CS5044 Practical 2(Group Work)

Word Count: 985

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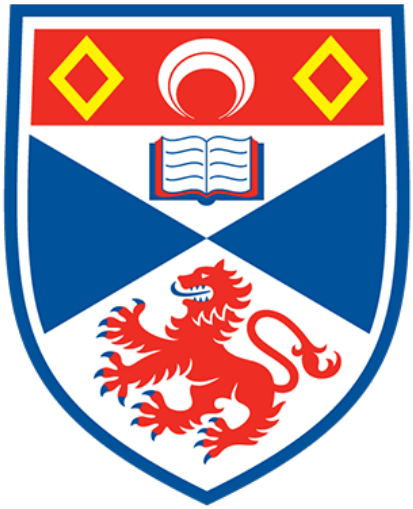


University of
St Andrews

Website: https://yj40.host.cs.st-andrews.ac.uk/P2/index.html

1. Data & Questions

1.1 Data Set

This visualization is based on Airbnb data in the US, there are 226k points with 17 attributes. The following are the key attributes and their types.

Attributes	Types
id	categorical
name	categorical
latitude	ordinal
longitude	ordinal
room_type	categorical
price	quantitative
minimum_nights	quantitative
number_of_reviews	quantitative
calculated_host_listings_count	quantitative
city	categorical

Source: U.S. Airbnb Open Data (Airbnb listings and metrics of regions in the U.S.)

1.2 Questions

- If I want to travel with my friend with a limited budget, which regions should I choose?
- If I have decided the city as my destination, can you recommend some houses for me?

1.3 Tasks

- Providing a map, to view all the houses and allow users to zoom in and zoom out to check details.
- Providing filters, to screen the house information based on city, price, room type, minimal nights and host counts.
- Providing a bar chart, to view the most popular houses (based on review count).

2. Description of visualization

The visualization contains variables that provide the location of the accommodation, its price, and number of reviews as the main objective is to provide travelers with overview and insight so they can find the ideal accommodation when traveling.

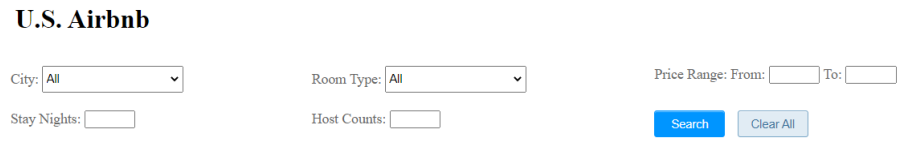
Since the file stored more than 220,000 rows of data, we filtered out Airbnb that has its last review before 2017/01/01. However, the date in the file was in the wrong format hence we used array.map function to change the format before filtering.

2.1 Filter

Firstly, users can use filters to screen the house information they need. We provide the following options:

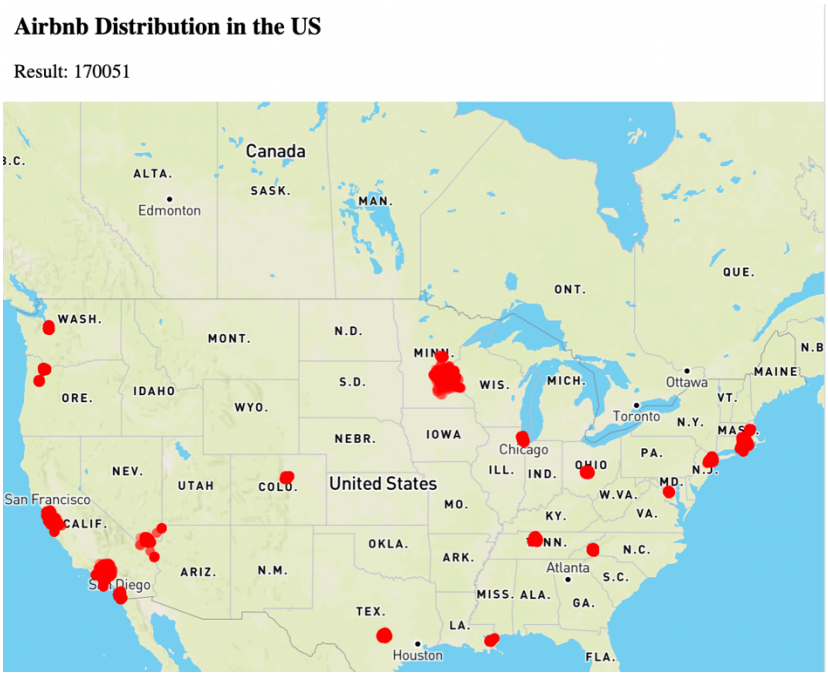
- City: Listing all cities from csv and “all” option
- Room Type: Listing all types from the csv and “all” option
- Price Range: Users can input the lowest and highest price to filter results
- Stay night: Users can input the nights they want to stay and filter the houses whose minimal stay nights are equal or less than it.
- Host Counts: User can input the host numbers and filter the houses which can reception more than this number.

