

Immigration Trends

CS 171 Final Project Proposal

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Background and Motivation. Discuss your motivations and reasons for choosing this project, especially any background or research interests that may have influenced your decision.

As the descendants of immigrants who came to the United States, we are fascinated by the stories of our ancestors and how they fit in with the larger movement of human migration. Global immigration trends influence not only country demographics, but also culture, economy, and religion. During Kristina's semester abroad in Argentina, Senegal, and India, she wrote a major research paper on Chinese immigration trends to developing countries. Sierra is a secondary concentrator in History and is currently taking two history seminars that examine the perspectives of immigrants and minorities of the U.S., one of which is perhaps the only Asian American history class offered at the college.

Project Objectives. Provide the primary questions you are trying to answer with your visualization. What would you like to learn and accomplish? List the benefits.

1. Which countries have experienced the greatest inflows and outflows of migrants, and from where and during which year(s)? Why?
2. How do immigration patterns differ between men and women?
3. Inference: what historical, social, political, or other factors may influence the trends we see in migration over the past 5 decades?

Answering these questions will help us learn about global migration patterns from 1960-2000, and may help us discern why different groups, nationalities, or ethnicities of people move and for what reasons. The quantitative data have important qualitative consequences for our understanding of international trade, population growth, development, politics and more.

Data. From where and how are you collecting your data? If appropriate, provide a link to your data sources.

Our data is sourced from the [World Bank Global Bilateral Migration Database](#). Global matrices of bilateral migrant stocks spanning the period 1960-2000, disaggregated by gender and based primarily on the foreign-born concept are presented. Over one thousand census and population register records are combined to construct decennial matrices corresponding to the last five completed census rounds.

The data reveal that the global migrant stock increased from 92 to 165 million between 1960 and 2000. South-North migration is the fastest growing component of international migration in both absolute and relative terms. The United States remains the most important migrant destination in the world, home to one fifth of the world's migrants and the top destination for migrants from no less than sixty sending countries. Migration to Western Europe remains largely from elsewhere in Europe. The oil-rich Persian Gulf countries emerge as important destinations for migrants from the Middle East, North Africa and South and South-East Asia. Finally, although the global migrant stock is still predominantly male, the proportion of women increased noticeably between 1960 and 2000.

We hope to explore and show these trends (as well as discover others) in our visualization of this dataset.

Data Processing. Do you expect to do substantial data cleanup? What quantities do you plan to derive from your data? How will data processing be implemented?

The data has been manually cleaned up into one aggregate CSV file: aggregate_data.csv contains the entire dataset and has the following relevant quantities: **Origin, Gender, Destination, Count, Year**

Sample:

	A	B	C	D	E	F	G	H
1	Origin	Gender	Destination	1960	1970	1980	1990	2000
2	Afghanistan	Female	Afghanistan	0	0	0	0	0
3	Afghanistan	Female	Albania	0	0	0	0	0
4	Afghanistan	Female	Algeria	22	8	6	5	4
5	Afghanistan	Female	American Samoa	0	0	0	0	0
6	Afghanistan	Female	Andorra	0	0	0	2	3
7	Afghanistan	Female	Angola	0	0	0	0	0
8	Afghanistan	Female	Anguilla	0	0	0	0	0
9	Afghanistan	Female	Antigua and Barbuda	0	0	0	0	0
10	Afghanistan	Female	Argentina	2	4	6	20	0
11	Afghanistan	Female	Armenia	0	0	0	0	4
12	Afghanistan	Female	Aruba	0	0	0	0	0
13	Afghanistan	Female	Australia	16	31	350	1236	4449
14	Afghanistan	Female	Austria	19	64	105	149	854
15	Afghanistan	Female	Azerbaijan	0	0	0	0	0
16	Afghanistan	Female	Bahamas, The	0	0	0	0	0
17	Afghanistan	Female	Bahrain	22	32	2694	6227	10054
18	Afghanistan	Female	Bangladesh	49	40	25	12	13
19	Afghanistan	Female	Barbados	0	0	0	0	0
20	Afghanistan	Female	Belarus	0	0	0	0	0
21	Afghanistan	Female	Belgium	7	34	15	120	111
22	Afghanistan	Female	Belize	0	0	0	0	1
23	Afghanistan	Female	Benin	0	0	0	0	0
24	Afghanistan	Female	Bermuda	0	0	1	0	2
25	Afghanistan	Female	Bhutan	0	0	0	0	0
26	Afghanistan	Female	Bolivia	0	0	0	0	0

Visualization. How will you display your data? Provide some general ideas that you have for the visualization design. Include sketches of your design.

