SOSC 4300/5500: Overview

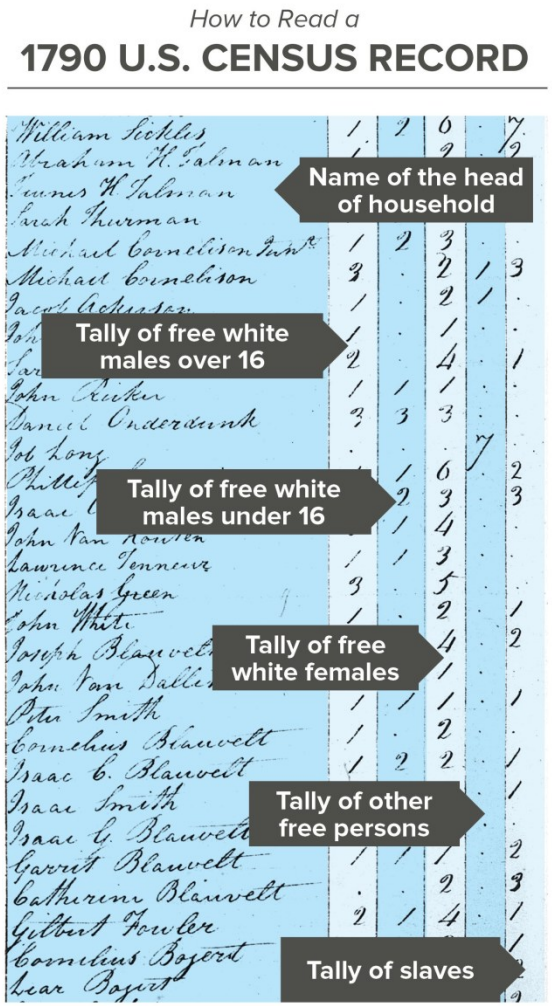
Han Zhang

Feb 8, 2022

Outline

Before Digital Revolution

- https://www.familysearch.org/blog/en/1790-census-form-questions/



Before Digital Revolution

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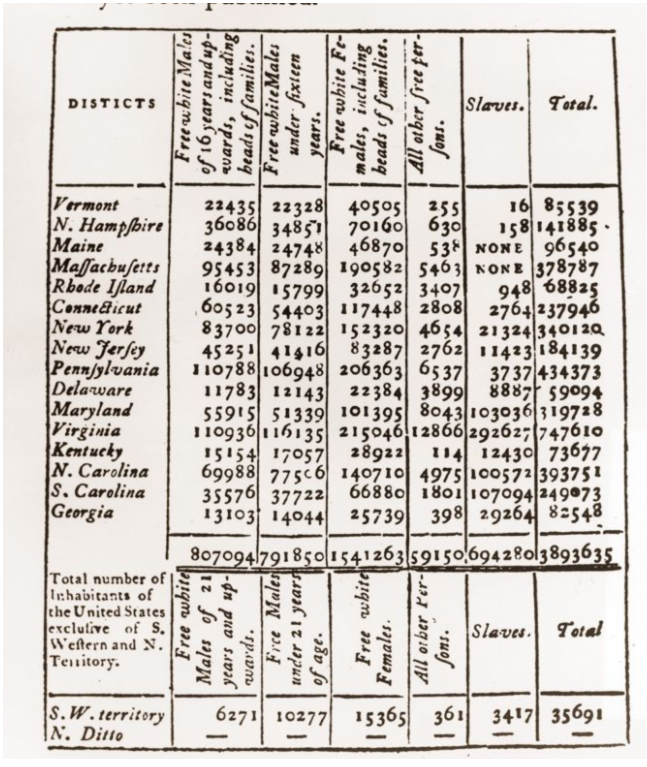

