Visualization For Data Science, Spring 2017
PROCESS BOOK

Discover Your Family

Group Members:

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Repository Link:
https://github.com/devcom15/dataviscourse-pr-family_exploration

Overview and Motivation:

Families and genealogy are very important to many peoples, cultures and religions. Several studies show that there are many benefits associated with getting to know our families and its history better. For example, a study conducted at Emory University and published in 2010 involved asking children a range of questions about their parents or other family history. The authors found that the more children knew about their family history, the higher their self-esteem and the better able they were to deal with the effects of stress.

(http://shared.web.emory.edu/emory/news/releases/2010/03/children-benefit-if-they-know-about-their-relatives-study-finds.html#.WiNjh7aZNcy)

Another problem families may face is that it may be difficult to keep track of who everyone is (particularly extended family) what they are doing, and where they live. In Clint's case, (one of our group members and provider of our data) there are already over 300 descendants from his 4 grandparents.

Facebook and Family Trees are two tools that are helpful in staying connected with and being aware of family relations and activities. Facebook typically focuses on what is happening on the current day, it is also cluttered with many other features and doesn't specifically cater to family exploration. Family Trees are also typically used with a high-level depth perspective, which may not always be ideal if the user is looking for a quick and immersive way to review details about relatives.

Questions:

The focus of our visualization was to create a tool that will allow users to explore their families in an immersive and informative way. We made use of some of the advantages that are found in Family Tree and Facebook, but specifically focused on utilizing views that emphasize the personal aspect of individuals in a focused view of a family tree.

Some questions/solutions we originally looked to analyze with this visualization:

- Create a visualization tool that would allow one to quickly view near relation's information, such as age, location, etc. for the purpose of a refresher when meeting family.
- Create visualization tool that is capable of showing organized views of certain families and identifying what current living members are up to in various locations

As we built our visualization, we found that there is also a lot of merit in providing interesting statistical information for our focused views. This aggregate data was readily

available, and showed some interesting data for the snapshot of the family we focused on for our visualization.

We ended up with a visualization that provide the following:

- A visualization tool that allows a user to quickly view a near (and some not so near) relation's information, such as age, location, recent activities, etc.
- A visualization that shows the growth and progress of a snapshot of a family tree.
- A visualization that clearly shows the impact of a single individual on the next view generations.

Data:

One of our group members, Clint Rollins, had significant portions of family history information on hand for use. For five generations, he had a collection of basic information about individuals, such as birth, location, hobbies, images of the individuals, and death dates (if applicable). This data came from a variety of sources, and ultimately some time had to be spent doing manual data entry. For each family member, a JSON object was created with properties detailing their personal information, and a unique identifier assigned to their image.

The data we chose to use is effectively a snapshot of a very long family. We did not include the full dataset in the visualization, but did what we deemed to be a sufficient number to show the usefulness and scalability of our project.

Exploratory Data Analysis:

We largely looked at the information provided on an individual view from Facebook, and sought to combine that information with visualizations that a user would be more likely to find on something like ancestry.com or familysearch.org.

Facebook of course provides a useful function in keeping users informed on the posted events of their friends and contacts. While there is no in depth scientific visualization, the association between images, names, and events is significant.

A Family Tree view traditionally doesn't show much in-depth information for individual members of the family, instead focusing on the overall information and providing a tool for users to go up the family tree to see far ancestors.

We strived to combine these two ideologies and create a tool that would work with narrowed version of a family tree, thus creating a more intimate and personal view of

ones near relatives. We considered this approach as being more of a “width” vs. “depth” visualizations of families.

Design Evolution: What are the different visualizations you considered? Justify the design decisions you made using the perceptual and design principles you learned in the course. Did you deviate from your proposal?

From the outset of the project we had envisioned 3 linked views:

- **Family View -** This view allows the user to explore families and navigate to other families through pictures.
- **Tree View** - This view is the more prototypical family exploration tool. However, in this case, one of the main purposes will be to provide a way to conveniently navigate to the person or family which the user would like to see in the Family View. This view is effectively a more zoomed out view of what is currently displayed in the Family View.
- **Individual View** – This view displays more information to the user about a specific individual.

