Design Challenge 3

Impactful Weather Dashboard

INFO 474: Interactive Visualization
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Project Background

For this project, I wanted to bring a unique perspective to weather data that is not typically represented. I accomplished this objective by visualizing "impactful weather". I am defining impactful weather as precipitation (rain and snow measurements) and record-breaking temperatures. Precipitation can be impactful due to rain/snow making transportation difficult, causing damage to homes and businesses, etc. Record-breaking temperatures can be impactful due to health risks. Freezing cold can be harmful to those in homes with no heat, those living in vehicles or with no shelter. Extreme heat is very harmful to elderly people, and also those with no shelter or A/C. If this project were to be adapted, it would be beneficial to have separate visuals for snow, ice, heat waves, etc.

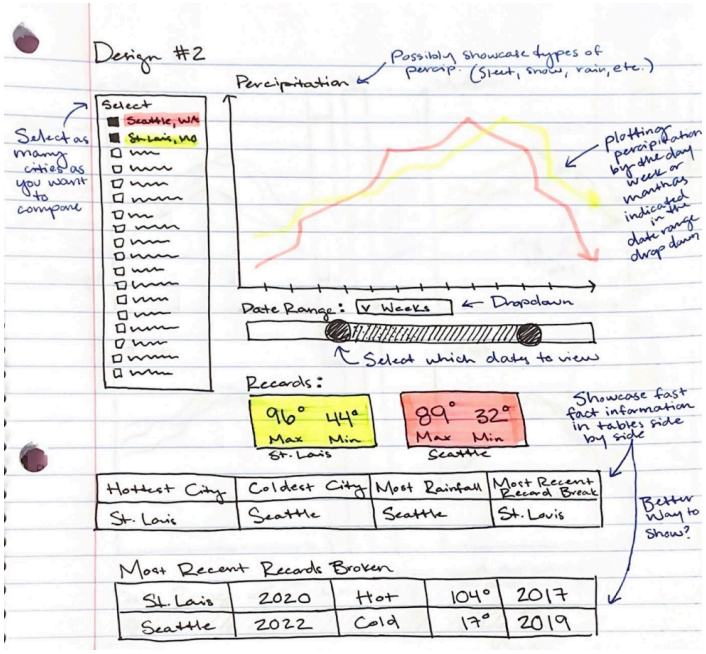
User Tasks

1. Someone moving to a new city, or just visiting, wants to **view** that city's impactful weather patterns and trends in order to **prepare** for the weather in that city.
2. Residents of particular cities want to **view** impactful weather patterns to **prepare** for future weather events.
3. Traffic Safety personnel want to **determine** which months/seasons are possibly dangerous due to precipitation for drivers/commuters in order to **inform** them of those conditions and **help** prepare them.
4. Farmers want to **discover** ideal months/seasons for planting and harvesting (view seasonal patterns) in order to **increase** production and **minimize** crop loss.
5. Businesses want to **discover** when weather will affect their business and minimize the number of patrons they'll have in order to **determine** when they should stay open or close.

6. Meteorologists want to **view/analyze** weather patterns, trends, and changes over time in order to **forecast** the weather and **prepare** viewers for upcoming impactful weather events.

Design Overview

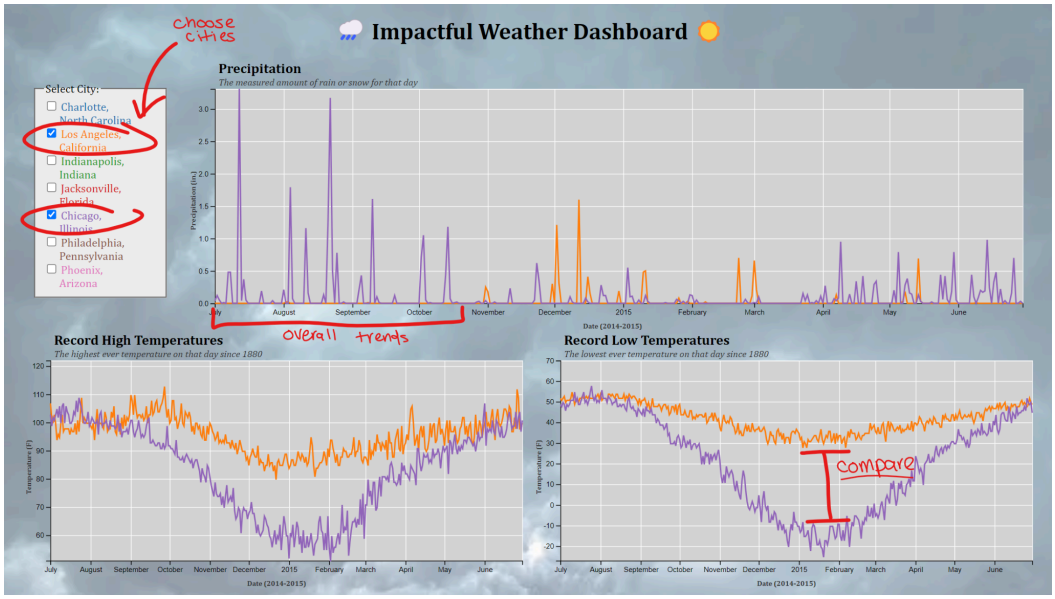
For this design, the most important aspect to include in the recreation was the ability to compare cities easily. This was clearly missing in the original design. I decided to base my redesign around this concept, and add in other aspects as time pertained. I began by drafting sketches of possible visualization layouts.