When the user changes filters, he/she needs to click “Search” button to update the result. When the user wants to view all the data, he/she can click “Clear All”. Furthermore, these filters are flexible since the users do not have to apply every single one of them to search, which is as robust as filters on websites like Amazon or Netflix.

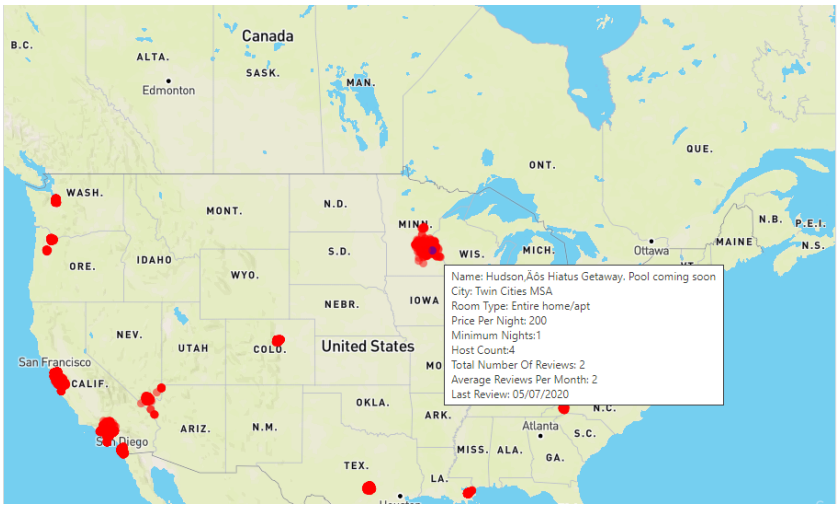


2.2 Map

In the map, the users see the US map with dots presenting all the qualified houses. When the filter changes, the result number will be updated.



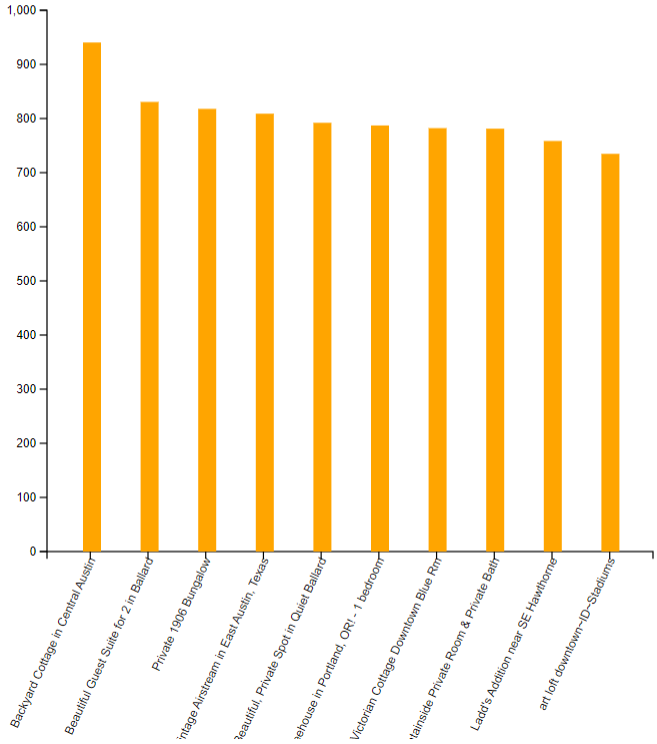
When the user hovers the mouse into the dot, detailed information will be present.



