COM-480: DataViz Milestone 2

Jonathan Doenz, Aleksandar Hrusanov, Aslı Yörüsün

I. Project Motivation and Project Goal

Our main goal is to give an unbiased view of the migration movement by providing appropriate visualisations (more dynamic and interactive) to readers.

We would like to address the biased information issue on the news about the global migration (e.g. the European refugee crisis). So the next time someone claims that there are too many immigrants from this particular country to another one, you have a mean whether to validate the claim or not. Besides, you can have an overview of what are the countries that have the highest (and lowest) numbers of immigrants overall and with respect to their total populations. If we have time, we can even give an insight to our readers on which routes are more secure (in terms of related casualties) to take while migrating.

II. Tools and Lecture References

A. Lectures

Some lectures we will possibly refer to:

- *Sets 2, 3, 4: SVG, JavaScript, D3*
- *Set 5: Interactivity* - navigation, zooming, brushing, scaling, event handling, animations
- *Set 7: Design* - general design principles and practices
- *Set 8: Maps* - world map, projections, radial layout, Sankey diagram,

B. Tools

Some tools we (might) make use of:

- Leaflet JS, TurfJS - interactive maps and advanced geospatial analysis
- Bootstrap, Font Awesome - libraries to setup our website
- GeoJSON, TopoJSON - encodings for geographical and topological information
- Ion.RangeSlider - might use for time slider

III. Tasks Breakdown

Our project can be seen as consisting of five major visualizations and each of them can be broken down further into subtasks. Each visualization requires handling respective datasets.

A. Migration Flow Map – see Figs. 1 & 2

- Create a 2D projection of the world map using TopoJSON data
- Implement *hover-over* functionality - when hovering over a country, show migration inflow to/outflow from the given country with arrows point from/to the all origin/destination countries.
- Implement *on-click* functionality - when a country is clicked, a side panel appears with additional information about the selected country
- Implement a *hide-and-show* side panel containing various filters (e.g. select countries, show inflow/outflow, etc.)
- Implement a *time slider* to give the user the option to select which time period to be visualized
- Implement *map zoom*

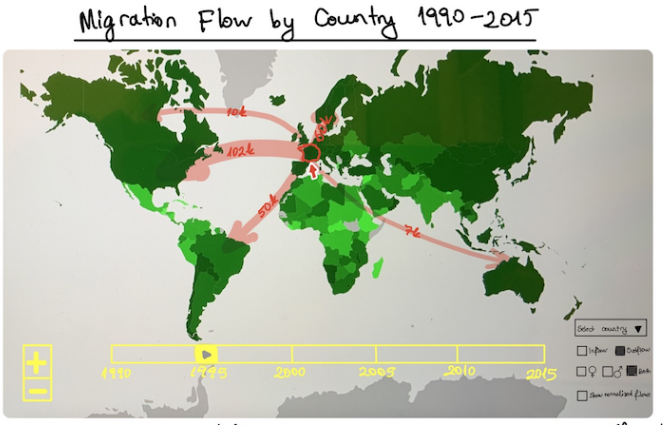

Fig. 1. Migration Flow Map

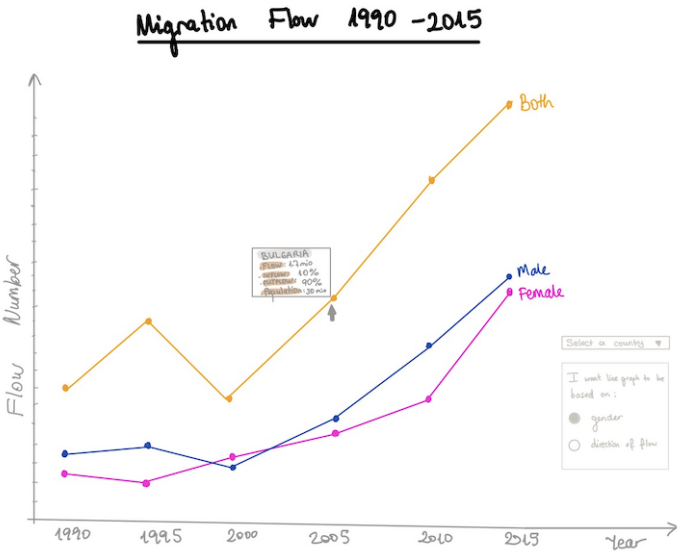

Fig. 2. Overall migration flows'

B. Gender and Age Diverging Bar Chart – Fig. 3

- Implement sort of a *diverging stacked bar chart* having age ranges on the vertical axis and male/female on the left/right half of the bar chart.
- Implement *filters* - selecting desired year, desired country (migration stock), selecting desired to and from countries (migration flow).