We would like to incorporate a world map because maps are visually intriguing and useful to data visualization, especially with regards to geographical data.

For our WorldView, users will have the option to toggle between *ingoing* and *outgoing* migration data, as well as for different years and by gender. For the outgoing view, when the user hovers over a country, outgoing arcs would be drawn to the top 10 destination countries that their emigrants travel to (with numerical labels displaying the actual numbers). For the ingoing view, when a user hovers over a country, incoming arcs would be drawn from the country's top 10 immigrant sources. If it isn't too cluttered, we may combine these two depending on if differing channels (i.e. color) make this clear enough.

With these basic functionalities, the map would only give a snapshot of the data. To get more information, the user would click on a particular country and the map would fade away to reveal more in-depth data regarding both emigrants and immigrants of that selected country (CountryView). Having the initial map is an easy way to give the user an overview of trends, while also providing a simple selector for countries. Users

can also query for a specific pair of countries to view detailed data on migration between those two (RouteView).

(WorldView) Radio buttons: toggle between Ingoing or Outgoing migration numbers

(WorldView) Slider: choose year from 1960, 1970, 1980, 1990 or 2000

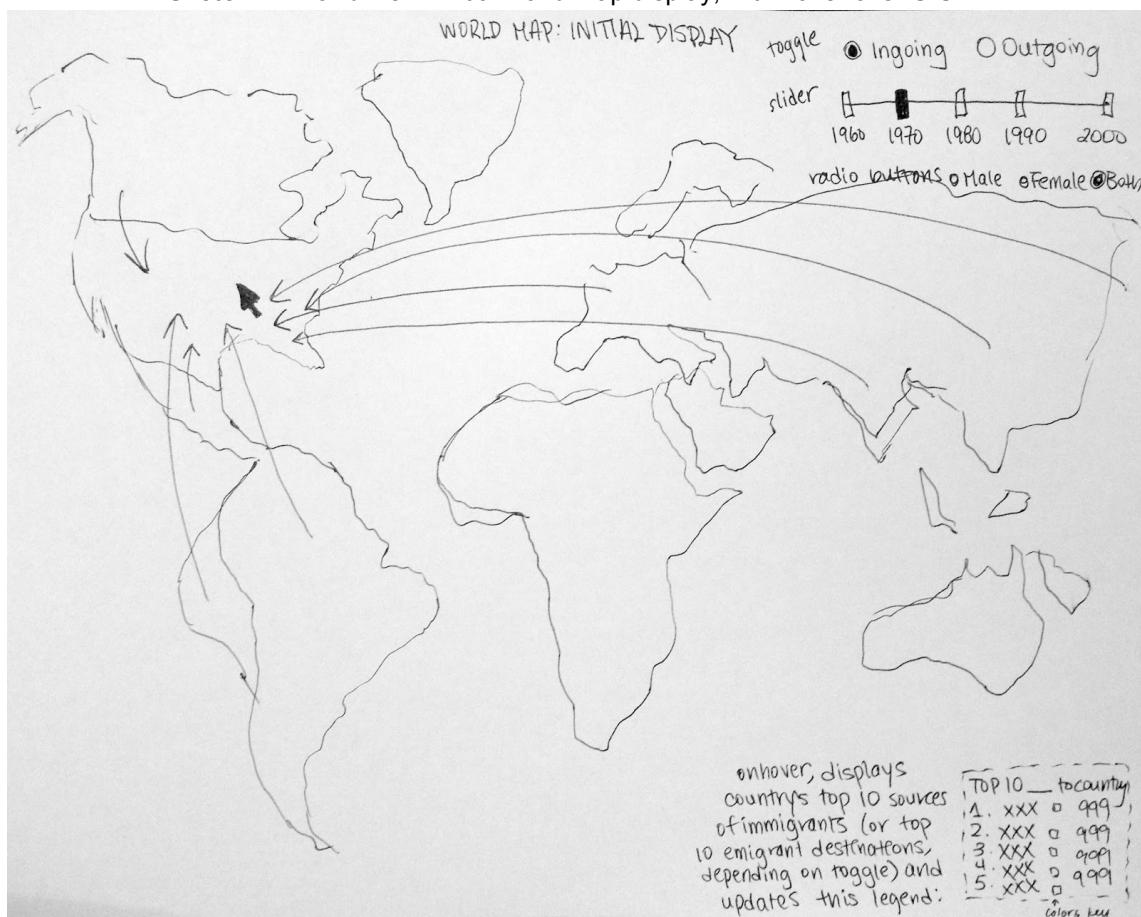
(WorldView) Radio buttons: choose from Female, Male, or Total