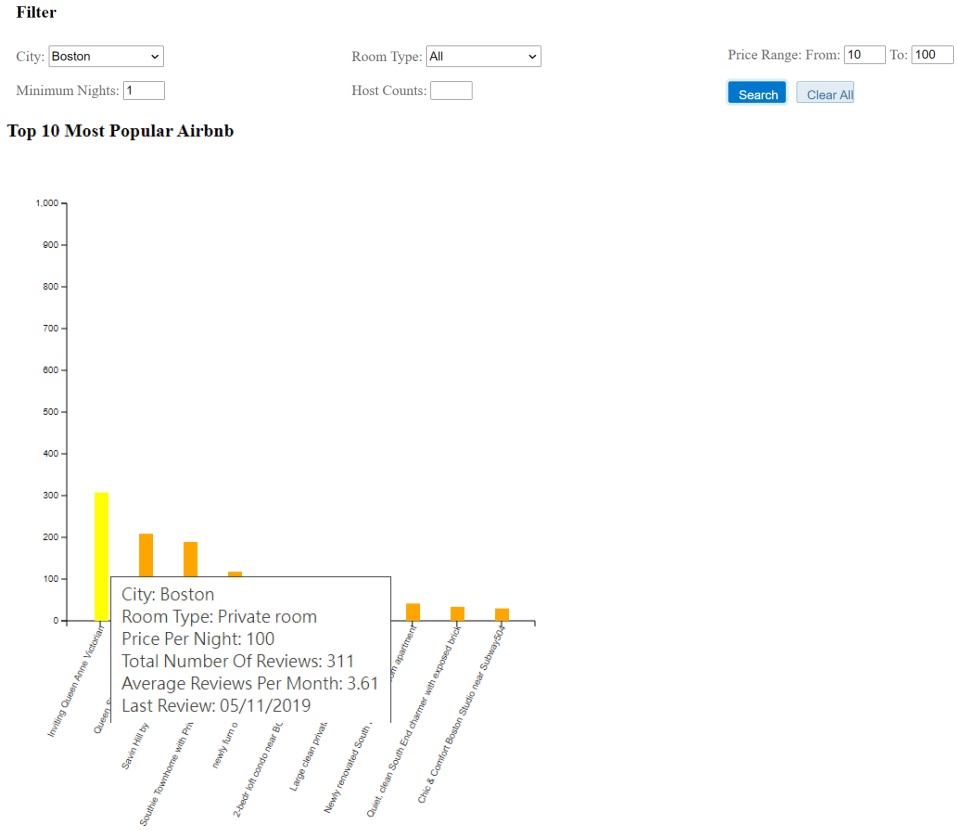
2.3 Bar Chart

In the bar chart, the users first see 10 Airbnb with the highest number of reviews in the US, which is not too helpful for travelers who have targeted their travel destination already.

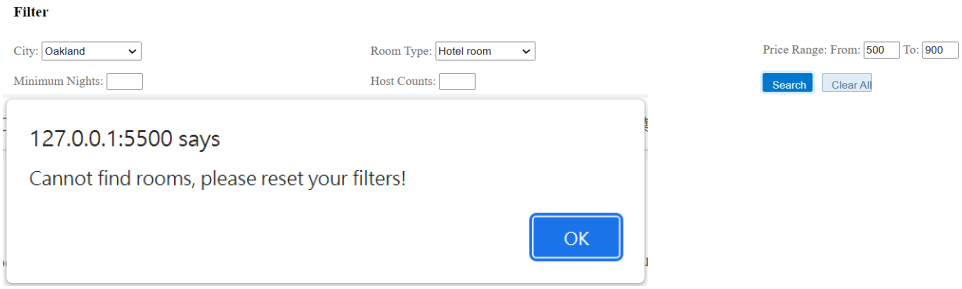
Top 10 Most Popular Airbnb



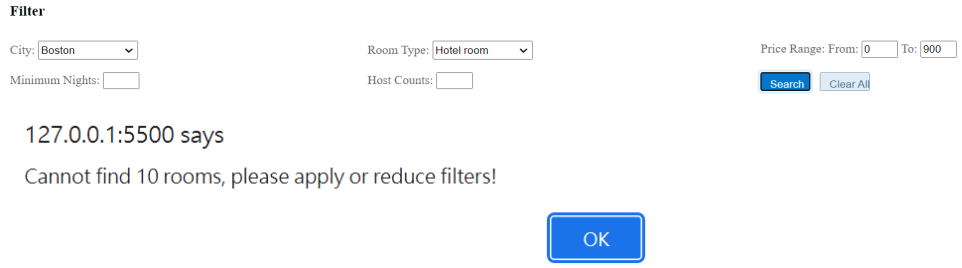
The following screenshot displays the result of 10 Airbnb with the greatest number of reviews in Boston that cost $10 to $100 per night, that also require the guests to stay for one night at least. Since the users can only tell the rankings from the chart, further information can be accessed by hovering their mice onto the bars. As a result, the chart itself provides the overview and the tooltips contain the insight of the dataset, while the filters make room selection easier.



Further interactions happen when the returned dataset is less than 10. If the users apply too many filters causing no matched results, an alert box pops up to notify users no data is found.



If there is some matched data but less than 10, the box returns a different message. However, both scenarios require users to change the settings of the filters.



3. Implementation

Most knowledge with JavaScript was from other coding modules we took, and other minor functionalities were modified from tutorial examples.

