573 Final Project Proposal

[Worldwide Human Migration]

Basic Info

- **Project Title:**
  - Worldwide Human Migration

- **Team Members:**
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- **Project Repo:**
  - https://github.com/coyawa/DataVisFinal

Background and Motivation

1. Background

Inspired by Xiaoqun's week 2 reflection about a video named 'Humanity's cultural history captured in 5-minute film'. Which demonstrate 120,000 individuals who were notable enough in their lifetimes that the dates and locations of their births and deaths were recorded.

The other website: http://peoplemov.in/ shows the global immigration flow at 2010. We want to further visualize the trend of immigration based on different attributes like a year, GDP, a war zone. Our goal is to explore the reason behind the immigration flow. The connection between viz and reader, considered.

2. Motivation

We are all international students who decided to move to another country to study. Therefore, we are curious about what stimulates people to live in another country. The war? The population density? Alternatively, any other reasons.

Project Objective

1. Questions to be Solved

In our meeting, we found two categories of the question to be solved by visualization. The first one is to figure out the global/general migration pattern; the second one is to explore the migration pattern for one specific country. Not only the migration volume and migration direction but also the situation for those countries will be presented in our attempts.

2. Things to Learn and to Accomplish

In this project, we could learn how to design a web page and how to organize and present the dataset in a way that consumers are willing to take a look. What's more, we will learn how to combine different charts with various visualization idioms to achieve our goal. What we will accomplish is a web page contains well-organized visualizations and descriptions to tell a story.

3. Benefits.

Capitalizing the powerful D3 library in this project, we can enhance our proficiency in JavaScript as well as front-end design technics. Our goal is to build a user-friendly interface, which provides us a great opportunity to get exposure in human interaction design field. Finally, the most important thing is that, by aggregating multiple attributes data set, we can learn how to convey the information concisely to the users, which is the key to implement a great visualization.

Data

For the dataset, the first problem is where to collect the migration data. For the migration data, we found two data sources that have different durations and a different country(which might take a lot of time to clean the data). In the further discussion, We decided to add more features in our visualization, that is the reason why we introduced world population data by country in our dataset.

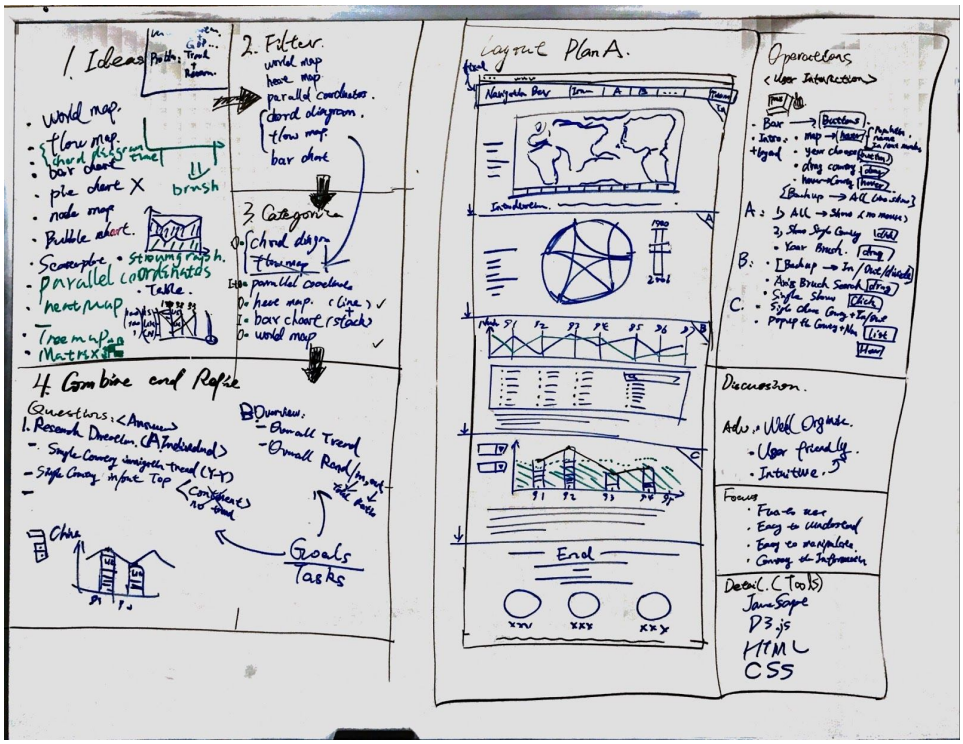
1. **Migration flow till 2009.**
    - http://www.un.org/en/development/desa/population/migration/data/empirical2/migrationflows.shtml (Contains Migration data from 2000 to 2009, divided by Country(region, developed or developing country) or by citizenship)
2. **Migration bilateral matrix data at 2010,2013.**
    - https://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittances-data
3. **World population data(by country)**