DISTICTS	Free white Males of 16 years and upwards, including heads of families.	Free white Males under sixteen years.	Free white Females, including heads of families.	All other free persons.	Slaves.	Total.
Vermont	22435	22328	40505	255	16	85539
N. Hampshire	36086	34851	70160	630	158	141885
Maine	24384	24748	46870	538	NONE	96540
Massachusetts	95453	87289	190582	5463	NONE	378787
Rhode Island	16019	15799	32652	3407	948	68825
Connecticut	60523	54403	117448	2808	2764	237946
New York	83700	78122	152320	4654	21324	340120
New Jersey	45251	41416	83287	2762	11423	184139
Pennsylvania	110788	106948	206363	6537	3737	434373
Delaware	11783	12143	22384	3899	8887	59094
Maryland	55915	51339	101395	8043	103036	319728
Virginia	110936	116135	215046	12866	292627	747610
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	807094	791850	1541263	59150	694280	3893635

Total number of Inhabitants of the United States exclusive of S. Western and N. Territory.	Free white Males of 21 years and upwards.	Free Males under 21 years of age.	Free white Females.	All other Persons.	Slaves.	Total
S. W. territory	6271	10277	15365	361	3417	35691
N. Ditto	—	—	—	—	—	—

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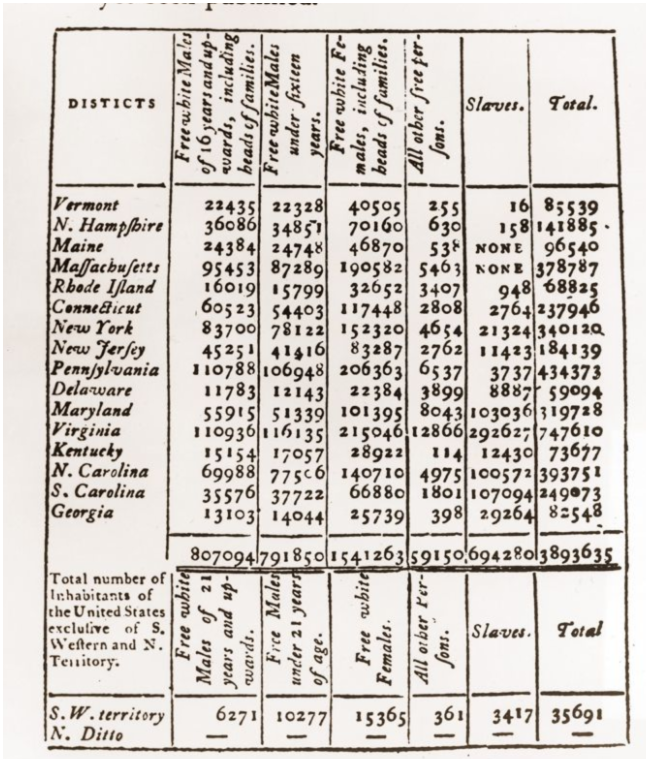
- 1890 US census took 8 years to clean and process by humans



