INFO4310: HW3 – Consumer Visualization Design

DUE BEFORE: March 8, 2023 at 11:59PM (midnight - 1) eastern time

In this assignment, you will work **in a group of 1-4 students** to develop an **interactive visualization which helps consumers to make decisions about a dataset**.

Consumers often start their search with little pre-existing familiarity with the data in front of them (e.g. first time homebuyers in a new city) and also generally lack perfect awareness of their search criteria when they first begin looking (e.g. not having a reasonable budget for an expensive city). Visualization designers must create interfaces which quickly and effectively give the user an understanding of the potential choices out there, and then afford easy and reversible interactions to filter and sort through the dataset. Dynamic HomeFinder is one example of an early system trying to support this kind of exploration. A lot of its advances have carried into modern consumer interfaces like that of Zillow. We've examined and discussed many contemporary examples along these lines.

Interactions can take any number of forms. Examples include filters in linked charts, pan/zoom on a map, interactive clustering models, faceted browsing interfaces, and recommender systems. Because there are often many points in these datasets, managing overload for users is important, forcing trade-offs between showing all data and only showing "important" points that match user criteria perfectly. **The goal of this assignment is for you to gain an understanding of how consumer exploratory interfaces change the design and implementation of visualization systems online.** As you work, you should consider how terms from your course readings apply to the interactions you design, and how you can integrate concepts from the readings into your work. Overview, detail, focus, context, and filtering should all merit consideration as you design. **While assignment datasets do have geographic attributes, you are not required to show a map.**

All submissions must incorporate both features:

a) Handle the high density of data by using **techniques from our readings** such as **dynamic querying** (filters); **pan/zoom**; **overview+detail**; **search, show context, expand on demand** (focus+context); **degree of interest** functions; or **recommendations**.
b) Adapt to users' changing criteria flexibly and reversibly, following the principles of **tight coupling** to make sure the interactions are effective for users.

You must use HTML, Javascript, and D3 to complete this assignment. While you may use any programming language you like to pre-process the data, your visualization must not make use of any other external libraries without instructor permission. My aim in constraining the specification is to force you to focus on the specific design elements of your visualization.

This assignment is around 1 week in duration. Please be sure to create a submission that reflects at least 1 week of group work on the prototype and design rationale document. **Scope your project down** so that you can deliver something that is **thoughtfully designed** in the time.

Dataset

In this assignment you will choose from a set of datasets which are based on real-world use cases and are derived from real-world scraped data. While you may bring in additional data to add context, it is not recommended due to time limitations. Please note that these datasets are intentionally quite out of date to discourage groups from over-extending themselves by including additional data sources or doing extensive re-processing. The datasets:

> **zillow_pittsburgh.xlsx** - This dataset of homes for sale provides data very similar to that of zillow.com. Users of this dataset are looking to buy a new home, which likely involves them playing with criteria such as price, number of bedrooms, neighborhood, and location. Assume that users do not come in with a perfect set of criteria for their home, and instead must learn about their needs by exploring (e.g. learn how big/expensive homes are in the area so they can set budget)
>
> **yelp_boston.csv** and **yelp_pittsburgh.csv** - These datasets provide features similar to that of yelp.com. While it has fewer numeric features compared to the other dataset, they have text data. Users of this dataset might be looking for the perfect place from which to order some take-out or trying to find a good date night spot. Assume that users don't come in with exact price range, category, and location of restaurant, and instead must learn about their needs by exploring (e.g. learn what kinds of food are good in town and whether reviews are generally high or low).

If you would like to choose your own dataset that is more relevant to your interests or informative for your group, please reach out to the instructor for approval.

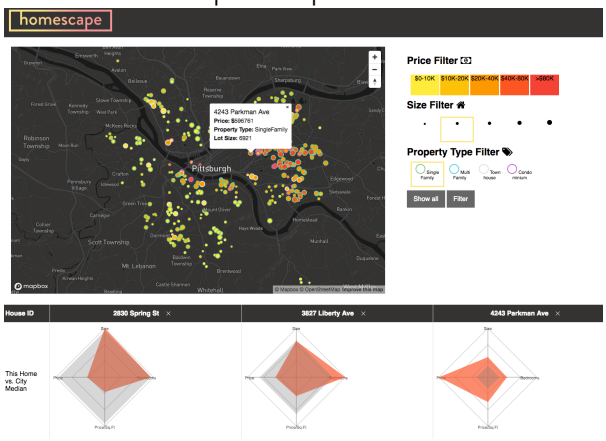
Once you have chosen a dataset, specify different user exploration needs for the dataset. For example, users of the home dataset may need to filter by price, separate homes by neighborhood, or find areas that have lots of homes for sale. You do not need to be exhaustive in listing these needs; rather, focus on a few key things that users will need to do during their exploration. These will guide what sorts of affordances you need to offer users in your tool. For example, if users will need to filter by price, then the visualization ought to give some way to show/hide/emphasize points based on those criteria.

I expect you to provide **at least 1 interaction affordance** for exploring the dataset which will **help consumers make more informed decisions**. Your rationale document, therefore, should identify how you prioritize user needs and how your interactions will support the data exploration process.

