, for example, they can choose an entire room or apartment for a patron count of 2 to 3 and a price of around 2000 USD (Fig.04).



**Fig.04: Screenshot of Dashboard with applied filters**

As a result, we get 17 private rooms at a price of 2000 USD of which 16 rooms have a patron count of 2 and 1 for 3. We can see the locations as well on the maps. (Check on the interactive dashboard).

Moreover, customers can get information about the property like the name, price and the type of rooms available by hovering over maps of mentioned places. If they select one type from the “Available room count per type” chart, the dashboard will show the results of that type and also give the location on the maps from which users can get more information about it.

For an individual user with certain specifications, it’s hard to find a place to stay in a new city or country and not anyone can rely on people because everyone has different opinions. So, for them also it’s the best source to get at least some idea of the ranges of accommodations available as the data used for building the dashboard is taken from the official website of Airbnb which keeps updating according to the survey.

### **Conclusion:**

This dashboard can make the entire interaction attractive and can give the essential information to the customers before selecting an Airbnb in Cape Town. This dashboard contains a wide range of accommodations with wide range according to customers. By using it, users can save a lot of time and get improved results in a very short span of time. Staying is one of the reasons for getting stressed but now users can reduce it while using the provided dashboard and also increase their productivity. Visualization is useful for the users, but it has some limitations like if a user wants to rent property in a specific area in Cape town, they cannot find it by searching a specific area name. They can do so if they know the location on the map. To overcome the same limitation, a search bar should be there with certain filters to select rooms in a specific area. Also, data should be filtered according to areas rather than considering the whole city.

Overall, this dashboard is helpful for the people who are moving to or searching for the perfect Airbnb of their type in Cape town with a wide range of prices and room availability in the area they want. They can also have an overview of the area where most of the Airbnb exists. So, users can use this dashboard for getting their choice of accommodation.

### **ACCESS TO INTERACTIVE DASHBOARD:**

[https://public.tableau.com/views/Capetown/CapeTownAirbnb\\_1?:language=en-US&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Capetown/CapeTownAirbnb_1?:language=en-US&:display_count=n&:origin=viz_share_link)

### **References:**

- (a) Dataset of Cape Town from Insideairbnb: <http://insideairbnb.com/get-the-data>
- (b) Tamara Munzner; Eamonn Maguire, (2015), Visualization analysis & design, CRC Press.
- (c) Importance of dashboard : <https://guidingmetrics.com/benefits-of-metrics/6-benefits-to-building-your-dashboard-today/>
- (d) Levels of validation: <https://jenniewblog.wordpress.com/2016/02/12/four-levels-for-validation-chapter-4/>