C. Refugee Population by Country – see Fig. 4

- Create a 2D projection of the world map using TopoJSON data
- Creating D3 elements (e.g. circles) with different sizes to signify different amounts of refugee population in various countries.
- Map those D3 elements to respective countries' centroids.

D. Migration Stock with Development Level – see Fig. 5

- Implement a *sequenced sunburst diagram* with D3 elements (with data that describes sequences of number of migration

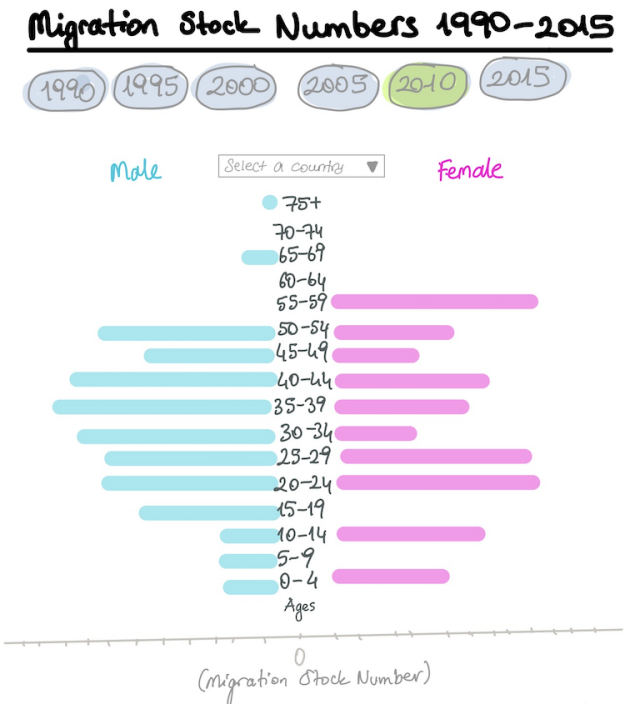

Fig. 3. Migrants' stocks by age

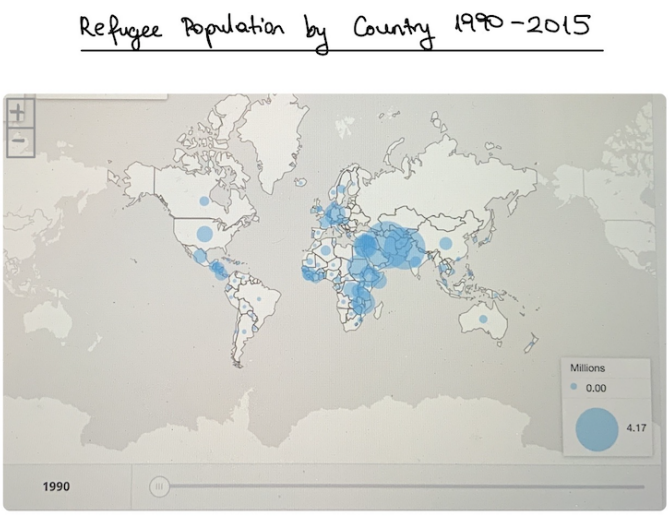

Fig. 4. Refugees' population map

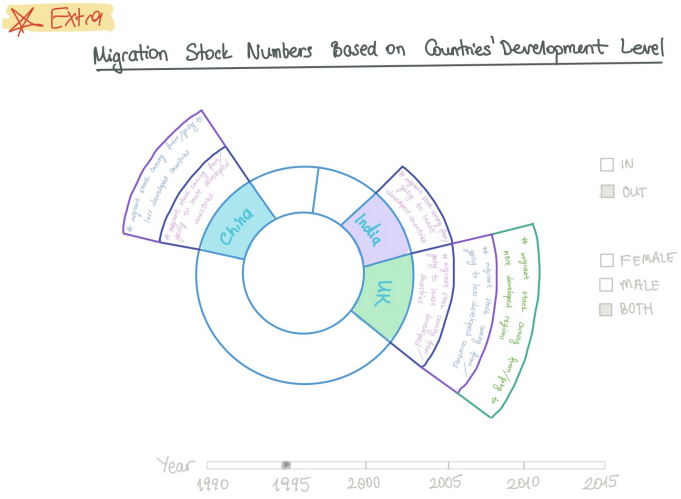

Fig. 5. Migrants' stocks by countries' development index

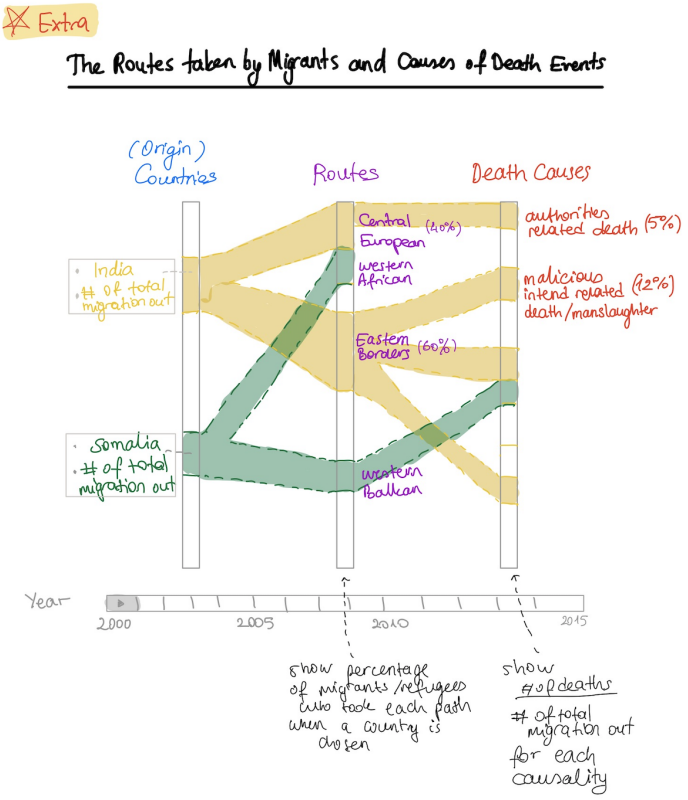

Fig. 6. Migration routes and casualties

stocks coming from and/or going to a country based on the country's development level).

E. Migration Routes and Causes of Death – see Fig. 6

- Implement a *sankey diagram* with D3 elements with 3 columns as being *(origin) country, route, death causes*. One can click on a country to show its number of total migration out, which migration routes were taken, and if there is an event (missing/dead people) occurred what were the reasons of that event. It is also possible to click over each column of the sankey diagram to show their sankey distributions. This will give an insight into which routes tend to be more dangerous and which more safe.

IV. Functional Project Prototype

Functional prototype can be accessed on Learn Migration!. Code can be found on the following repository.
For the implementation of our project we mainly use HTML and CSS for website structure and style, Javascript and D3 for functionality and interactive visualizations. We also rely on additional libraries such as Bootstrap (to add better structure and dynamic responsiveness), Font Awesome (for icons and fonts), as well as jQuery (to simplify DOM tree manipulation and handling). For the map visualization we have used a TopoJSON file to project the world map.

V. Extra Ideas

- **Migration Stock Sunburst Visualization** - refer to Migration Stock with Development Level – see Fig. 5.
- **Sankey Diagram of Migration Routes & Causes of Death** - refer to Migration Routes and Causes of Death – see Fig. 6. For this idea we need new dataset which can be found here.
- **Migration Flow Animation** - substitute the static arrows on the world map visualization of migration flow with some sort of animation (e.g. a collection of moving particles)