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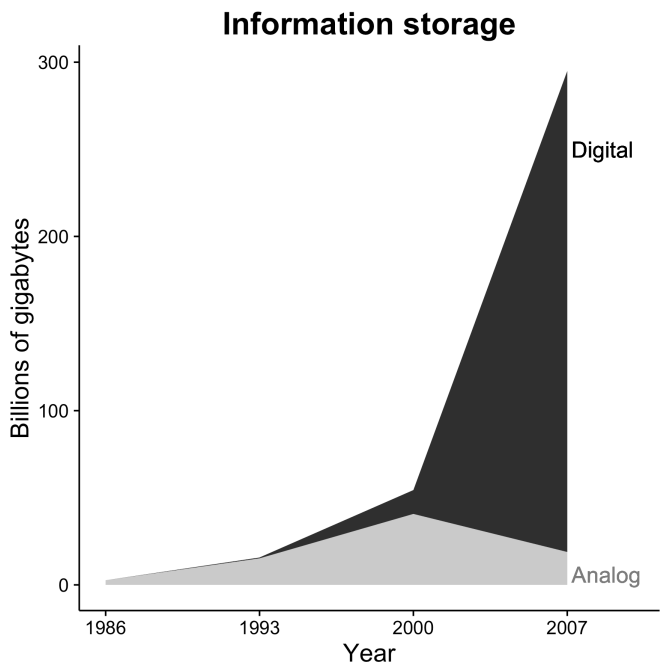
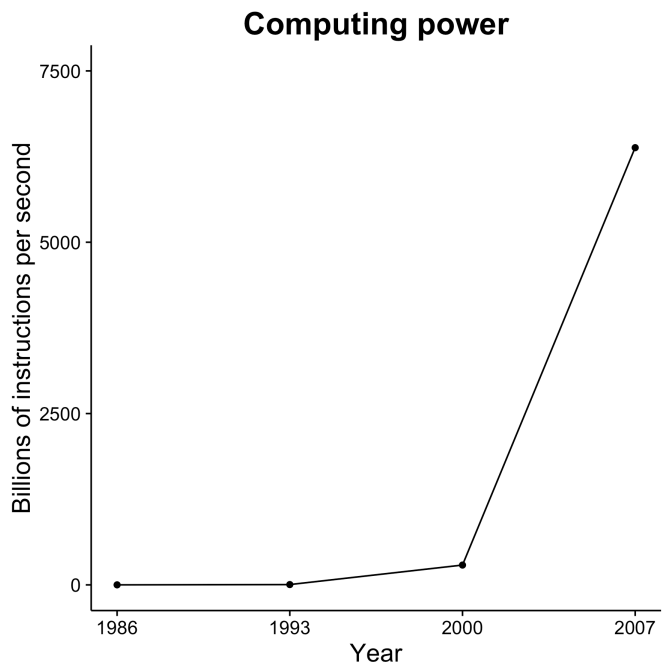
- But data are still in analog format; they are represented in a physical way.

Welcome to the digital age

- Since 2000, both computing power and digital data are quickly increasing





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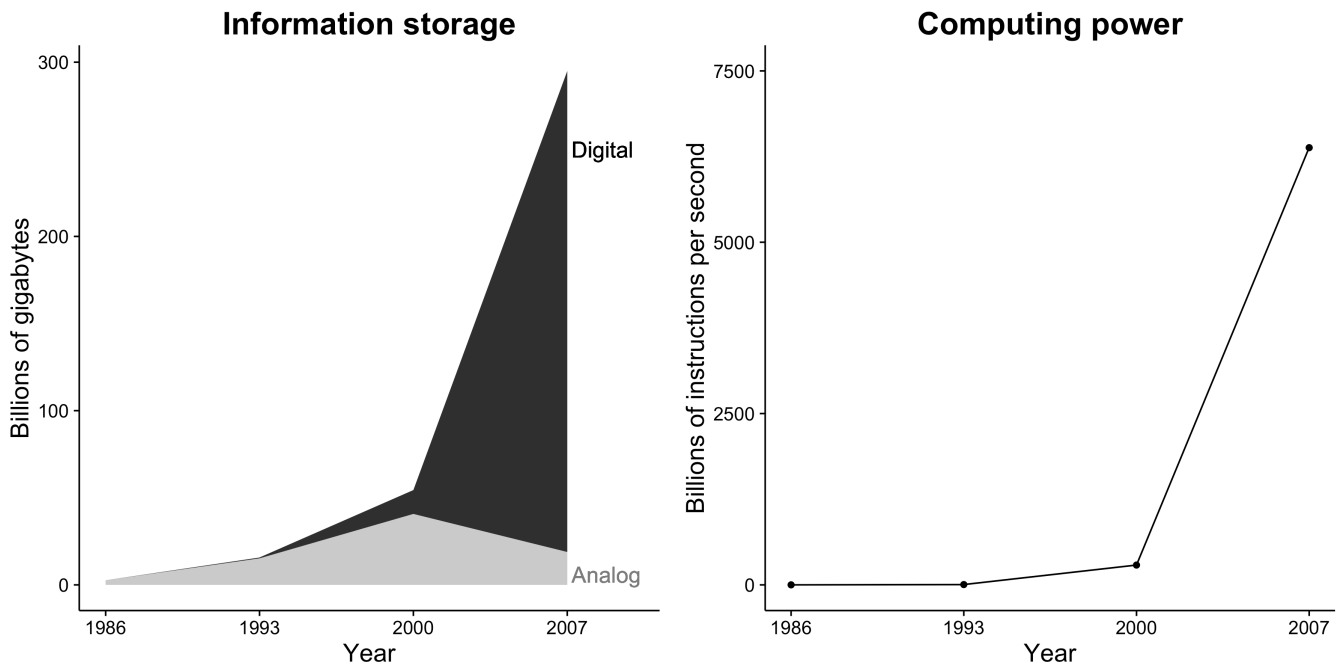

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  - Before digital age, they just fade away, but now they are kept

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- From printed maps to Google maps
- [in class activity]: can you think of other examples of digital data that are transformed from traditional analog data?

