**Group 17 Assignment Report**

**Executive Summary:**

1) Who is in your group?

   The members of Group 17 are as follows:
   Hung-Wen Chen
   Aravind Bharathy
   Yen-Ting Pan
   Sarah Swanz
   Omkar Sunkersett

2) Briefly describe your proposed idea (paragraph or two). What will you be communicating?

   Our project focuses on building a better Airbnb experience for improved user safety and convenience whilst searching for accommodations. Users will get an understanding of the relative safety of particular neighborhoods with Airbnb listings, as well as the walkability, including convenience to public transport, of the neighborhood. This type of information is not available in Airbnb. We will be showing city neighborhoods rated by safety and convenience so that Airbnb users can explore potential neighborhoods to then use as the search criteria whilst looking for accommodations on Airbnb.

3) Who is your audience for this?

   Airbnb users, especially those new to a city with no knowledge of what neighborhoods are safe or convenient. This idea could be expanded for people moving to a new city and looking for where to live. Please note that this project is a prototype that can be used to incorporate new features in Airbnb.

**Questionnaire:**

1) What is your data?

● Details of the Airbnb apartment in Chicago, including position, room type, price, etc from this source: http://insideairbnb.com/get-the-data.html
● Crime data for Chicago from https://data.cityofchicago.org
● WalkScore API from https://www.walkscore.com/professional/api.php

2) What are the tasks or learning goals you want to support? What should someone be able to understand after seeing / using your visualization?

Our goal is to help Airbnb users identify safe and convenient neighborhoods in Chicago. Users can browse or explore neighborhood characteristics and compare attributes of different neighborhoods. Users won't be looking for patterns or trends in the data. After seeing our visualization, users can find safe and convenient Airbnb neighborhoods in Chicago to narrow their search on Airbnb.

3) How are you encoding the data visually?

Our data has been encoded as follows -

Overview map:
        Neighborhood outlines plotted on map → shapes (polygons)
        Safety/Convenience Combination Rating → Color Saturation

Zoomed map:
        Walk Scores → Color Saturation (heat maps)
        1-100 scale pulled from WalkScore API, then scaled to 0-10 for heatmap

Sidebar:
        Scatter plot with average line → color (above average green, below average red on a interpolated color scale)

4) Why is your solution effective?

We have intentionally encoded safety rating on a 1-500 scale to differentiate the different neighborhoods in a better manner. This has had the effect of limiting the

potential "good' neighborhoods to 5-7 and has reduced the user's need to search across all 77 neighborhoods for example.

5) How are you using text to support your visualization? Do you have any narrative structure in mind?

The introduction to the website explains what it does and does not (i.e. it is not a replacement for Airbnb booking). It is meant for exploring and comparing neighborhoods and does not entail a narrative structure. The labels in the sidebar and the average line help depict the city average to have a basis of comparison for a particular neighborhood. The sidebar also shows visual information in textual format, denoting green text for above city average and red text for below city average.

An example of the sidebar text:

# South Deering
**Safety Rating:** 76

**Convenience Rating:** 66

6) How are you using interactivity (if at all)? Why does it support your task?

Our initial form of interactivity is a map zoom. Zooming in on a particular neighborhood allows the user to see more information about the best locations in that neighborhood (i.e. the rentals plotted on the map with a heat map of each WalkScore). This allows the user to explore the neighborhoods. Clicking on the neighborhood then brings up additional details like breakdown of safety score and the WalkScore (initially combined in in the overview map). The initial view helps orient the user to Chicago and gives a preview of the top  safe or convenient

neighborhoods. If the user wants more details, he or she can zoom in and click for more details in order to understand the density of the rentals and best locations in the neighborhood, and the breakdown of the safety and convenience metrics, including how they compare to the city average.

7) What are the limitations of your solution?

The limitations of our solution are in broadly two categories:

1.  Data limitations:
    Our data is limited to Chicago only.
    Our solution is not linked to live Airbnb data, which is not available for use.

