Exercise: Graph Design (Time)

[Last revision: Apr. 2020]

In this assignment, you have to design visualization solutions for questions related to the AidData dataset. This dataset contains information about financial transactions for aid purposes between two countries. Given the data structure and analytical questions presented below, your goal is to sketch views that would help an analyst to obtain the answer for those questions.

Data

In the AidData dataset, each row represents a financial transaction between two countries. The dataset contains the following attributes:

- **Year:** year of the commitment
- **Donor:** country providing the financial resource
- **Recipient:** country or organization receiving the money
- **Commitment Amount:** the total amount of financial resources provided
- **Coalesced Purpose Name:** the purpose of the transaction

Below is an example of the data:

Year	Donor	Recipient	Commitment Amo...	Coalesced Purpose Name
1996	United States	Peru	19,085,570	Radio/television/print media
1996	United States	Brazil	272,863,443	Energy generation and supply, purpose unspeci...
1996	United States	Argentina	34,107,930	Power generation/non-renewable sources
1996	United States	Argentina	68,215,861	Power generation/non-renewable sources
1996	United States	Argentina	73,788,687	Power generation/non-renewable sources
1996	United States	Argentina	102,323,791	Power generation/non-renewable sources
1996	United States	Argentina	115,966,963	Power generation/non-renewable sources
1996	United States	Bolivia	27,286,344	Power generation/non-renewable sources
1996	United States	Bolivia	150,074,894	Power generation/non-renewable sources

**Note: The full dataset has many more columns and it also includes international organizations other than countries. The description here focuses only the attributes and entities (countries) relevant for the assignment.*

You can find a (simplified and reduced) copy of the data here (use this one!): https://drive.google.com/open?id=1YiuHdfZv_JZ-igOemKJMRaU8dkucfmHxOP6Od3FraW8

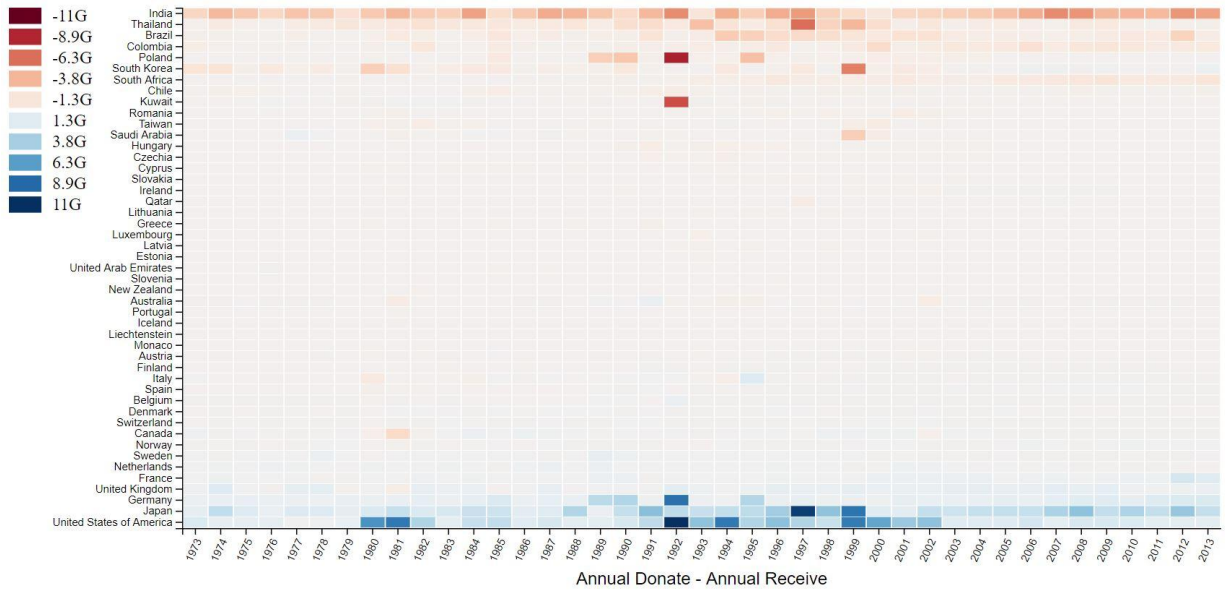
You can find the full dataset with descriptions here (to understand gather more background information about the data set): https://www.aiddata.org/data/aiddata-core-research-release-level-1-3-1

Goal

Your goal is to create 3 independent visualizations of the same data set, each one with the intent of answering the questions stated below. For each numbered visualization, you should be able to create a data visualization that answers **all** of the questions specified.

These are the 2 visualizations you should create.