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- Big data are repurposed for research
  - They are big
  - But you need some effort to get what you want

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  - Regression in most times won't work!

Social scientists and data scientists

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- Social scientists: computational social science
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- Data scientists: computational social science
  - Get more data, and apply some fancy machine learning algorithms over social data

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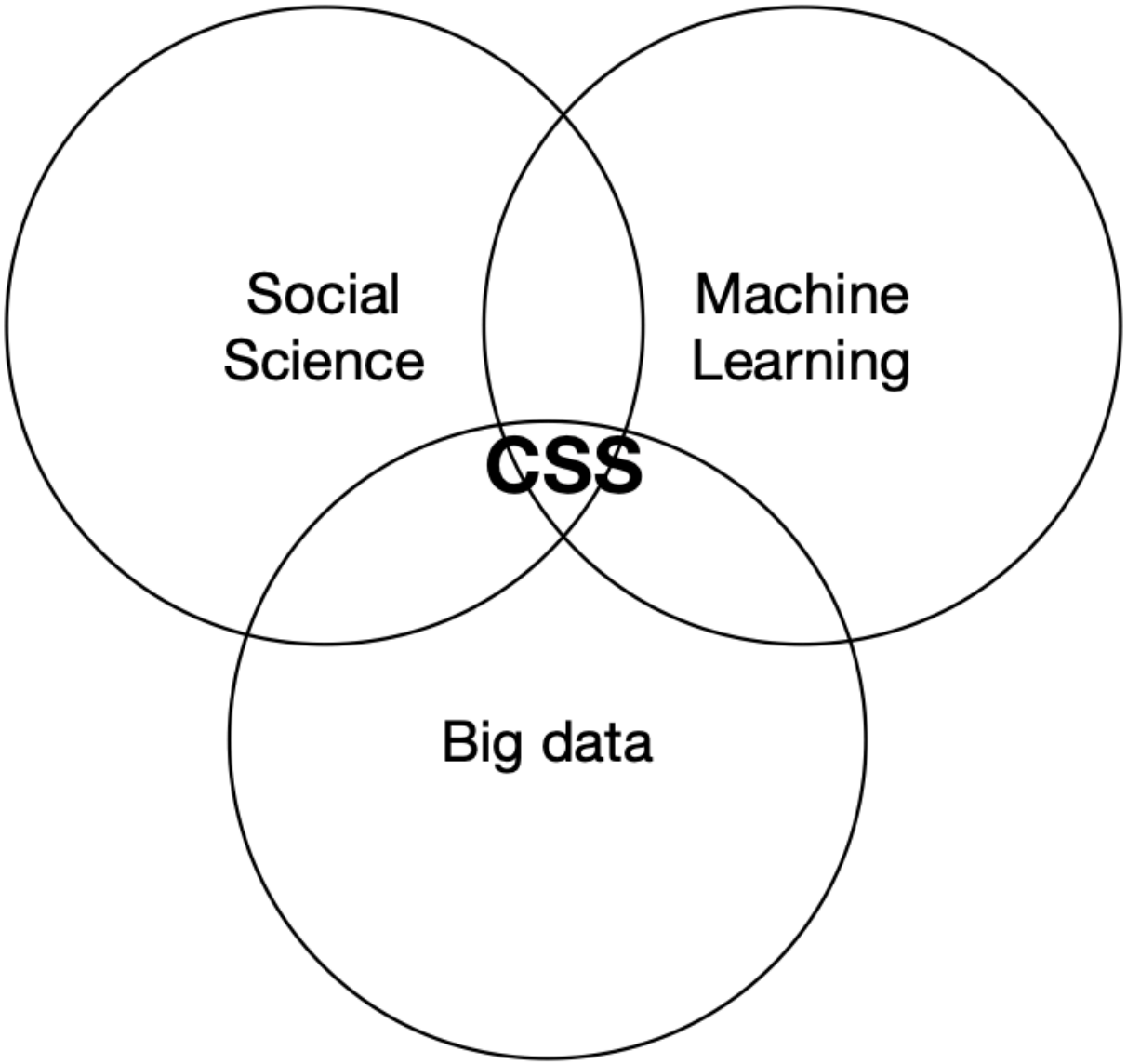
- Computational social science (CSS): bridging social and data science