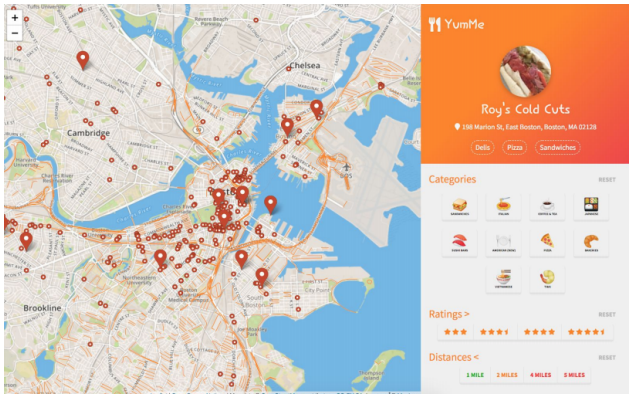
Examples of interesting past HW3 submissions

(please note that the listed examples had about 2 weeks of time and are not necessarily 100/100 scoring projects)

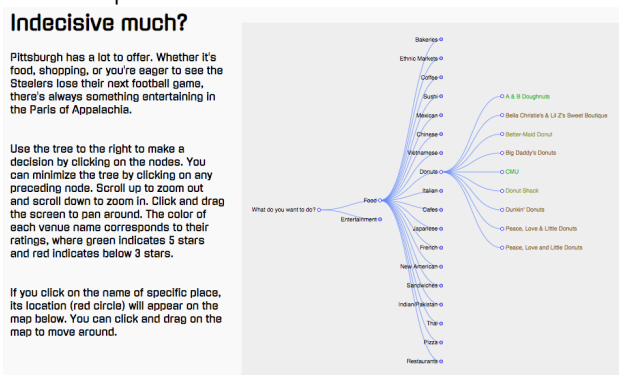
An interactive tool for the home dataset which simplified the kinds of searches users could perform and provided a radar visualizations of users' comparison points with clicks.



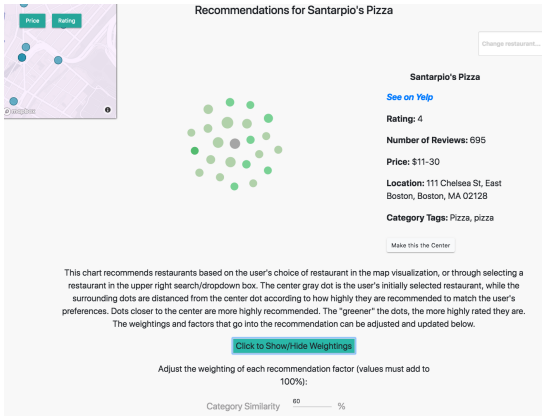
This tool made use of the Open Street Map API to graph restaurant data geographically. Care went into how to mark each place on the map, highlight user selections, and track user favorites



This (overly) ambitious project linked an interactive hierarchy to a map view of restaurants, with the intuition being that users think about categories of places as a tree rather than a list.



When users of this restaurant tool clicked on a place on the map, they arrived at a details screen that showed similar places in a force-directed layout and allowed users to tune the recommendations.



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Task

Pick a dataset, think about the use case, and design your tool

Choose a dataset, then think about what you want to visualize and how you will help users to interact with the data. Consider what sorts of needs the user will have as they explore the data, and how those needs may change over time. Think about which visual and interactive elements best support users as they explore. As part of your prototyping, you may find it helpful to use existing tools (e.g., Tableau or R) to explore the data and test multiple visualization strategies.

Implement your design

After doing some design work, implement your design using the d3 library and JS/HTML/CSS.
Note: while you are free to use non-programming tools (e.g., Tableau or ggplot) to explore your data set and try out design ideas, you must program the final application by yourselves.

Generate your <u>short</u> final report

Your final report should:

- Describe the data you chose and identify specific exploration needs that your user has
- Provide storyboards that outline the interactions you will design for your dataset and justify why you are using those particular interactions
- Briefly describe your final interactive visualization application, including a screenshot
- Step back and think about issues or trade-offs associated with the interactions you developed, and how you might alleviate those (or whether they are unavoidable).
- Briefly outline the development process of your tool. Explain how your visualization/interactions changed between storyboarding and final implementation. Comment on any trade-offs or design choices you had to make while developing.
- Identify how work was broken down in the group and explain each group member's contributions to the project. Give a rough breakdown of how much time you spent developing and which parts of the project took the most time.

There is no specific length requirement for the report. Cover all of the above bullet points briefly.

Deliverable

Before the deadline, please submit to CMS a ZIP file containing:

- The working source code for your visualization
- Your write-up in PDF form

Late assignments will not be accepted. Upload early and then re-download to verify.

Preparing for In-class Critique

In addition to posting on CMS, you must also make your project publicly available so that others can access it during in-class critique. I suggest that you make use of a simple Heroku Flask server, as outlined in class.

Once you have made your project accessible to the public, please submit a link to your project using this Google Form: https://forms.gle/w3tmiBbT4sWAhtbp6

You must submit a link before the homework deadline to receive credit for this assignment.

Grading

This assignment will be graded both on the soundness of your design and the quality of your write-up. I will also be looking for how you think about your audience, the story you are telling, and how your design choices align with those two factors. Some examples for point deductions include misleading, unmotivated, or unnecessary graphic elements; poorly thought out or non-responsive interactions; incomplete write-ups; poor choices for encoding data dimensions; choices that don't align with your intended message; and not adding your submission to the form for critique.