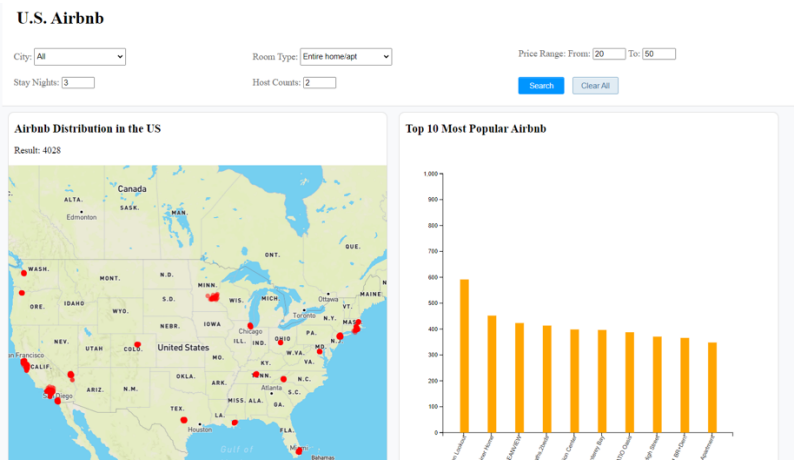
For the map function, the main source comes from the week8's tutorial [1], in which we use the map to show data for Edinburgh Locations. But we met one issue that after filtering, the original dots still showed in the map which affected the visualization. Then we searched and used the "remove()" into the search function, then the dots will be updated [2].

For the bar chart function, we were struggling to get the position of the bars on the axis until we found this solution online [3].

4. Insights from visualization & critical discussion

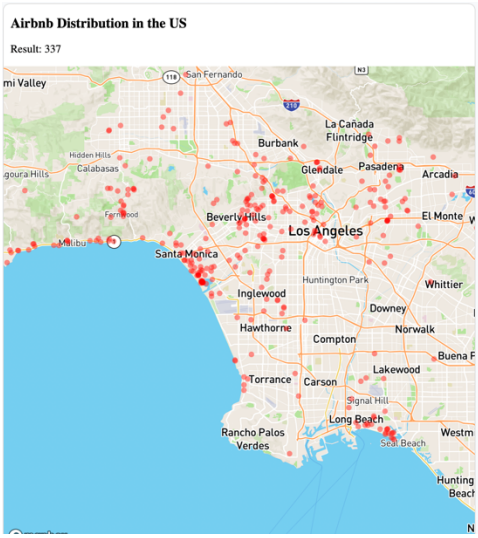
To answer the first question," If I want to travel with my friend with a limited budget, which regions should I choose". The user can filter the Room Type (Entire Home/Apt), Price Range (20-50), and stay night (3) and host counts (2), when click the search button, he/she will see the updated map and know which cities have qualified housed.

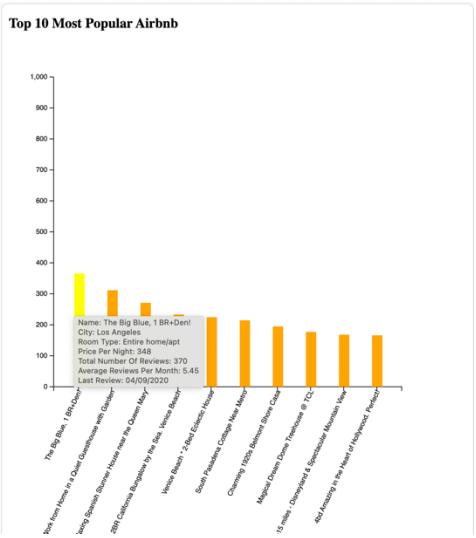
We can see that all the red dots area are qualified.



To answer the second question, "If I have decided the city as my destination, can you recommend some houses for me?". If the user decides to choose Los Angelas, he/she can filter the city and click search button.

When the user zooms in the map, all the qualified houses will show in the left map, and the top 10 popular houses will show in the right bar chart. When hovering over the map or bar chart, the user can see the details of this house.





Critical Discussion

Strengths

- Applying filters for qualified rooms
- Using a map to show the locations of houses
- Using a bar chart to review the ranking of popular houses
- All detailed information can be found when hovering dots or bar

There are some weaknesses with the current design:

- Price range cannot be represented on the map
- Reviews are not accurate for popular due to many guests don’t write reviews
- When the users find the house, they want to stay, they cannot be redirected to Airbnb to book the house.

References

[1] *MAPS WITH D3.JS AND MAPBOX.* [Online] Available at:< https://studres.cs.st-andrews.ac.uk/CS5044/Tutorials/d3/week_08/D3_03_maps.pdf > [Accessed 02 April 2022].

[2]FreeCodeCamp. *How to work with D3.js's general update pattern.* [Online] Available at: < https://www.freecodecamp.org/news/how-to-work-with-d3-jss-general-update-pattern-8adce8d55418/ > [Accessed 02 April 2022].

[3] Jonathan Soma. *Positioning Tricks.*[online] Available at: < https://jonathansoma.com/tutorials/d3/positioning-tricks/ > [Accessed 02 April 2022].