PROJECT PROPOSAL

Climate Change: What's Effected?

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Project Repository: https://github.com/SonamChoudhary/dataviscourse-pr-climate_change

BACKGROUND AND MOTIVATION:

Climate change has become more and more alarming in the recent years. Research has shown how climate change is affecting the mountains and has further caused danger to the flora and fauna. With our project we aim to explore and present some of the effect of climate change particularly on ski resorts and we would also highlight an animal species affected by it. Surrounded by mountains which we enjoy so much, climate change, and its effects, have always been something we have wanted to investigate.

PROJECT OBJECTIVES:

Our objective is to provide an interactive visualization to explore the effects of climate change on ski towns by visualizing the change in temperature and the snow fall.
Our second objective is to provide an interactive visualization to explore the effects of the climate on an animal species by investigating the conditions that constitute the natural habitat for that species and the temperature range that the species can survive in.
While the user can investigate an animal independent of the ski resort and vice versa our visualization would also allow a user to view the impact in relation to each other, animal found around the selected ski area.

DATASET:

The primary source of data is NOAA's climate data online climate search platform. We will be specifically using NOAAs normalized data to minimize the need for further Data Processing.
The Data comes in the form of csv files. We will be receiving one file for each location that we want to include in the visualization. Within the file we will be using temperature, snow fall total, and snow fall probability data. We will also be using latitude and longitude data which is also included in the file.
The other data we will be temperature tolerances for each animal that we use in our visualization.

DATA PROCESSING:

We have three data processing tasks that will need to take place:
- First, because each CSV file will be downloaded separately we will need to load the files in to our visualization depending on the location (ski resort) the user chooses.

- Next, we will need to manually collect the temperature tolerances for each animal and key them into a database to be used in the visualization.
- Finally, in the visualization the user will have the choice to interact through a temperature control. They will see in real time the affect climate change has on each mountain and animal.

VISUALIZATION DESIGN:

Design 1:

Figure 1: Design 1

Our first design has 7 components. Each component helps show the effect climate changes have on Ski Mountains and an animal that inhabits them.

Components:

1. The first component is a map of the United States of America. On the map will be indicators of the location of each ski resort and will also serve as a controller to load the data for the rest of the components. When clicked upon the ski area statistics including temperatures, animal inhabitant, snow data, and snow fall probabilities.

2. The second component is a graph of temperature data for all 365 days of the year. It will contain three lines one showing min temperatures, one showing max temperatures and one showing freezing. The Y axis will be temperature and the X axis will be days of the year.

3. The third component is a graphic highlighting the animal living in the area. There will be a short description of how climate change affects that animal.

4. The 4th and 5th components are graphics highlighting snowfall data and snowfall probabilities throughout the year.

5. Covered above.

6. The 6th component is a graphic or data table highlighting the days of the year that this animal is above or below its temperature tolerances.

7. The final component is a slider that the user will be able to use to change the average temperature for each day of the year. As they move the slider to the right the min max temperatures will increase/decrease. The snowfall and snowfall probabilities will increase/decrease. Finally, the temperature tolerances will update for the animal showing that the animal will no longer be able to occupy the Ski Area.