During the evolution of the project, we wrapped the Individual view in with the Family View, and then created a Map View, which would show the location distribution of family members in the data set, as well as provide yet another way to select which family is viewed in the Family View.

We split development of these three views up, one to each member of our team. To better understand the development of these visualizations, each member put together a design entry.

Here is a list of these entries for each visualization:

Family View:

[entry by clintrollins 11.10]

Initial Family View

I've begun work on the initial family view. Note that there is data for all of my parents descendants, and will work best if only exploring these people. Currently, the basic functionality is available, allowing the user to click on any picture (except the center picture) to update the view.









Clicking on one of the children will give a view like this:

As I was working on this, it became apparent that it might make sense to also include code in the same class that lets one go to the individual view. Thus, it is currently set up such that a person clicked who has no spouse or children to go to an 'individual' view that display the person with his/her parents at the side. We can later add information about that person below, rather than children.

Add Info about person here

Some challenges when working with this were simple problems of getting the correct layout for the pictures and making sure that they are aligned correctly. I still haven't been able to center the images of all of the children as shown in the first picture (I've tried text-align: center among other things).

Some of the updates I intend to work on in the future:
- Add text to display names.
- When a family picture is at the center, include pictures of the individual spouses on the side, below their parents pictures.
-Smooth transitions
-Add individual data.

[entry by clintrollins 11.29]

Finished Family View

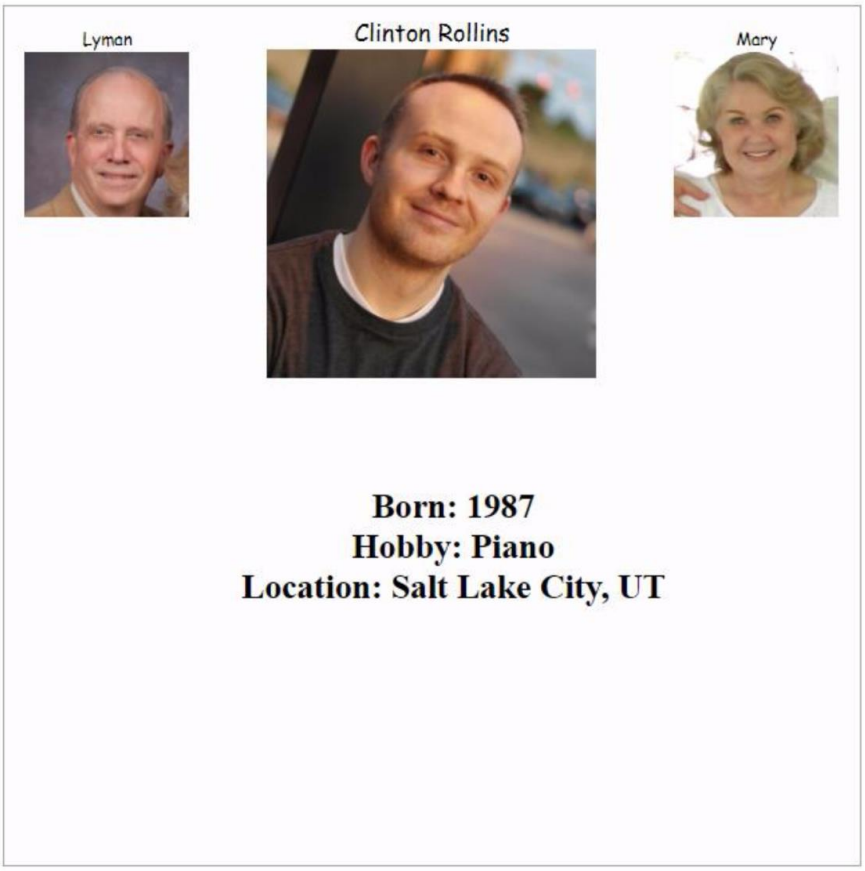
I've now mostly finished work with the family view. The only part I may consider adding is smoother transitions of images.