- http://data.worldbank.org/indicator/SP.POP.TOTL

Data Processing

The data for each country are stored in different files, and since we have three data sources including migration data, population data. Substantial data processing are needed in our project because we need to integrate all the data source in one file.

Visualization Design



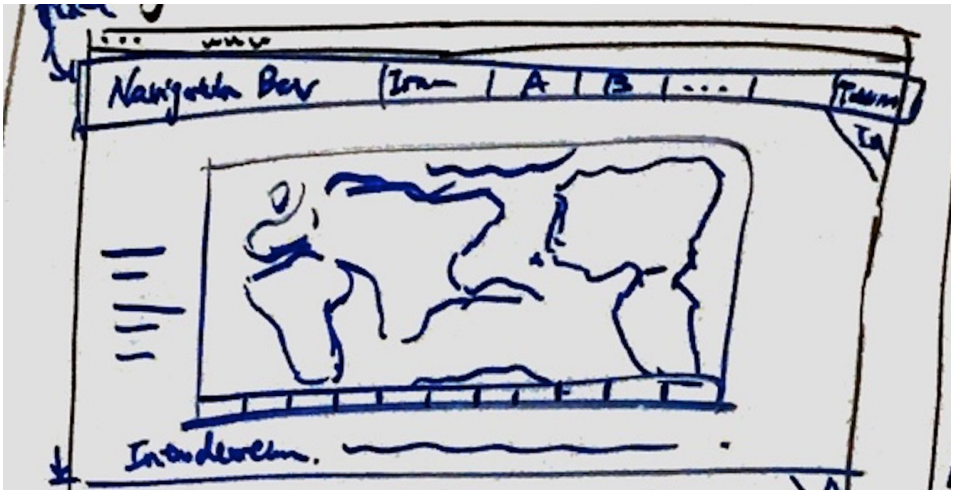
- This is the visualization design brainstorm whiteboard sketch; we use the five design sheet inspired from (http://fds.design/). First, we brainstormed the visualization ideas, then filter and categories them.

- Then, we start to think about the detail of our visualization, the goals and the tasks and which visualization should be choose to reach the goals.

- Finally, we explored the design space and decided to choose four visualizations to build this visualization project, they are:
    - **Overview:**
        - World Map Visualization