Figure 2: Design 2

Our second design has 7 components. Each component helps show the effect climate changes have on Ski Mountains and an animal that inhabits them.
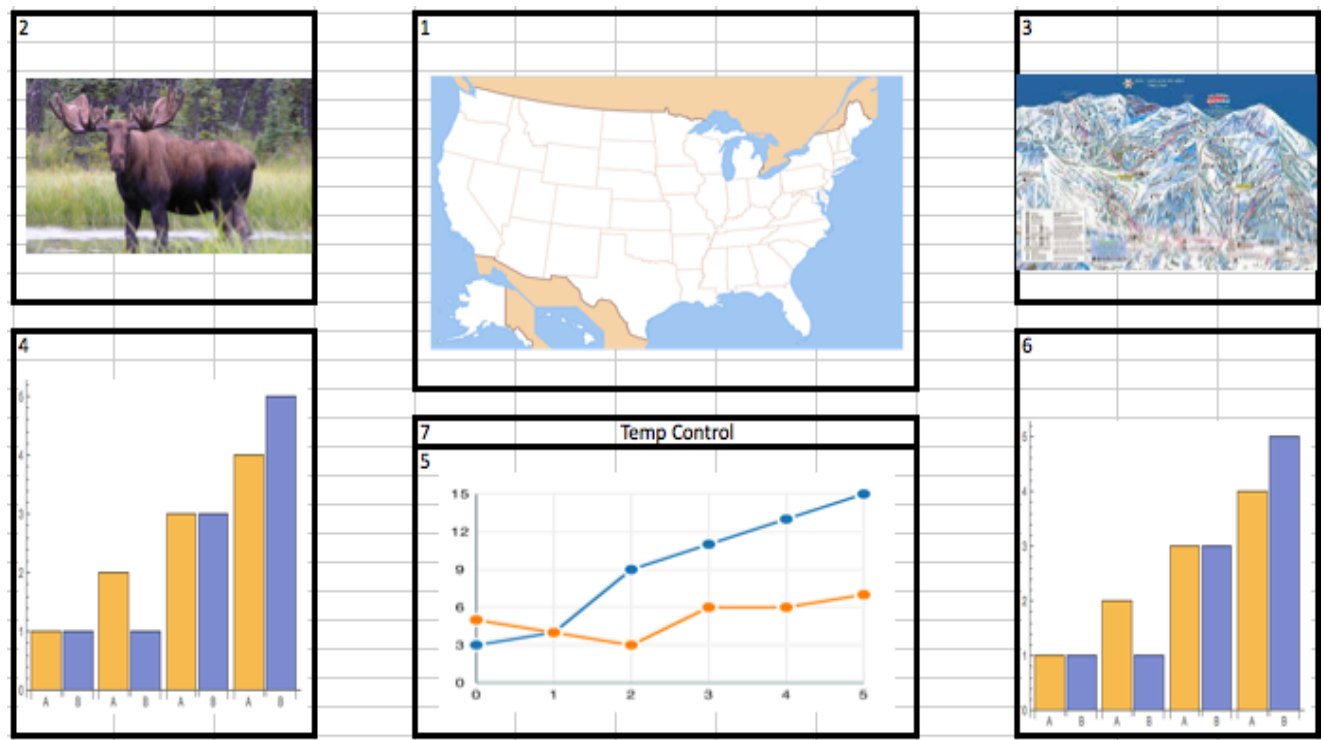
Components:

1. The first component is a map of the United States of America. On the map will be indicators of the location of each ski resort.

2. The second component highlights snowfall data and snowfall probabilities through out the year.

3. The third component is a graph of temperature data for all 365 days of the year. It will contain three lines one showing min temperatures, one showing max temperatures and one showing freezing.
The Y axis will be temperature and the X axis will be days of the year.

4. The fourth component will be checklist of all ski areas loaded into this visualization. This will be the controller to load the data for the rest of the components. When clicked upon the ski area statistics

including temperatures, animal inhabitant, snow data, and snow fall probabilities. The checkbox allows for comparison amongst ski areas if multiple boxes are checked.

5. The fifth component is a graphic highlighting the animal living in the area. There will be a short description of how climate change affects that animal. This will also include a visualization that highlights the effect climate change has on this animal.

7. The final component is a slider that the user will be able to use to change the average temperature for each day of the year. As they move the slider to the right the min max temperatures will increase/decrease. The snowfall and snowfall probabilities will increase/decrease. Finally, the temperature tolerances will update for the animal showing that the animal will no longer be able to occupy the Ski Area.

DESIGN #3:

Figure 3: Design 3

Our third design has 7 components. Each component helps show the effect climate changes have on Ski Mountains and an animal that inhabits them.

Components:

1. The first component is a map of the United States of America. On the map will be indicators of the location of each ski resort.

2. The second component is a graphic highlighting the animal living in the area. There will be a short description of how climate change affects that animal.

3. The third element will highlight resort facts of the ski area including skiable acres, restaurants, terrain statistics. It will also provide a terrain map of the ski area.

4. The fourth visualization highlights the effect climate change has on this client. If the animal is affected by temperature it will show the amount of days the temp is above or below the tolerance of that animal. If another climate change factor is causing the animal to leave the area we will use this area to highlight that element.

5. The fifth component is a graph of temperature data for all 365 days of the year. It will contain three lines one showing min temperatures, one showing max temperatures and one showing freezing. The Y axis will be temperature and the X axis will be days of the year.

