

INFO4310: Assignment #4 - Consumer Data Visualization

(credit to Jeff Heer and Danielle Szafir for assignment ideas)

In this assignment you will develop a novel interactive data visualization tool that helps consumers make decisions about a dataset. Consumer decision-making is a particularly hard challenge for visualization designers. Consumers often start their search with little pre-existing familiarity with the data in front of them (e.g. first time home-buyers 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). The challenge, then, is for the visualization designer to 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](#). 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.

You will **form groups of 2-3 people** for this assignment so that you can successfully develop an interesting visualization in the time allotted. We have **provided datasets** below from which you can choose. Each dataset corresponds to a particular use case. If you would like to choose your own dataset that is more relevant/valuable for you, please reach out to the instructor for approval. Unlike in previous assignments, **your goal is to develop a tool that helps consumers make decisions about a dataset**. Before you develop the tool, think carefully on the kinds of things consumers might need to do with the data and construct visual metaphors/interactions to meet those needs. Consider how [HomeFinder](#) provides a set of tools that match user needs during home searches. I expect that projects will **incorporate tools both to a) allow users to (un)filter points by personal criteria and b) handle the high density of data by using techniques like dynamic queries, pan/zoom, overview+detail, or focus+context**. Tools should **accommodate users’ changing criteria and exploration goals**. Data have a geographical component, but you are **not required to put data onto a map** (though that may be a useful visual metaphor for you). As you work, keep a log and screenshots so that you can write a good final report.

This assignment is three weeks in duration (not including spring break). Please be sure that your assignment reflects three weeks of group design and implementation.

Task

Pick some data and identify particular user search affordances you need in your tool

Choose one of the following datasets to power your tool:

- [Houses for sale in Pittsburgh](#) - This dataset of homes for sale is scraped from 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)
- Restaurants on Yelp from [Pittsburgh](#) or [Boston](#) - These datasets are scraped from Yelp, and each contain different data features. They possess fewer numeric features compared to the Zillow datasets, but have rich text fields. 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/valuable for you, please reach out to the instructor for approval.

Once you have chosen a dataset, specify different user search 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 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 (as in dynamic query systems).

I expect you to provide **at least 2 different interaction affordances** 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.

Implement your design

After doing some design work, implement your design using the d3 library and JS/HTML/CSS. You are welcome to use other libraries in addition as long as you obey their license terms, explain why you are using them, and include them with your submission.

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 final report

Your final report should:

- Describe the dataset you chose (including any potential weaknesses or post-processing necessary) and identify specific needs of consumers who are exploring that data to make a more informed decision. Your needs should match up with the affordances and visual metaphors you later implement.
- Identify potential challenges for users in seeing or interacting with the data. For instance, high densities of points in certain geographic areas might make it challenging for users to find individual points on a static map.
- Outline the interaction affordances you are implementing to help support the data exploration process. Link the affordances to particular user needs and explain how the interactions will help in the exploration. Describe how your interactions help overcome the challenges you identify for data explorers.
- Briefly describe your final interactive visualization application
- 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). Because you aren't creating an exhaustive data exploration system, this is your chance to talk about what you would do if you had more time to develop the system.
- Briefly outline the development process of your tool. Explain how your visualization/interactions changed between design 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. Please cover all of the above bullet points.

Submitting

We will be discussing this assignment in class on 4/13, so be certain you have turned it in and followed these instructions by the end of **4/12 at 11:59PM**. Late assignments will be penalized as outlined in the syllabus

Please create a ZIP file containing the following:

- Your final report document in PDF format
- All source code for your interactive visualization tool
- A high resolution image of your storyboard

Upload your file via CMS.

In addition, please **post your visualization online** so that we can try it out during critique.

[Github Pages](#) are one easy way to post your project online. Create a link using your group members' names at the bottom of this document directing people to your online tool.

Grading

This assignment will be graded both on the soundness of your design and the quality of your write-up. We will also be looking for how you think about your dataset, how you organize your design process, your development from design to final tool, the particular interactions you chose (and rationale behind them), and overall thoughtfulness. Some examples for point deductions include misleading, unmotivated, or unnecessary graphic elements/interactions; incomplete write-ups; poor choices for encoding data dimensions; choices that don't align with your intended exploration goals; and not posting your submission to this document for discussion.

Finished Assignments

Links to interactive online versions of HW3 go [here](#); post **critique** links after names