(CountryView) click on a specific country to view more detailed data

(RouteView) by route: user chooses Country A and Country B to view detailed data on migration between the two

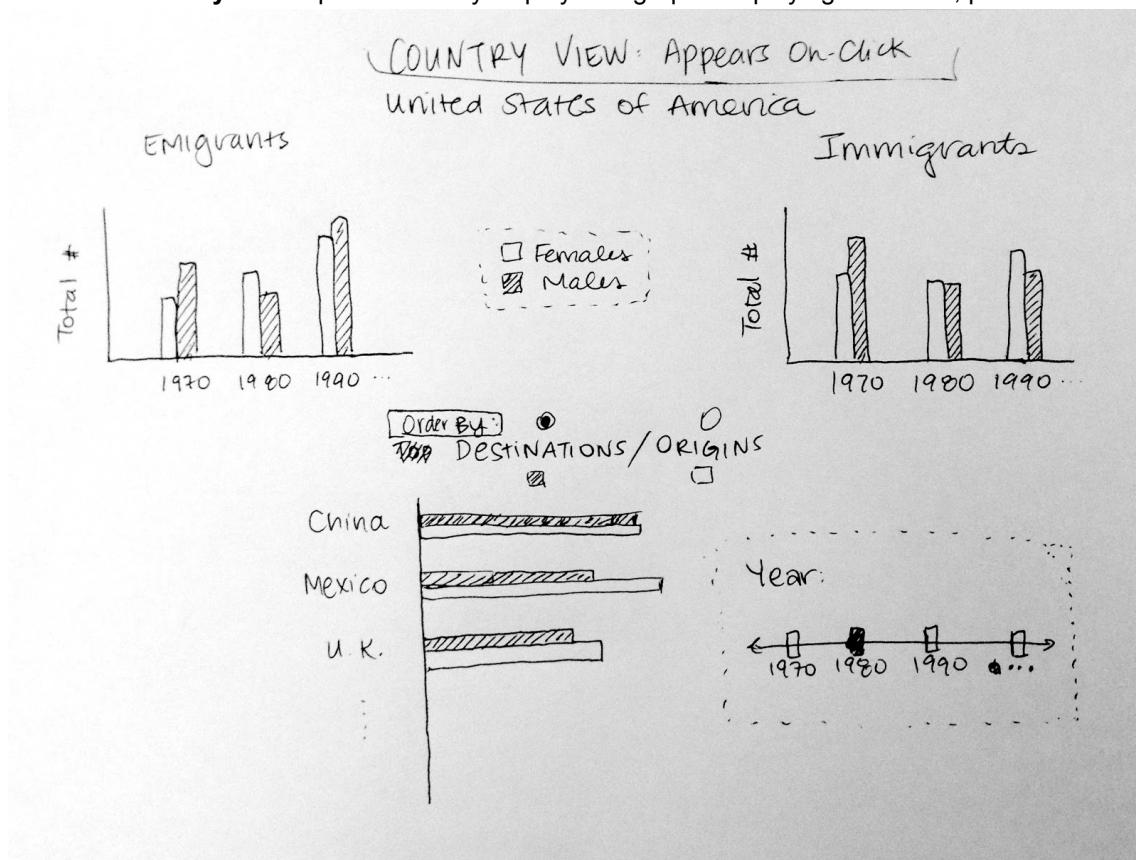
Below we've included a few sketches of what this will look like. Of course, the interactivity and sleek design we intend to include cannot be represented very well in these paper sketches.

Sketch 1: WorldView. Initial world map display, with hover over U.S.A.