I decided to stick with the change to include the individual view in the same class as the family view. Any time a child is clicked who does not have a spouse or children will transition to the individual view. If the single photos on the sides are clicked then we also go to the individual view.

As one who does not have much frontend experience, I discovered that the code can get unruly very easily as I continued to add more functionality and text. I learned that it is important to have a strong foundation with organized divisions in order to keep things clean. It is also important to have a good understanding of how each of the display types work (IE inline, block, inline-block).

Here is the finished family view:

Here is the individual view:



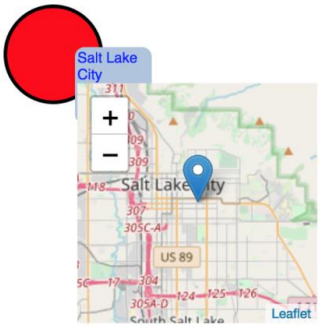
Note that it would easily be possible to add more data or information about the individual if desired in a future update.

Map View:

Tooltip with map

The family tree visualization will have a particular feature: a tooltip that appears when hovering over a node of the tree and that will show the city where the person represented by the node lives (or is buried). The tooltip will also display other information.
The tooltip, now, displays the map of the given coordinates. To accomplish this, the map.html file uses the Leaflet library to retrieve the information and openstreetmap.org to populate the maps visualization. The choice of Leaflet was dictated by the fact that, since Leaflet is open source, it integrates well with d3. Google maps could have been another good choice, but it is more complicated and the security to access it is more elevated. That is why it has not been chosen.

An example of the tooltip is the following:



The difficulty in integrating this map with the data is that the data contains names of the cities, while the library needs coordinates (latitude and longitude). We are exploring different ways to do that. The first way would be to integrate the coordinates in the data, but it requires more time. Another way would be to uses a geocoder. We are currently exploring this option

Map view

The visualization has to display the position of the family members in the United States. Since the collected data shows coordinates only in the United States, there was no need of a world map, but in case the data was different, it would be easy to change. The map was drawn from a topojson. After drawing the map, circles are displayed on the map, one for each member of the family in the data. Hovering over the circles will show a tooltip with a map showing the city where the selected member of the family lives.
The result is the following:

After this was completed, I connected the map to the brush, so that the map would display the position of only the people born in the period selected by the brush. Furthermore, when one of the circles on the map is clicked, both the tree and the family view are update to show the member of the family that was selected.

Tree View:

Aaron_entry1 VIS FALL 2017 November 10, 2017

My current efforts for this project have focused on building the family tree view of our project. This will be one of 2 main views and include integration with the tool tip described by Allessandro's entry 1.

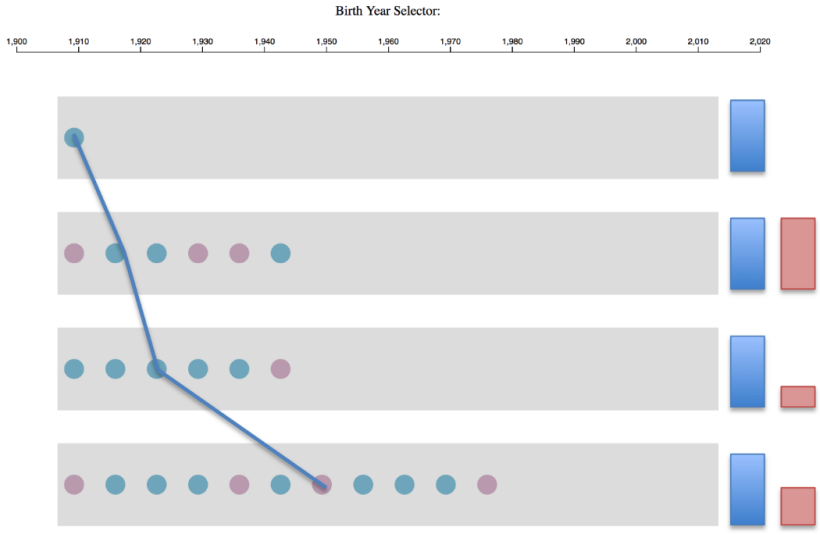
The family tree as it stands now is a bare bones prototype, due to projects in other courses, I was unable to focus as much effort into this as I would have liked to for this milestone. Currently, I am drawing circles from a smaller select portion of our data for testing, the blues are males, pink are female. Each grey bar is a generation, and the birth year selector is a brush which will function similar to how it did in the election assignment. (It is in a mostly working state now. Mostly.)