2.  Implementation limitations:
    There's only so much data you can encode on a map without getting cluttered. Mapping all Airbnb rentals on the overview page makes it appear overcrowded, so we have displayed it in the zoomed view only. We have also had trouble encoding both the safety score and the WalkScore on the same map and so have devised the right sidebar to display that information.
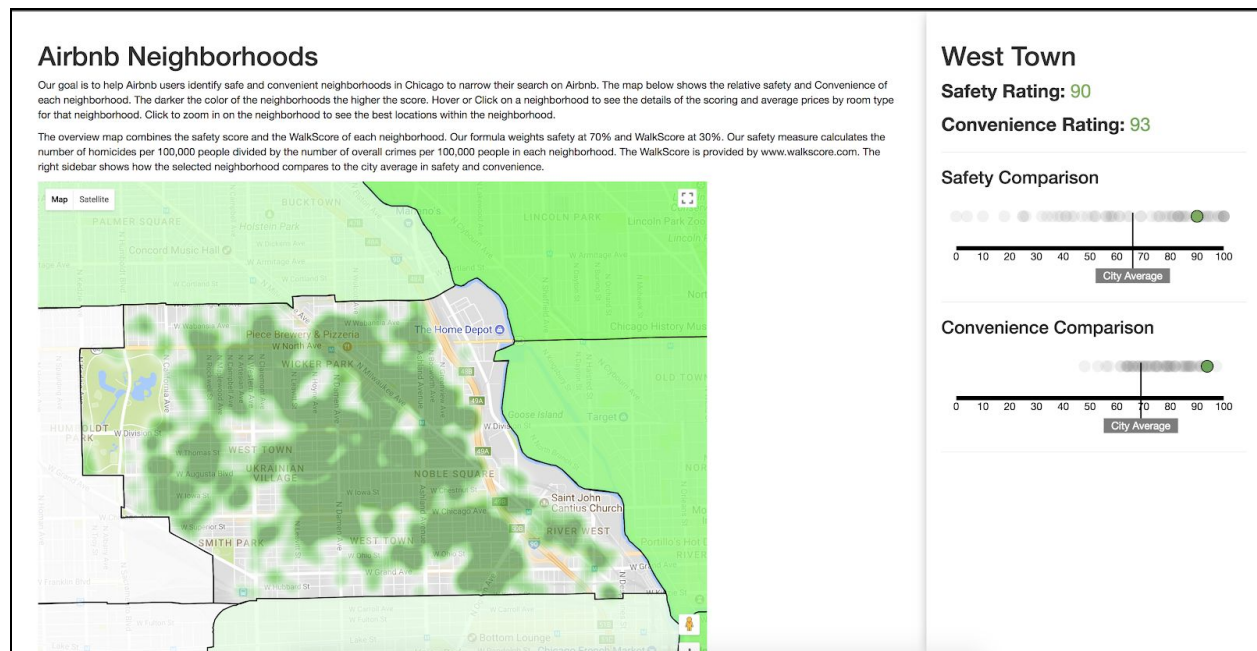
**Screenshots:**