Computational Social Science (CSS)



Study Goals

1. Describe the opportunities and challenges of computational social science
2. Evaluate computational social science research on social phenomena
3. Practice the essential techniques to analyze social big data, especially text data (covered in Tutorials)
    - Getting data
4. Propose research questions that are suited to be examined by computational methods with big data
5. Write a research article that utilizes the techniques and methods of computational social science to address social science problems, or design a project that use computational social science to address some real-world problems.

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- Office: 2379

Teaching Assistant: Chen, Pei

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Schedule (tentative)

Week	Topic	
1	02-08	Introduction; big data
2	02-15	Prediction; Machine learning
3	02-22	Prediction; Evaluation
4	03-01	Text (I)
5	03-08	Text (II); supervised
6	03-15	Text (III); embedding
7	03-22	Text (IV); unsupervised
8	03-29	Image data
9	04-12	Network; agent-based modeling
10	04-19	Network; strength of ties
11	04-26	Network; causal inference

Grading Components

- 4300 and 5500 will be graded independently

Attendence and participation	10%
Homework assignments	30%
Literature review Report	15%
Final Paper/Project	
Presentation	15%
Write-up	30%

Grouping

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- You can choose to write a research final paper
  - The intended audience for research final paper are other researchers
- Or a project that analyze a "real-world" case.
  - Like building a website that has nice visualization
  - Project should attract layman

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- If there are so many groups, we will possibly shift to poster

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- And allows team work easily (especially if you have lots of codes/data)
- Last, GitHub simplifies sharing data and codes, making research more transparent and useful for the community

So what is it?

Linus Torvalds: creator of Linux

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  - Of course you can push multiple times, if deadline is not passed.

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  - Note: if you directly upload a file on GitHub in your own repo, you are performing `add`, `commit` and `push` operation simultaneously

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- We will cover these in tutorials

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- After our discussions, you can critically evaluate pros and cons of big data

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- They turned Google Books into word counts and released the data

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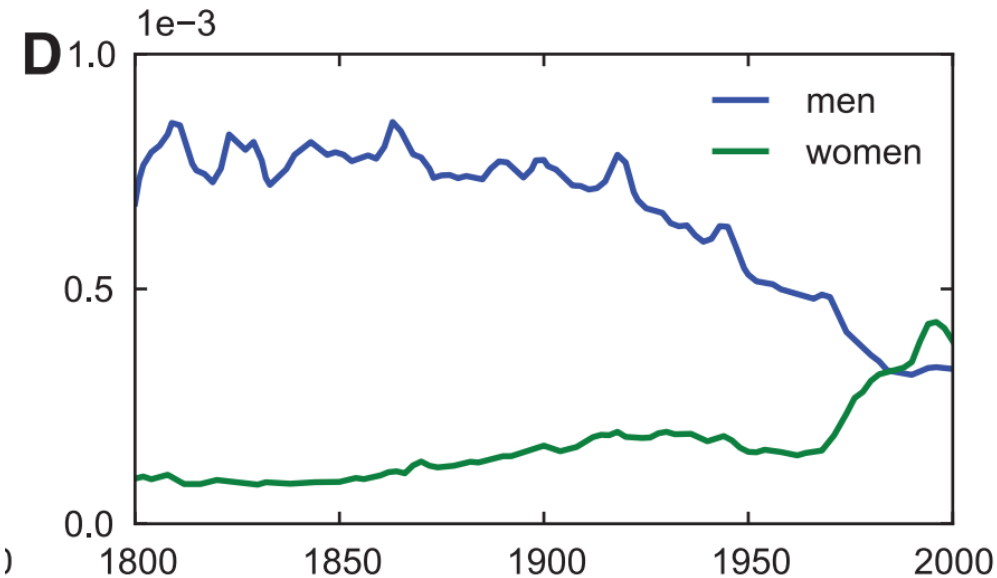