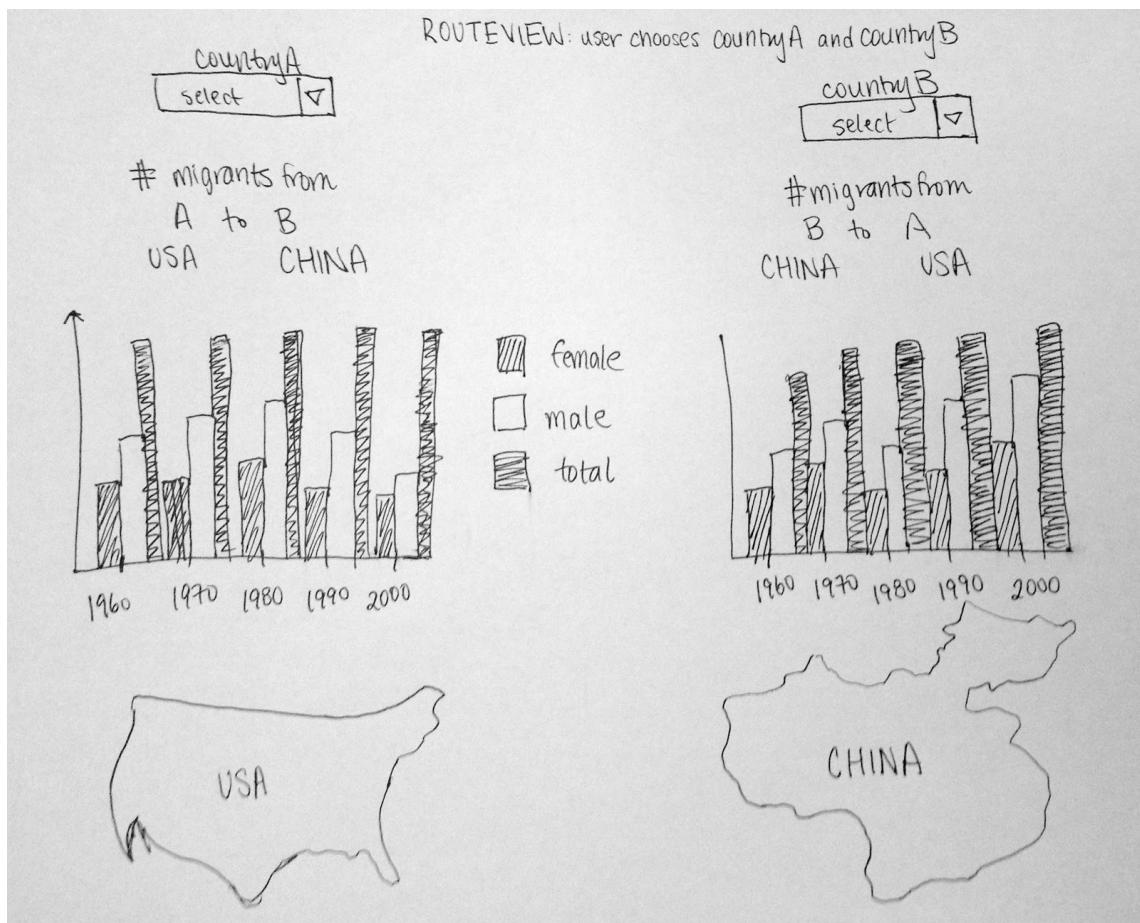


User will hover over country. Ingoing/Outgoing toggle determines which arcs/flows will be displayed on hover. The legend at the bottom of the screen will show what these arrows represent based on the arrows' colors. The legend will show the country name and the number of people.

Sketch 2: CountryView. Specific country display with graphs displaying additional, processed data



Sketch 3: RouteView. User selects two countries to see more detailed data.



Must-Have Features. These are features without which you would consider your project to be a failure.

- WorldView: interactive and functional world map with arcs/arrows and necessary toggles/sliders
- CountryView: for each country, display more detailed data about its incoming and outgoing migrants
- RouteView: allow users to select a pair of countries for examination, display detailed data

Optional Features. Those features which you consider would be nice to have, but not critical.

- Effects to focus the user's attention on specific patterns
- Animations to emphasize certain trends
- Beautified user interface and toggles, etc.

Project Schedule. Make sure that you plan your work so that you can avoid a big rush right before the final project deadline, and delegate different modules and responsibilities among your team members. Write this in terms of weekly deadlines.

- By Friday, 4/17: Finish basic setup, make substantial progress on must-have features
- By Friday, 4/24: Finish must-have features, add optional features
- By Friday, 5/1: Add finishing touches, submit project