Design draft that I worked off of for my final deliverable.

I chose to work off this draft for several reasons. The side checkbox selection allows the users to compare as many cities as they like. This covers many user stories. This allows someone choosing a new city to visit, or move to, to compare potential places to live all at once. It also allows people to select one city at a time and view trends. The original design did not allow the user to look at more than one city at a time, which limited its capabilities. The redesign allows users to still view an overview of one city, but also compare to other cities.

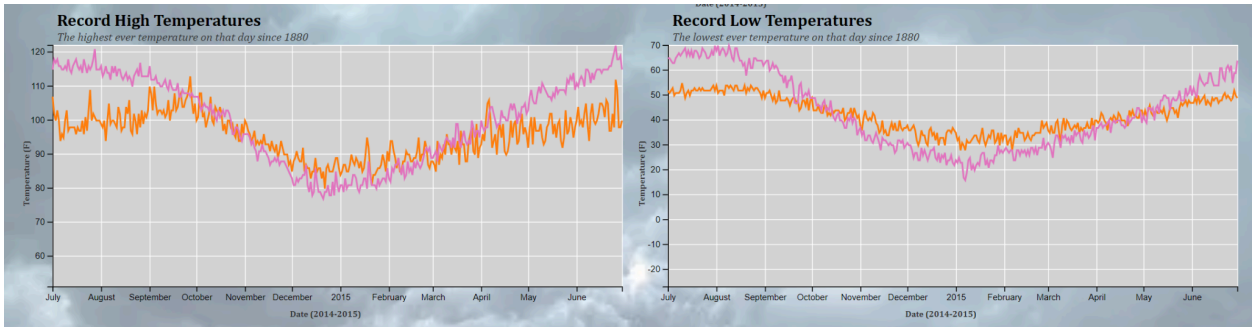
Another accomplishment of this design is the viewing of impactful weather. The graph allows users to visualize precipitation and record-breaking temperatures over time, which are important weather events that affect many users. For someone planning a move or a trip, or a resident of the city already, impactful weather can be important to prepare. This information is also important for farmers, traffic safety personnel, business owners, and meteorologists. Impactful weather directly affects their work, and the ability to discover trends and prepare for these events would be very important. This is a huge improvement from the previous visualization, as these values were not represented at all.



Screenshot of final design with annotations of design features.

These were the most important factors to carry over to the final deliverable. My final design creates 3 visualizations that dynamically update as cities are selected. This design allows users to choose as many cities as they'd like to compare, and they can see overall trends and comparisons in precipitation and record-breaking temperatures. This accomplishes many of the user tasks that were listed above and supports many likely users.

This design adheres to many of Gestalt's principles. There is clear use of Figure/Ground, with the lines of the line graphs at the forefront. The user's eyes are brought immediately to the lines as they appear on the screen. Proximity on the line graph allows users to see which cities are most similar to each other.



This view shows data for Los Angeles, CA and Phoenix, AZ.
Their proximity to one another on the graph lets the user know that
their record high and low temperatures are very similar,
and therefore may have a similar climate.

Of the many design principles used, the most important is similarity. These visualizations utilize color to make it very apparent which lines belong to which cities. As users select cities they can know that the blue line on the top graph represents the same location as the blue lines on the bottom graphs. Without this principle the graph would be impossible to interpret. All of the principles used make it extremely readable, easily interpretable and useful for users to compare and analyze weather data.

Design Shortcomings

This design does not accomplish the issue of analyzing smaller weather trends. In another redesign, adding a date filter would be beneficial to provide seasonal information for farmers, and week-to-week trends for city visitors.

Due to limitations in the data there is also no option to observe historical data, precipitation by type, abnormal weather events, etc. I believe these could also be incorporated into this visualization. To avoid overplotting and too much information intake, these features could be added as filters which would allow users to switch between these views.