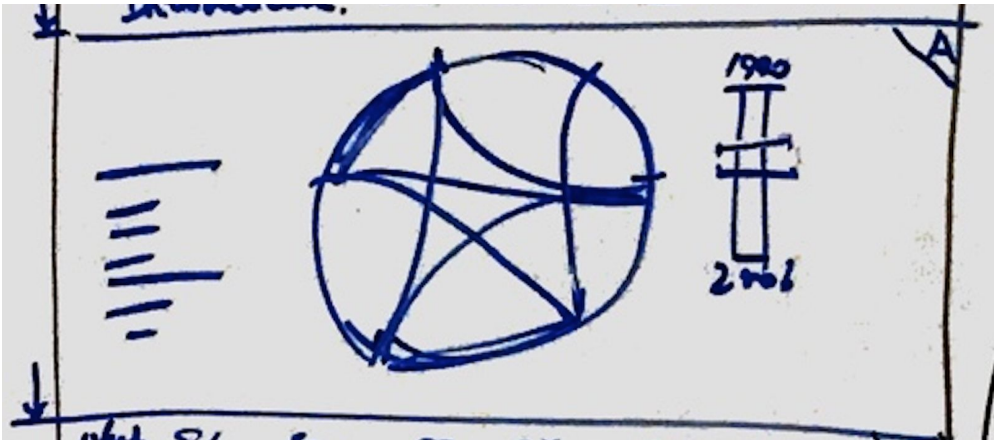
        - Heat Map Visualization
        - Chord Visualization
    - **Individual:**
        - Parallel Coordinator Visualization
        - Bar / Stack / Line Visualization

V1: The World Map & Heat Map Visualization



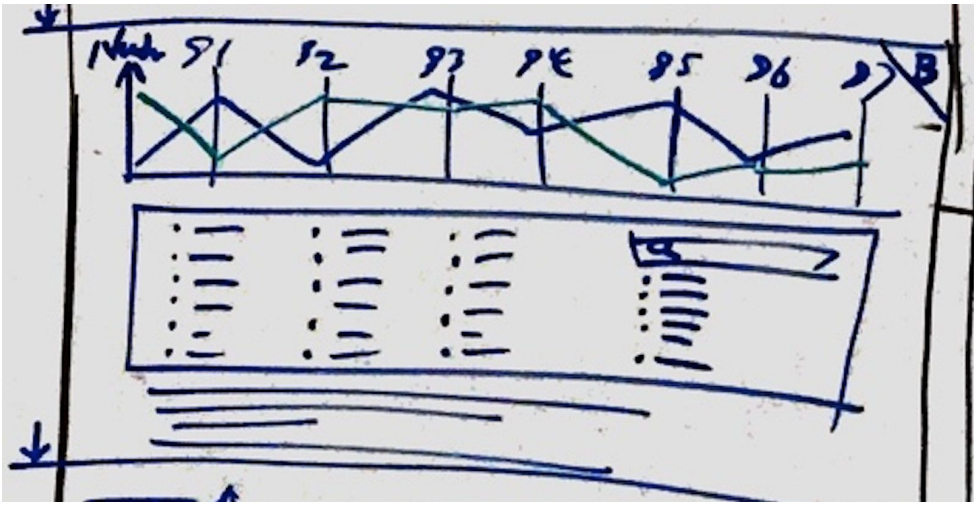
- Through the global map visualization, we hope we can give users a general/ global idea about migration before exploring into any further details. In our design, each country in the world map may have multiple links that link to other countries to demonstrate the direction of migration. We will represent the density of population and the number of immigration by using deeper color. There will have two modes, inflow and outflow, that allows user to switch between them by click on a bottom. A brush to choose the year. We think it would be very helpful for users to get a general idea.