Overview map showing combination safety rating & WalkScore by neighborhood (darker areas have better scores):
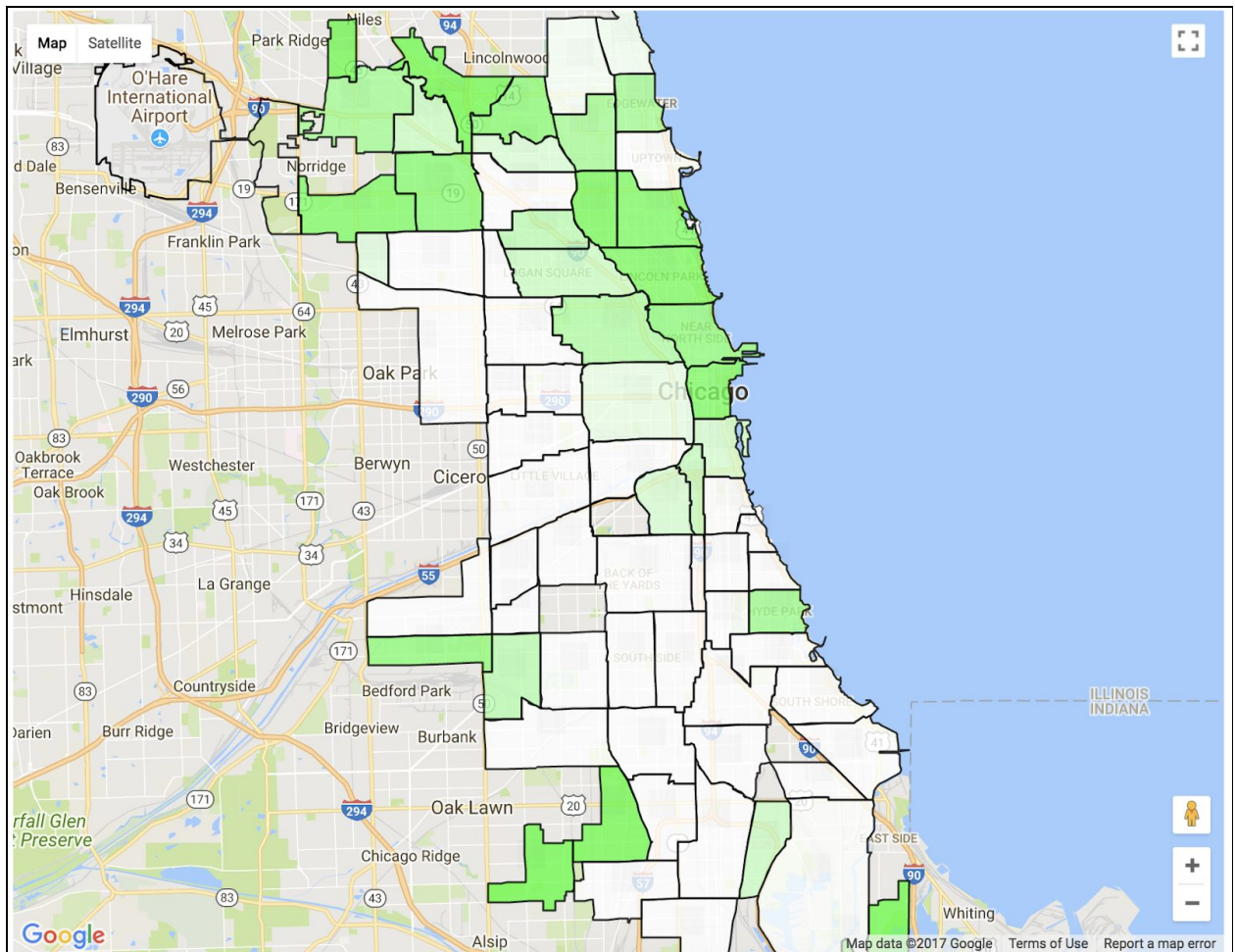
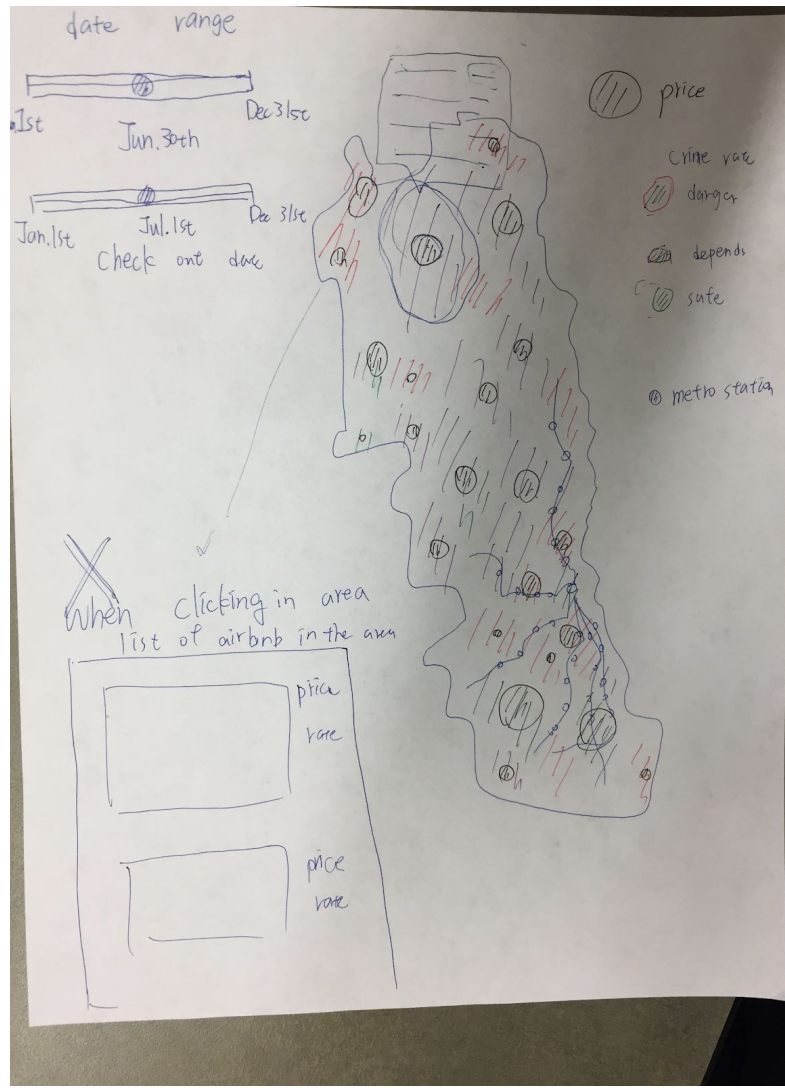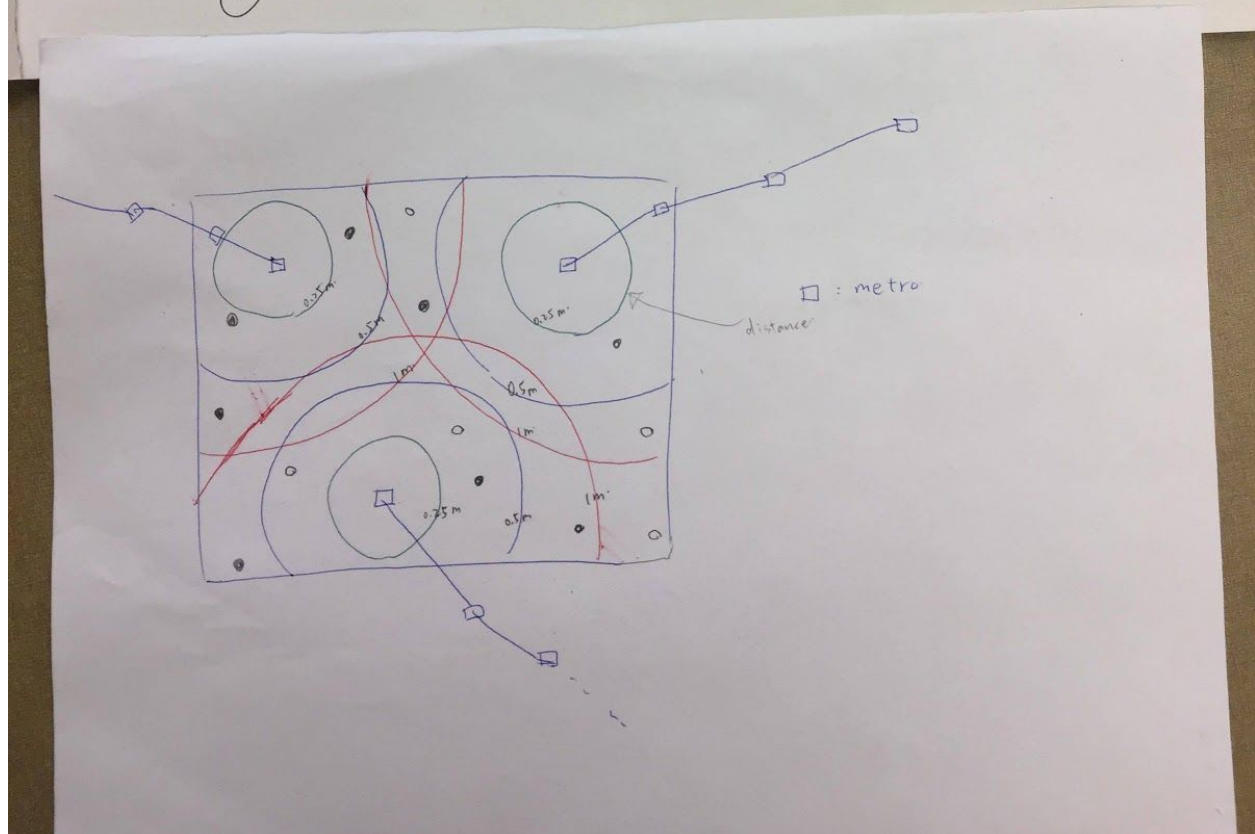