6. The sixth component highlights snowfall data and snowfall probabilities through out the year.

7. The final component is a slider that the user will be able to use to change the average temperature for each day of the year. As they move the slider to the right the min max temperatures will increase/decrease. The snowfall and snowfall probabilities will increase/decrease. Finally, the temperature tolerances will update for the animal showing that the animal will no longer be able to occupy the Ski Area.

Final Design

We have decided to implement design 3. We have chosen this design as it encodes the most information the most efficiently amongst all 3 designs. We also feel that it encodes our visualizations message in an impactful manner.

The map, which will act as one of the users controls, is displayed front and center making it easy for the user to interact with the visualization. To the sides of the map there are reference materials describing the affected animal and ski area. These three components will allow the user to easily identify the purpose of the visualization as well as orient to the geospatial location of the highlighted area.

Directly below the map and visual aids we have the data driven graphs. These can be manipulated through the temperature slider. Each of the graphs lends itself to the purpose of the visualization describing climate change affects on the highlighted animal, the amount of winter days in a region, as well as the affect on snowfall, and snowfall predictions.

MUST HAVE FEATURES:

1. Graph showing the Average Daily Temperature. Specifically showing the Min and Max categorized as freezing days and thawing days.
2. Picture of animal and a table of days that are above or below animal tolerance/
3. From the data able to map the ski resort on the map.
4. Based on the ski resort selected the corresponding snow levels are displayed in a graph.
5. Select the animal from the drop-down list. Have the information about the animal displayed in the info box.

6. Have the locations marked on the map with the animal population.

OPTIONAL FEATURES:

1. Filter ski areas based on regions.

   The East: (New England, Mid Atlantic, Southeast, Canada East), **Midwest**, **West**: (Colorado Rockies ,Central Rockies ,Canada West ,Pacific Northwest ,Sierra Mountains ,Southwest) as shown below.
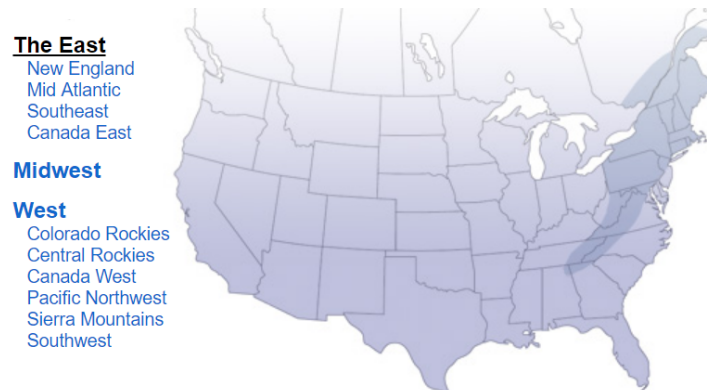
2. Including ratings for these ski resorts could also be added as a feature which we might want to add.
3. Have a graph showing the decrease in the animal population. Not the exact figures but just a representation of the decrease in the population.
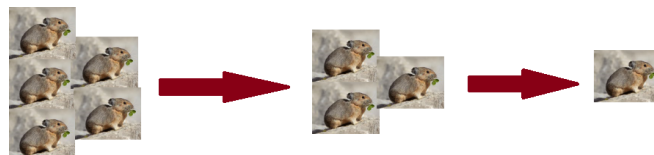
PROJECT SCHEDULE:

WEEK	OBJECTIVE
10/27/17	FINISH PROJECT PROPOSAL
11/3/17	COMPLETE DATA ACQUISITION
11/10/17	COMPLETED PROTOTYPE AND MILESTONE
11/17/17	MUST HAVES COMPLETED
11/24/17	PROCESS BOOK UPDATE - OPTIONAL FEATURES COMPLETED
11/30/17	SITE RUNNING - SCREENCAST COMPLETED
12/1/17	FINAL PROJECT DUE - EVERYTHING

REFERENCE:

- https://www.doi.gov/blog/9-animals-are-feeling-impacts-climate-change/
- https://catalog.data.gov/dataset?tags=mammals/
- https://www.fs.fed.us/database/feis/animals/mammal/alam/all.html#PreferredHabitat/