V2: Chord Visualization



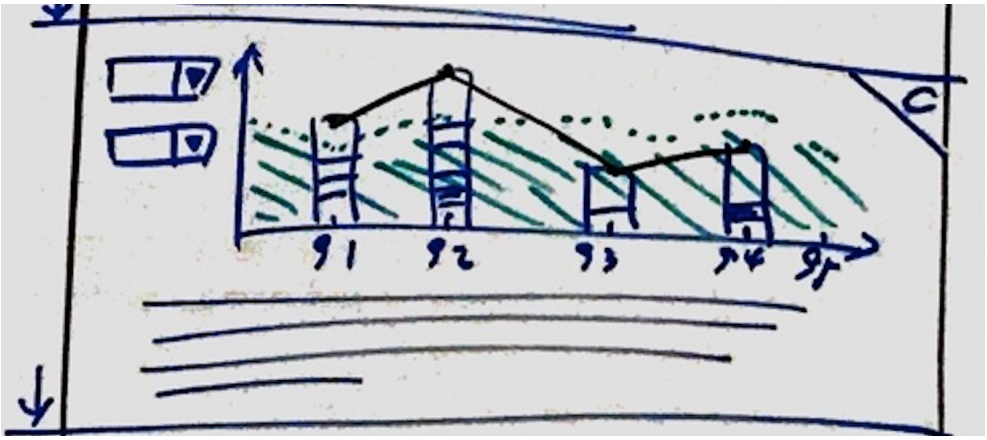
- Through chord visualization, we believe that users can have a general migration flow idea among different countries before further exploration. In this chord diagram, there will have tooltips that show detailed information about the immigration flow.

V3: Parallel Coordinator Visualization



- From this visualization, we wish we could provide users with very detailed information for the migration, and that's why we choose parallel coordinates. Multiple attributes of data will be displayed in the same diagram, such as years, number of immigration, name of countries. The trend of immigration among years and countries will be explored by this visualization. Users could choose to see one specific countries' migration pattern by the search function. Also, they could choose to explore a set of countries' migration pattern by the brush interactivity. Additionally, a choice for inflow, outflow and net flow volume will be provided in this visualization.

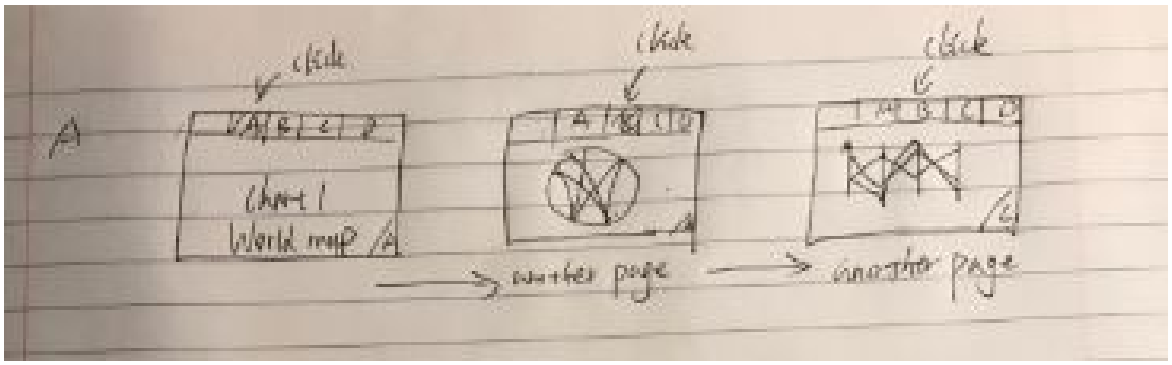
V4: Bar / Stack / Line Visualization



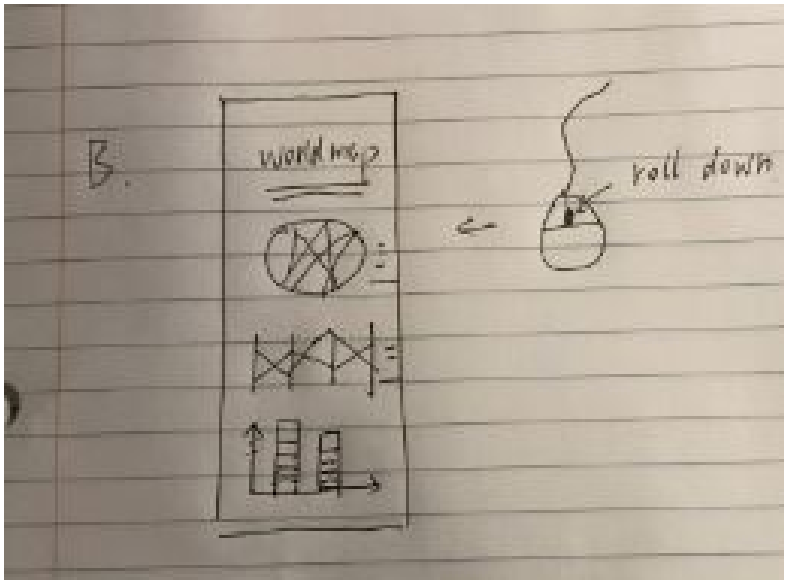
- This visualization can combine multiple information together, which helps us convey information more concisely. For each specific country that selected by users, the number of immigration of different years will displayed. The trend of immigration among years can be tracked in the line that connect the top of each bar. In each bar, migration countries will represented in different color and stack from top to bottom based on the number of migration. To reduce the chaotic, the opacity must be introduced in this visualization.The shadow area shows the population change.