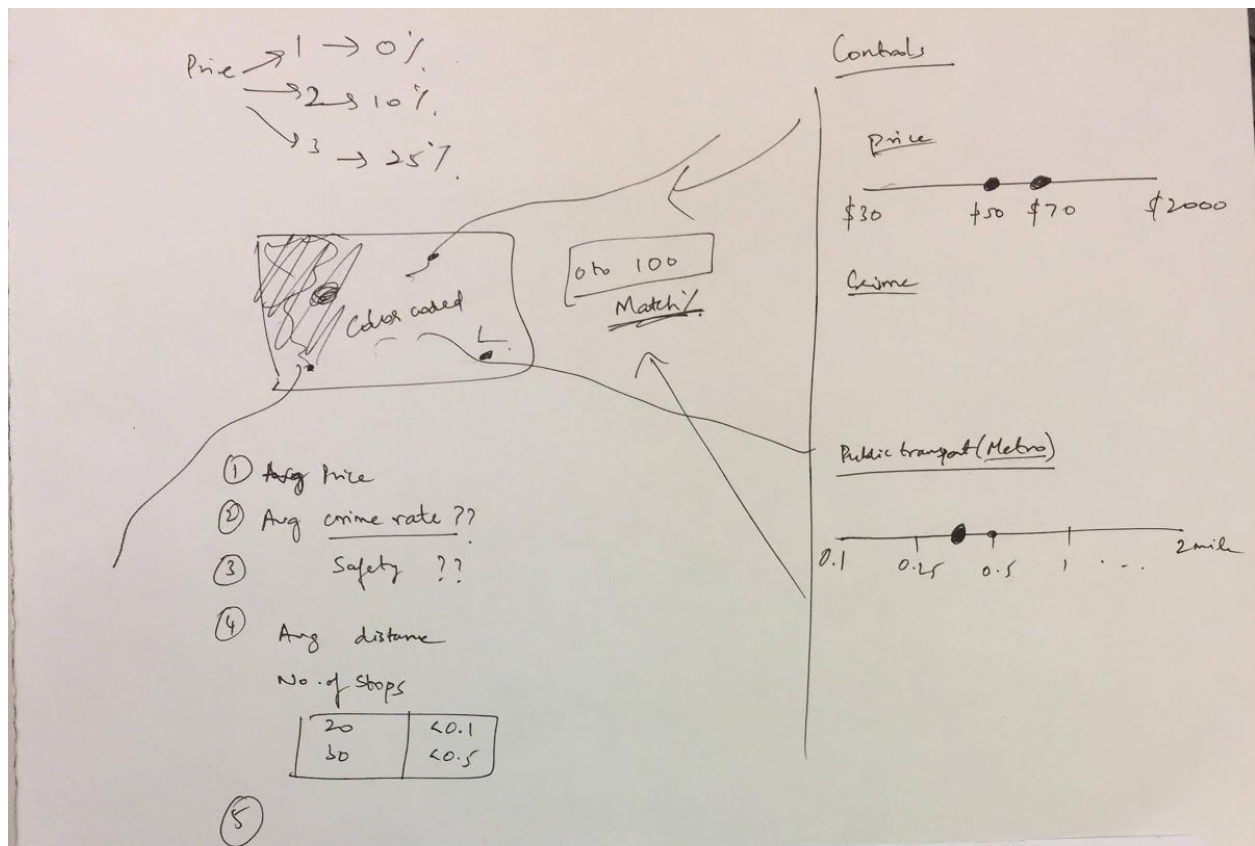Hover over neighborhood to get details on the sidebar:
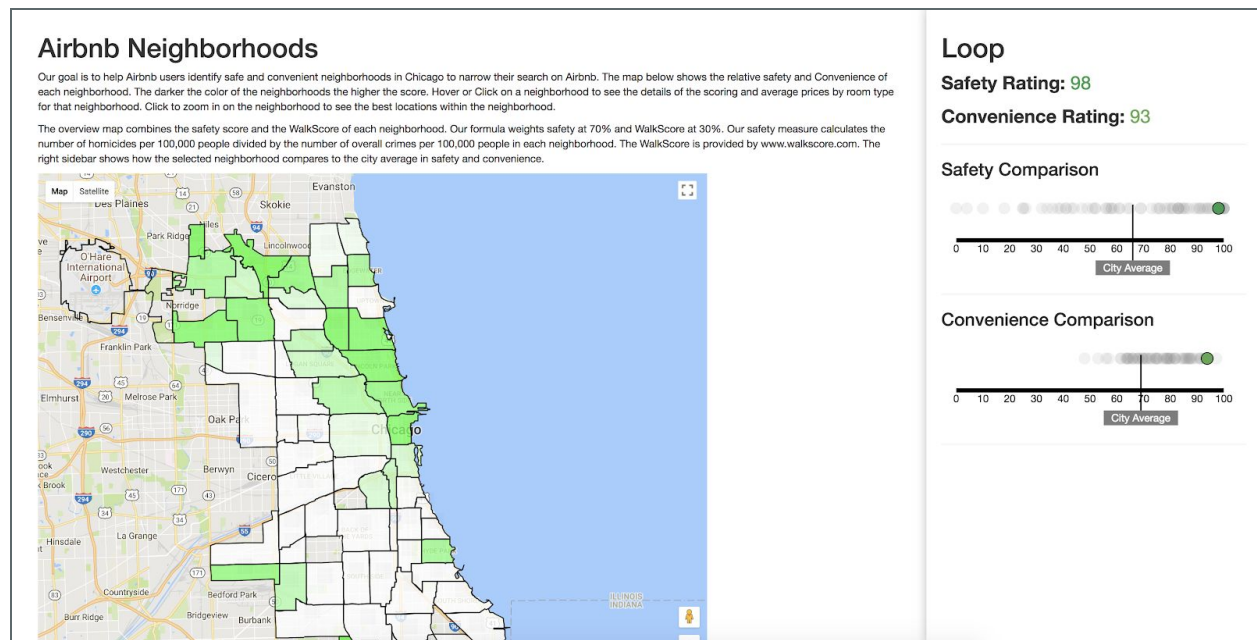