The overall idea is for each grey bar to contain a generation. Each circle will highlighted in a gender assigned color and a fill of a photo of the individual. When you hover over the circle, it will show a tool tip including details about the individual, and their location. When you select an individual, it will draw lines up and down showing the direct familial lines. (Where they once lived, if they are deceased). Using the brush selector, you can limit the data to only display individuals within a certain set of birth years. I also have plans to include line or bar charts next to each generation to display some statistics about them. Currently toying with: male/female ratio, life span comparisons (may not be good given the limited 100 time period) and perhaps something meaningful about children and spouses. (Would be interested in feed back.)

Tree/Brush/Stats MockUp

A brief sketch of where I would like it to go:

Tree/Brush/Stats MockUp



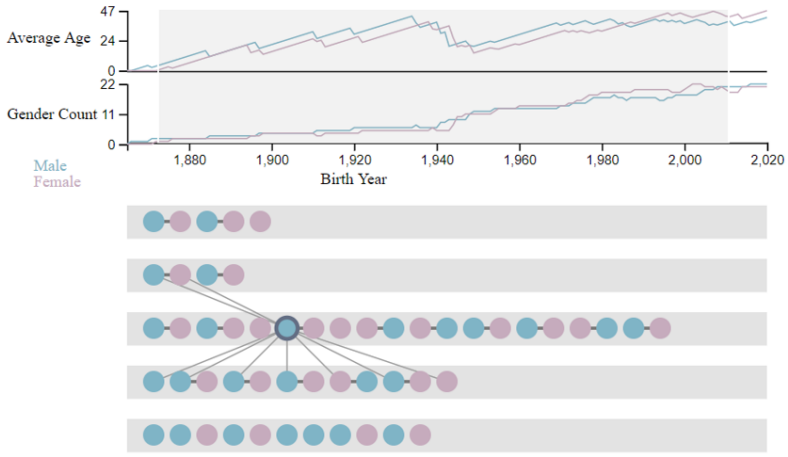
The Tree View is officially complete and is pictured below in its final form. After discussion with Carolina (The master TA), the design was changed from focusing on statistics for the individual generations, and instead was brought to the top to provide a time sequence. This helped build the story element of our project by showing statistics relevant to the growth/progress of the family units displayed.

There was some consideration that the generational separation could perhaps cause problems given datasets that had family members marry up or down the tree. However, for this particular zoomed in scope view, this was less of a concern. We considered creating unique links between spouses rather than the darker and more bold link as seen below, however, this ended up being a non-issue with the data set we were working with.

We had originally planned to fill each circle with the individuals picture. However, we ultimately decided that this looked to cluttered and sent a mixed message as to the use of the Family View, where this same data is already being displayed. Instead, there is a tooltip that pops up on each individual node providing name/birth date/death date.

The brush allows a user to select a range of birth years, and the tree view will then update only on that specific set of data.