Website Layout Prototypes.

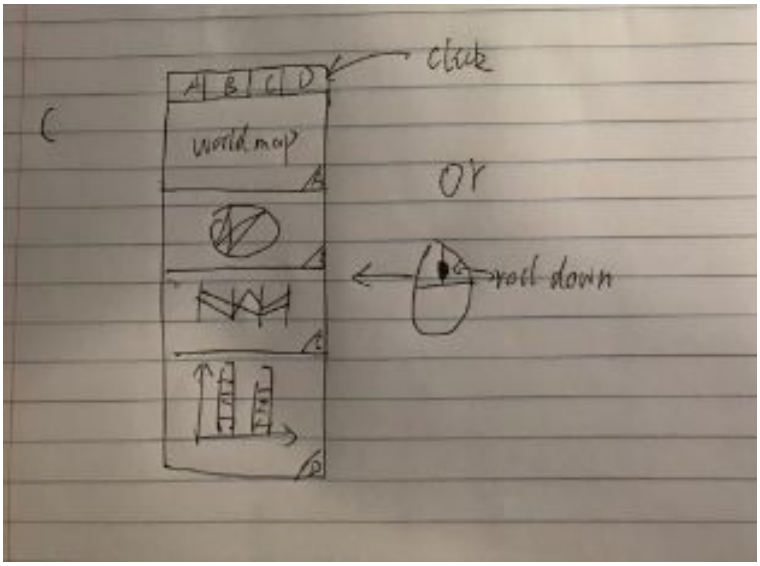
Design A:



Design B



Design C



In our meeting, after watched many visualization pages; we proposed three prototypes for our website layout. After careful consideration, we choose the Design C which contains the characteristics both in Design A and Design B. For design C; further descriptions are listed as follows.

- We choose the One page view instead of the more navigate button to other pages.
- Demo web page example : http://hotcars-nyc.github.io/
- If we have limit time, we can do like the example use the service of http://startbootstrap.com

Must-Have Features

1. World map with links to show migration and combined with heat map to show the population density
2. The navigation bar on the top to guide users to different visualizations.
3. A chord diagram to show the migration flow among different countries with selection idioms to choose the years.
4. A parallel coordinates chart to show the migration volume pattern for different countries with the brush and search function to reduce and select the specific countries
5. Team members introduction.

Optional Features

1. Animation to the world map links.
2. Animation to the chord diagram.

3. Other data selection or reduction tools in parallel coordinates. Brush or a zoom to choose the year range.
4. The stacked bar chart for the migration flows with a line.
5. Embed idiom for those visualizations which provided more texted or detailed. information like top countries flow from or flow to, population and GDP.

Project Schedule

- **Week5:** 2/15
    - Submit the project proposal. Start to clean the data.
- **Week6:** 2/23
    - Finish the data clean, build the basic website layout and at least one or two chart in D3 without interactivities.
    - After Prototype presentation, begin to add interactivities and finished all the work.
- **Week7:** 3/02
    - Final submission with video.