Zoom in on neighborhood:



**Sketches / Experiments:**

Consensus Sketch from Design Lab:

date range

| | | |
|---|---|---|
| 1st | Jun.30th | Dec 31st |

| | | |
|---|---|---|
| Jan.1st | Jul.1st | Dec 31st |

Check out date

price

Crime rate
danger
depends
safe

metro station

X
When clicking in area
list of airbnb in the area

price
rate

price
rate

Sketch proposed during Round Robin:

Concentric circles showing distance to metro (square) from Airbnb rental (circle).
Early map plotting all rentals, neighborhood outlines, and metro lines:
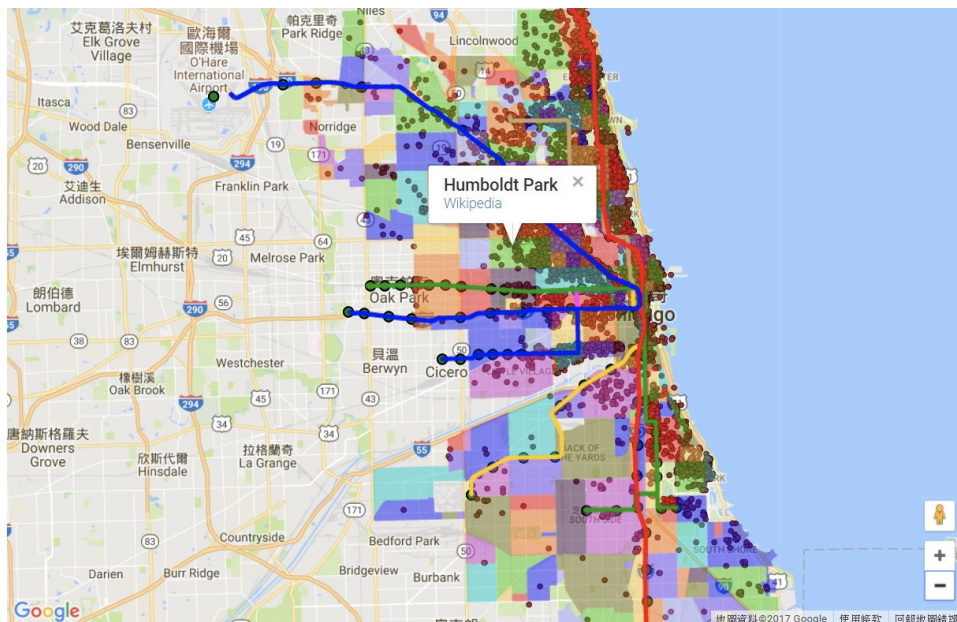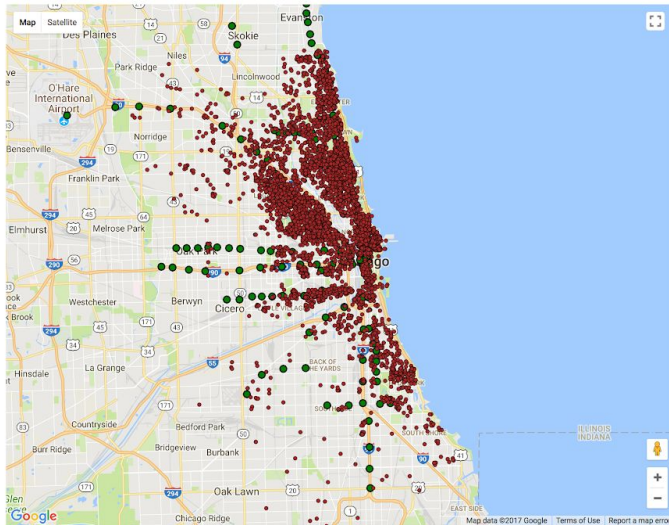


Early heatmap:
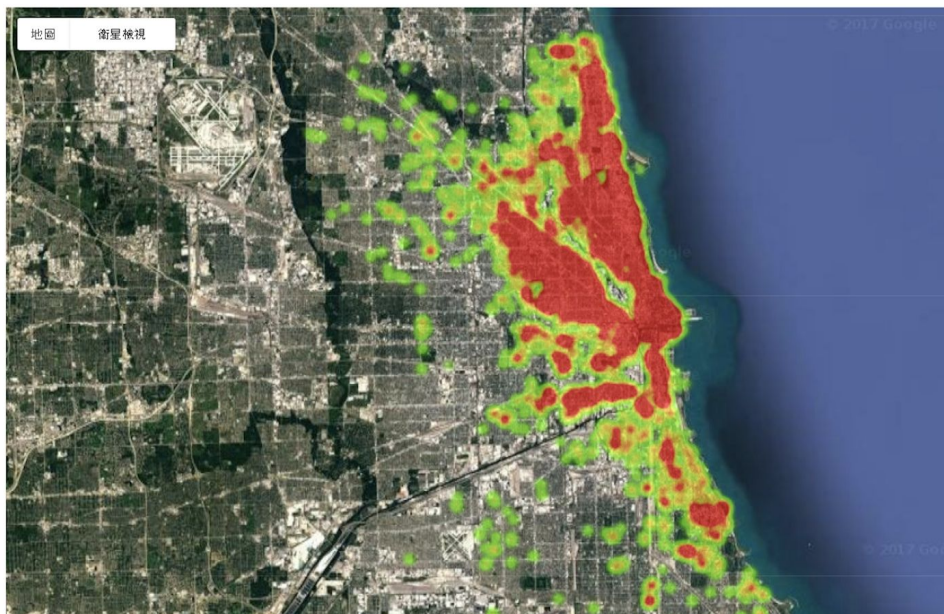
We have discarded the idea of depicted crime levels via heatmap because of issues with the crime data: Neighborhoods differed in number of property crimes vs. violent crimes, as well as in population numbers. We have settled on a safety metric for each neighborhood (number of homicides per 100,000 / number of overall crimes per 100,000) to give someone a sense of the dangerousness of the neighborhood.
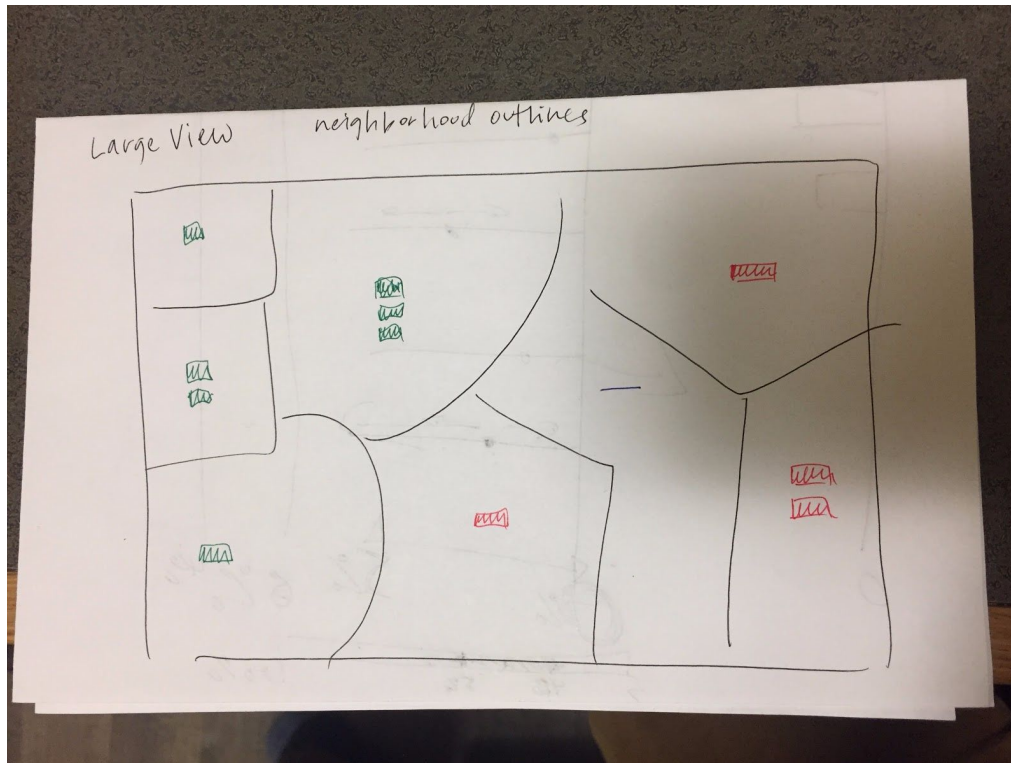
Plotting all Airbnb rentals:

Subsequent sketch of overview map:



Sketch of overview map showing neighborhood outlines. Each neighborhood has green/red bars (think wifi or health bars) showing the correlation between crime data (see note on how to calculate this) and the location review score. If the review score is high and the crime score is low, it has high correlation. If the review score is high and the crime score is high, it has low correlation (perhaps because of night life).

Subsequent sketch of zoomed map:
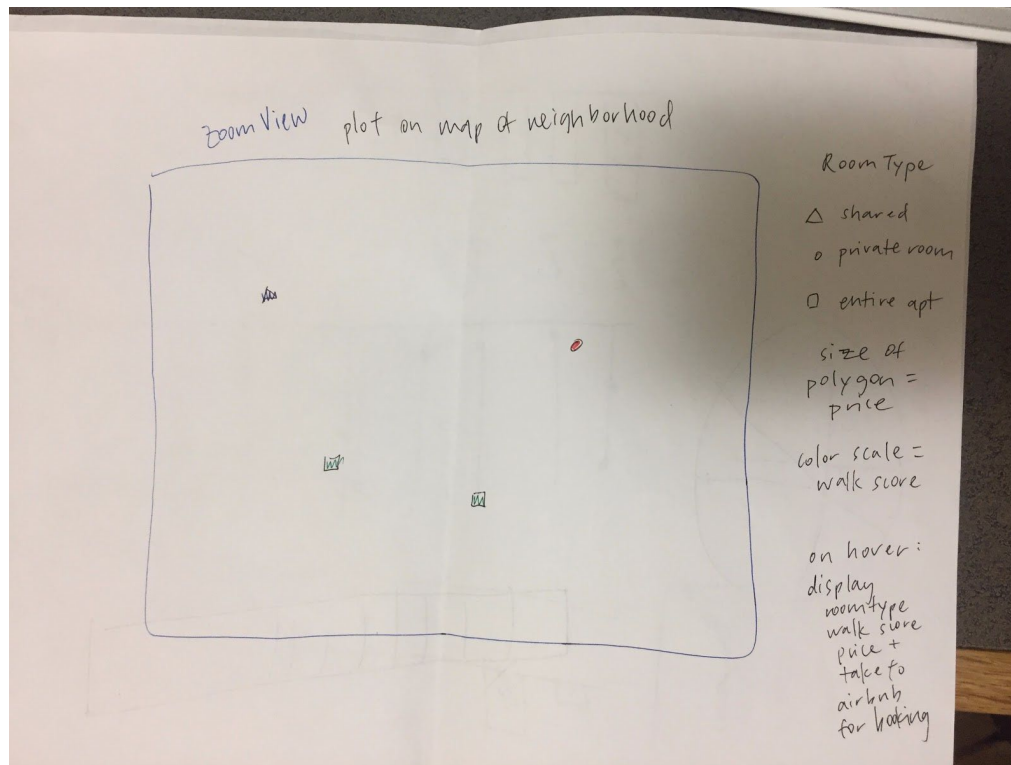


In the zoomed view, we'd show the neighborhood, plotting each rental (and metro if we want. Room types (shared, private rm, entire apt) would be coded by shape (circle, square, triangle). Price would be encoded by size of shape (larger circle = higher price). Walk score (call API) would be encoded by color gradient -- brighter red would be higher walk score On hover, we'd display room type, price, walk score for specific rental and link to take you to airbnb for booking (maybe)