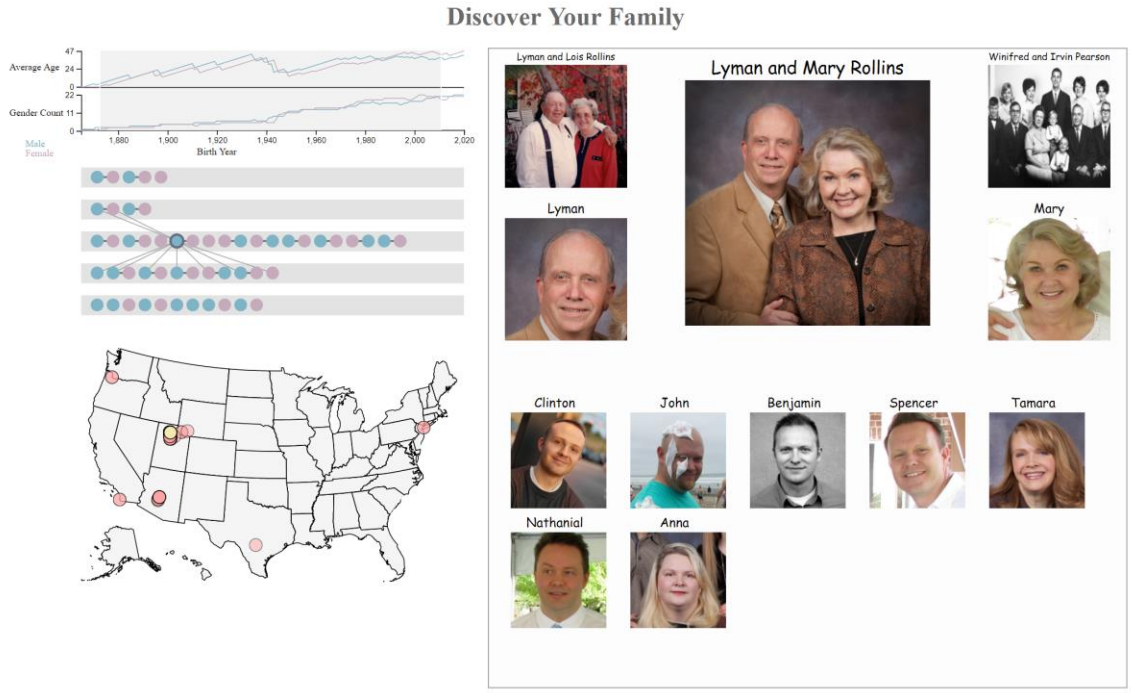
I also included a very minimalist set of labels. The color coding seemed to adequately provide indication as to which lines / nodes were which, and this meant we did not have to clutter the screen with any unnecessarily large legend.