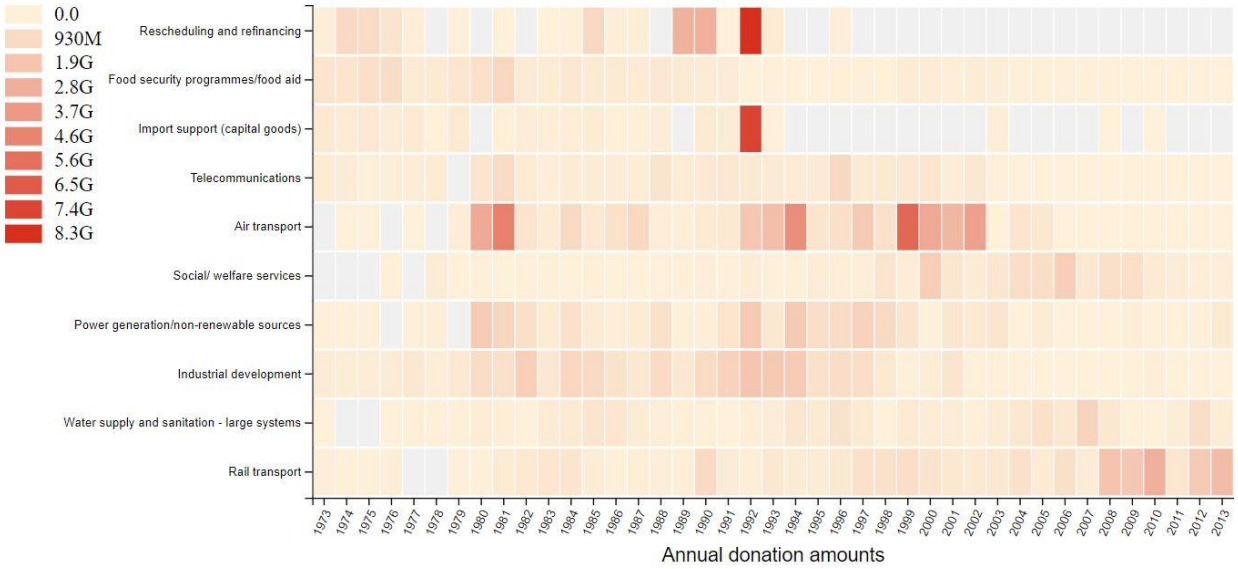
- **Visualization 1:** a) How does the amount donated vs. amount received change over time for each country?; b) Are there countries that mostly send or mostly receive and countries that have a similar amount of donations they receive and send?; c) Are there countries that change their role over time? That is, they used to mostly send donations and turn into mostly receiving donations and vice-versa?; d) Are there countries in which you can find a sudden increase ("peak") or a sudden decrease ("valley")?



Sort by total donate – total receive

Pros: Easy to find countries that mostly send or mostly receive
Cons: Cannot know the exact amount of donate and receive
Justification: Displaying too many lines on the same line chart results in a spaghetti plot that is almost unreadable. Small multiple for line chart might be a solution but scaling will be a problem.

- **Visualization 2:** Focus on the top 10 “Coalesced Purposes” of donations (in terms of amount of disbursement across all countries and all time). What are the top 10 purposes of disbursements (in terms of total amount of disbursement) and how does their relative amount compare over time? E.g., are there purposes that tend to be prominent for a period of time and others that become more prominent during other periods? Hint: looking at the graph one should be able to observe: “*Ah! During these years donations were mostly about X but then there were way more donations about Y*”. Note: if the purpose is “UNSPECIFIED” it should be removed.



Pros: Easy to find purposes that tend to be prominent for a period of time
Cons: Cannot know the exact annual donation amount
Justification: Displaying too many lines on the same line chart results in a spaghetti plot that is almost unreadable. Percentage area chart might be a solution but comparing width is hard. Also, it is potentially misleading since users may think that there are ONLY ten purposes.

- **[OPTIONAL] Visualization 3:** Focusing exclusively on countries that receive donations, how do donations shift geographically over time? Do donations tend to be always in the same regions of the world over the years or they have been shifting over time? Can you build a visualization that shows the “history of donations” so that one can get a sense of which regions of the world have had more need for donations over the years? Note 1: for

this visualization you can, if you wish, use interaction (but you don't have to). Note 2: For this exercise you may want to review the lecture on geographical visualization in which we explain how you can visualize geographical data over time. Note 3: if you want you can aggregate data over a few years (say, group together data at 5 year intervals).

Instructions

For this assignment, your goal is to come up with effective visualization designs to answer the questions posed and to communicate their answers found in the data.

Your coded solutions must use D3 and not other visualization libraries. Also, your final submission **will not be on Observable**. Instead, you will make a website using HTML, CSS, and D3 + JavaScript. You can find a project template in the info-vis-project-template GitHub repository.

Submissions for the mini-projects are split between two weeks.

Week 1:

- Submit one or more sketches that show your thinking about these problems. You can hand draw your sketches or use some drawing software.
- For each visualization problem you are encouraged to submit more than one solution. When you do that make sure to explain what are advantages and disadvantages of the proposed solutions.
- If you submit only one sketch then add only a single justification for your design and why you think it works for the problem assigned.
- NOTE: if you feel comfortable submitting draft solutions in D3 at this stage already it is totally fine to submit them in place of sketches.

Week 2:

- Submit a screenshot for each visualization you developed in D3.
- Note it is still ok in this final phase to submit more than one solution for a given visualization problem if you think there are some competing solutions that work well.
- Together with the screenshot, submit a zip file containing the code for your website.