This is an early version of our safety/convenience color gradient mapping:
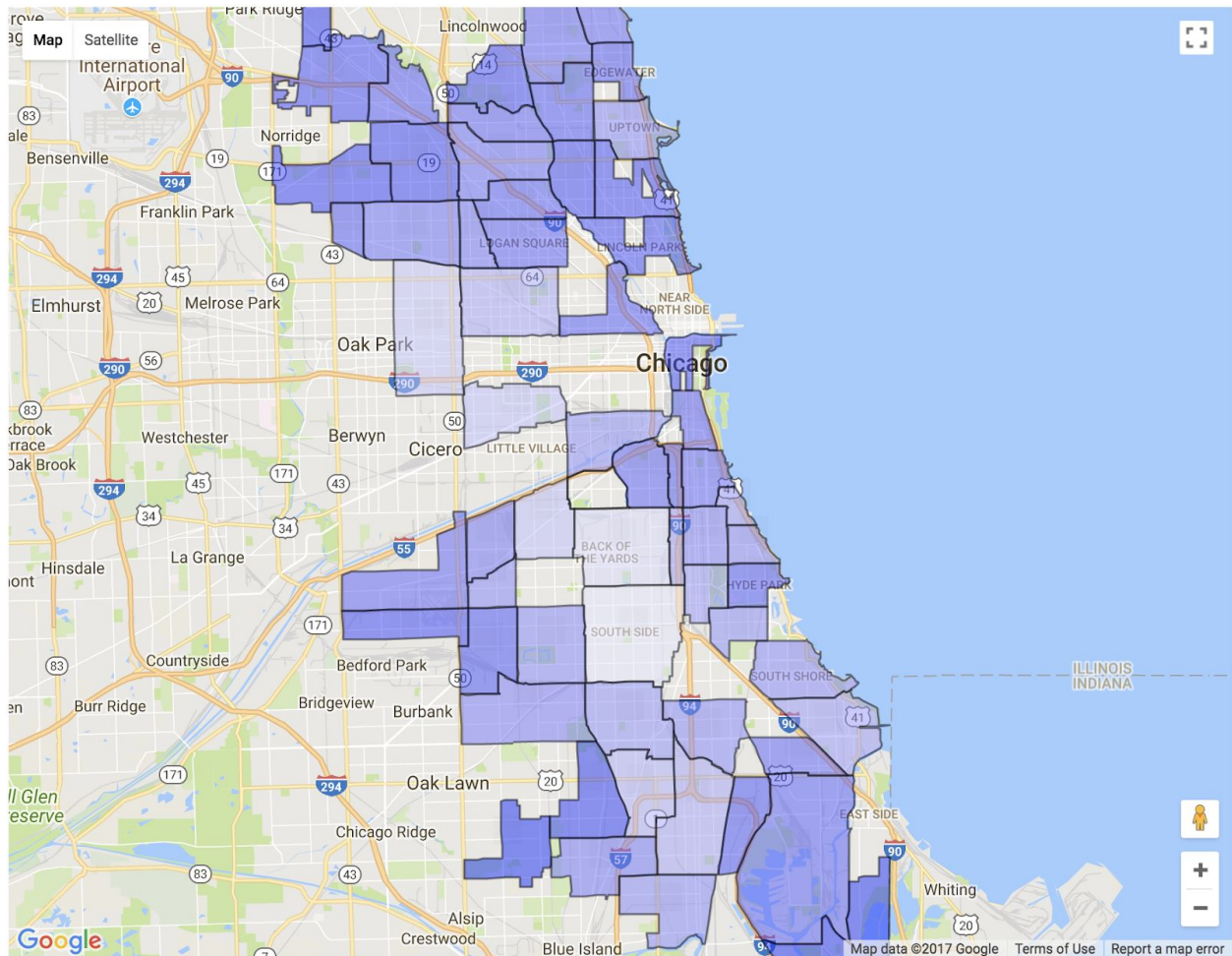


We thought that this scale resulted in not enough differentiation between the good neighborhoods and the bad neighborhoods and left the user with too many neighborhoods to explore. As a result, we have expanded the scale to 1-500 so that only 5-7 neighborhoods (see above) appear as possibilities to limit the burden on the user.

**Important Note:**

Before you check our solution, you would need to run a HTTP server in the root folder for the solution to work properly.