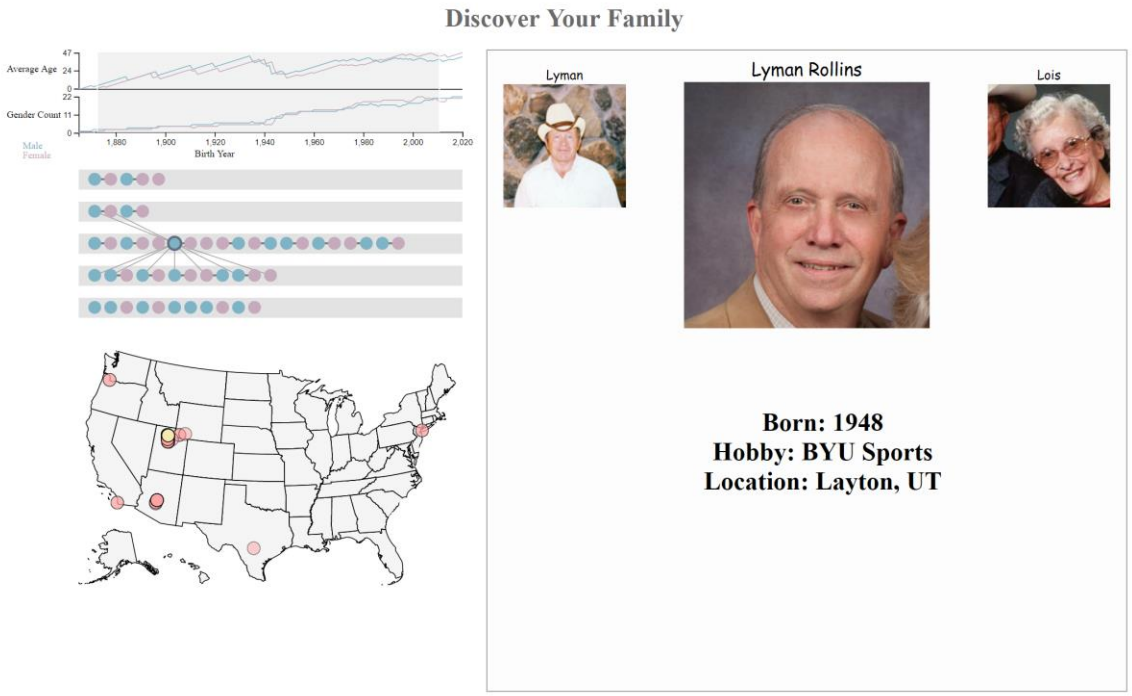


Implementation:

Each piece of our visualization is inherently linked to the others. Every interaction in each view will cause a trigger in the other views. This is done with the intent to provide the users multiple ways to explore the visualization, and creating context for who they are looking at as the primary member in the family tree.

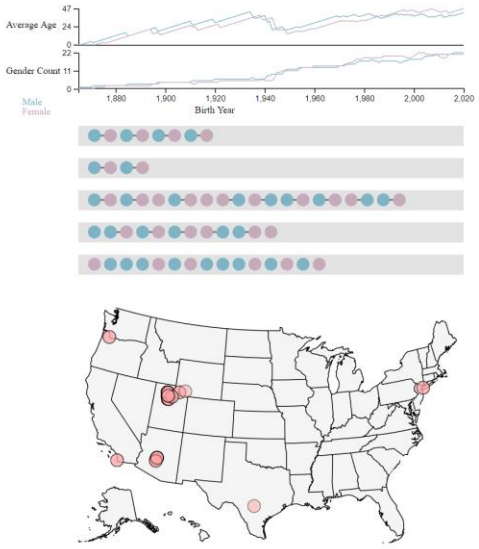
Starting with the family tree, you can select the images to navigate up and down the family tree. Selecting an image of just an individual will shift to their individual view, displaying personal information. With each selection of an image, the Tree view will update to show that individual as the focus and the Map view will highlight their current/last known location in yellow.





The Tree View provides a set of statistics for the family, in the form of time sequenced line graphs. These show the progress/growth of the family for the given period. You can also select through this time period with a brush, thus updating the Tree and Map views to only show nodes for members born during the selected range of years. Selecting any node on the tree will update the Family View to that individuals main view, and highlight their location in the map. Hovering over any node will also pop up with a tool tip indicating their name, birth date and death year (in applicable).

