CS 416 Data Visualization Final Project Reginald Musekiwa rwm4@illinois.edu

CS 416 Data Visualization Final Project:

# Background

This is a final project for the Data Visualization Computer Science course at the University of Illinois. Specifications include creating a narrative visualization implemented as an interactive web page using knowledge of communication and narrative structures acquired throughout the course. The narrative visualization should be on a publicly visible website and can only be constructed using D3 (libraries permitted: D3-annotation and topoJSON Client) and JavaScript.

The data presented and dataset was acquired from the U.S. Department of Homeland Security publication library. The data is part of a series of quarterly reports ‘detailing the number of adjustments of immigration status that occurred during the’ 2019 fiscal Year reporting period. ‘Disaggregated by type of adjustment, type and detailed class of admission, and country of nationality’.

I used the 2019 Fiscal Year report because it was most likely a more complete presentation of lawful immigration trends into the US prior to the Covid 19 outbreak.

Source : ( <https://www.dhs.gov/immigration-statistics/readingroom/special/LIASR> )

Table

Description automatically generated



## Messaging

The goal of this narrative visualization is to provide a simple presentation of legal immigration trends allowing the user to explore at all the steps in the story

## Narrative Structure

The structure of this narrative visualization follows an interactive visualization. The target user, a citizen of the US, a potential immigrant, a policy maker would most likely peruse through the story and deep dive in areas of interest based on the amount of data. For example. The bar chart on the Region Refugee Immigrants originate can be explored further to get details on specific countries. Deep dives can also be through establishing origin of I-94 non immigrate visitors and further analyzing the exact type of visa. All this information can be divided into Fiscal year quarters. This story is for fiscal Year 2019 prior to the pandemic interruptions and restrictions.

Visual Structure.

The story setup followed the visual seeking Mantra: Overview first, Zoom and Filter. and lastly Details on demand. Priority of scenes is given based on answers given and level of information. Possible questions for Fiscal Year 2019:

1. What region did the refugees come from?
2. What region did nonimmigrant visitors come from?
3. What country did most of the naturalized citizens come from.
4. How many non-immigrant admissions were admitted in each I-94 class
5. Which Quarter had the most I-94 admissions

# Scenes

There was no scene rendered. The plan was consistency in color and visually engaging presentation. One chart per page allowing utilization on mobile devises and on different content platforms.

Scene 1: Region of Nationality

## Annotations

Tool tips – answer questions on demand whenever a user hovers or clicks. As a third layer item in the visual seeking mantra, minimum annotations were used’.

## Parameters

The main parameters are quarterly totals for immigration. Using a filter, a user can select a specific Quarter, Region, Country, I-94 /Immigration class of entry.

## Triggers

Filters – Filters are to remove unwanted information allowing a focus or customization of the user interaction experience. The filters on the visualization are implemented throughout the story allowing the users to select Quarters of interest. Opacity allows a comparison with the larger group while highlighting the filtered selection.

Zooming allows focus on areas. Implementation on the chart would allow focus on a central reference point such as country

## Conclusion

The planning of this project after getting the specifications involved scheming through datasets online. Over the years, out of curiosity and being an immigrant to the US I have been fascinated by immigration policy and trends hence the choice of project. The goal is to provide quick insights into lawful immigration trends to the US. The target audience for the narrative visualization is the public who are Not subject matter experts who are not doing extensive research but would like to ingest the information by browsing and occasionally doing a deep dive with areas of interest. The typical user would be spending minimal time.

The data is part of a series of reports published by the U.S. Department of Homeland Security on a yearly and quarterly statistics. The data can be downloaded as a zip file and is presented in Excel sheet format. Pre-cleaning was required of the sheets to allow fit for use data quality and compatibility for visualization of the data. Cleaned files are publicly available in the Github repository (<https://github.com/ReggieW/US2019immigrants.github.io>) and original files on the DHS website ( <https://www.dhs.gov/immigration-statistics/readingroom/special/LIASR> ). There data bank hosts a wealth of information in the form of reports and tables which would benefit from narrative visualization allowing policy makers and the public to gain quick insight in terms of trends in immigration.

D3 has an advantage on the out-of-the box visualization tools like Tableau because it allows customized animations and has a vast library of resources. The only limitation is the programming and technical skillsets required to take advantage of the vast resources. I found D3 initially tedious and spent hours on chart development and not the narrative presentation. I also found that D3 requires knowledge of a suite of applications such as HTML, JavaScript, CSS, React etc. to fully take advantage of its unique rendering abilities. This takes away it’s appeal and widespread adoption however the finished product is well worth the effort when implemented right.

[Powered by TCPDF (www.tcpdf.org)](http://www.tcpdf.org/)