Discover Your Family



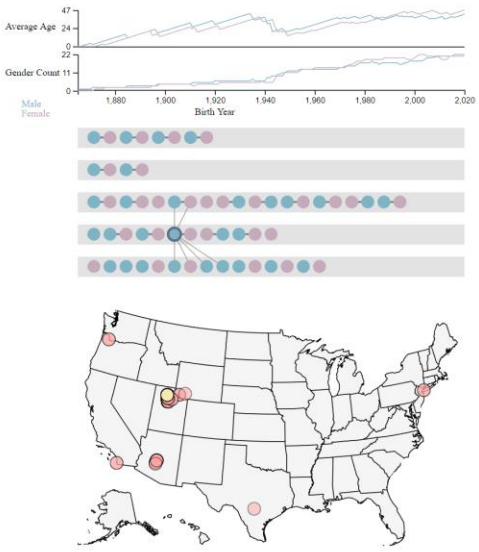
Lyman

Clinton Rollins

Mary

Born: 1987
Hobby: Piano
Location: Salt Lake City, UT

Discover Your Family



Mary and Lyman Rollins

Spencer and Melanie Rollins

Spencer

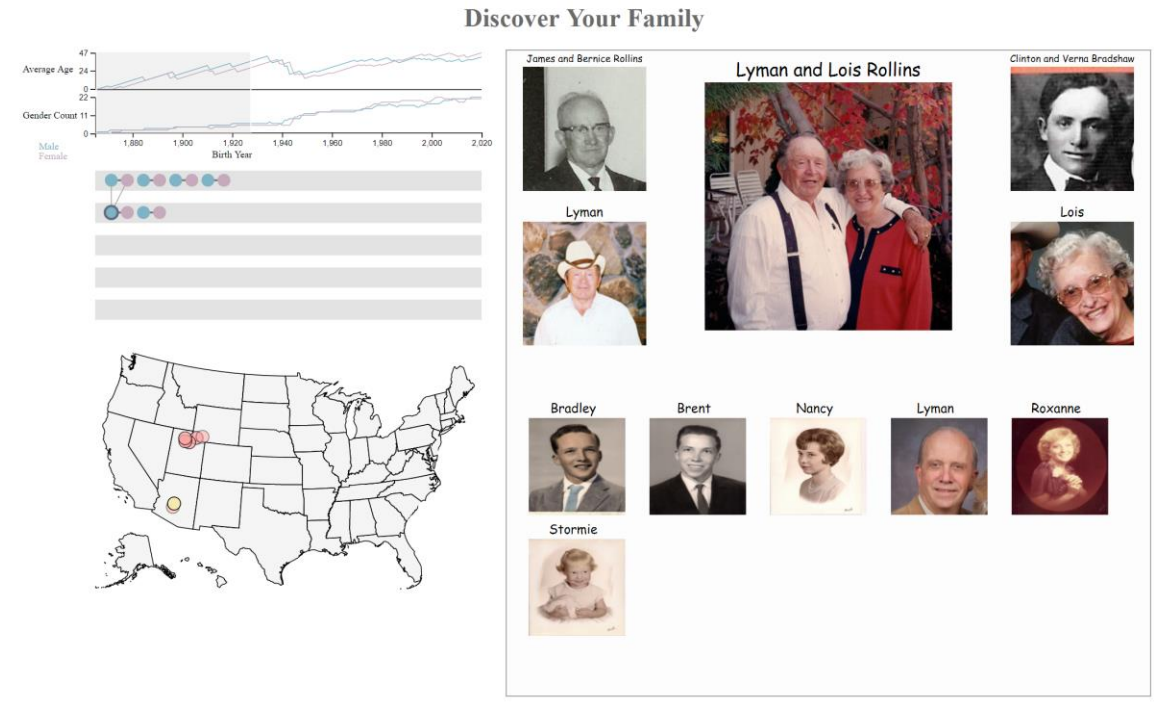
Melanie

Talmage

Leia

Ammon

Peter



Finally, for the map view. As is the theme here, selecting any node will update the Tree View and Family View to show information for the selected family member. Also included. When hovering over any node on the Map view, a tooltip will appear showing the individuals name, the name of the city, and a zoomed in view of the map down to the city.

Evaluation:

Overall, we feel we have created an effective tool that allows a user to see both the progress/growth of a family over a selected set of generations, as well as identify personal facts about individuals. The combination of interactable views creates a good environment for family exploration through spatial geometric location, ancestral links, image recognition, and time relation.

Aside from the general use of the visualization. We also learned from the data several unique things about the data set. Between years in 1940 and 1960, there was a sharp increase in births in the family, which coincides with the “Baby Boomer” time period. This is reflected both in the node increase, as well as revealed in the sharp decline in average age. Also of interest, was the migration of the family outside of its Utah/Wyoming roots. At the beginning of the time period, most family members are focused in the same centered location. Starting around 1940, there are branches that move out to various locations of the USA.

We feel that our visualization works well. There are of course things that could be improved on. Specifically, the personal information for the individual view demonstrated its usefulness, but it could have been more expansive. This could be accomplished by providing social media feeds for members with such accounts, and including more information in the database for those without (older/deceased or young family members.).

Something else that we would have liked to explore is generalizing the visualization to be more plug-in play with different data sets. The visualization was developed with the idea in mind that if a user had their own set of data that matched our parameters, they would be able to plug in their own information. To accomplish this fully, we would need to generalize several methods and probably re-conceptualize how the tree is being drawn to fit edge cases (such as family members marrying multiple people, having children from multiple spouses, etc.).