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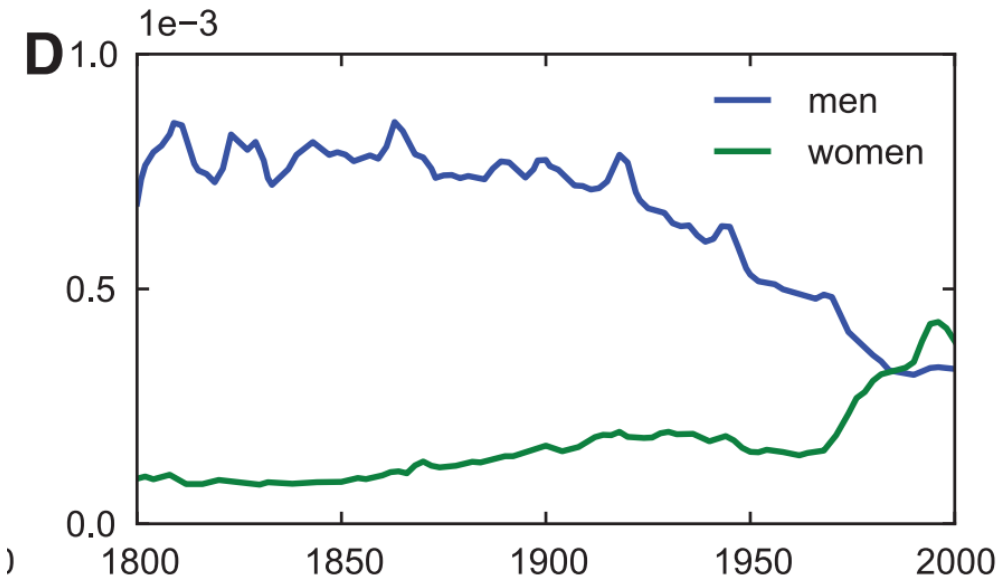

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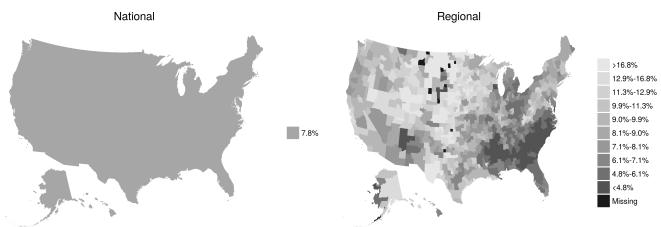

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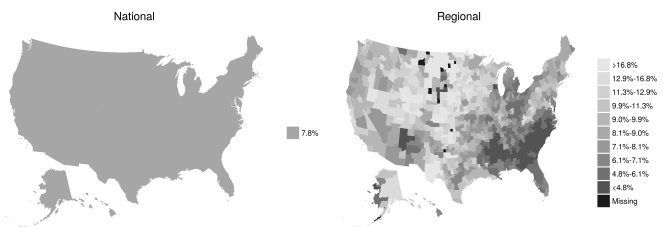

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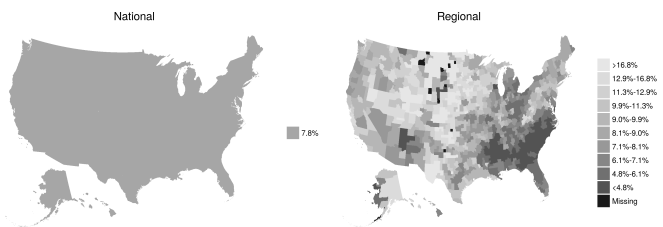

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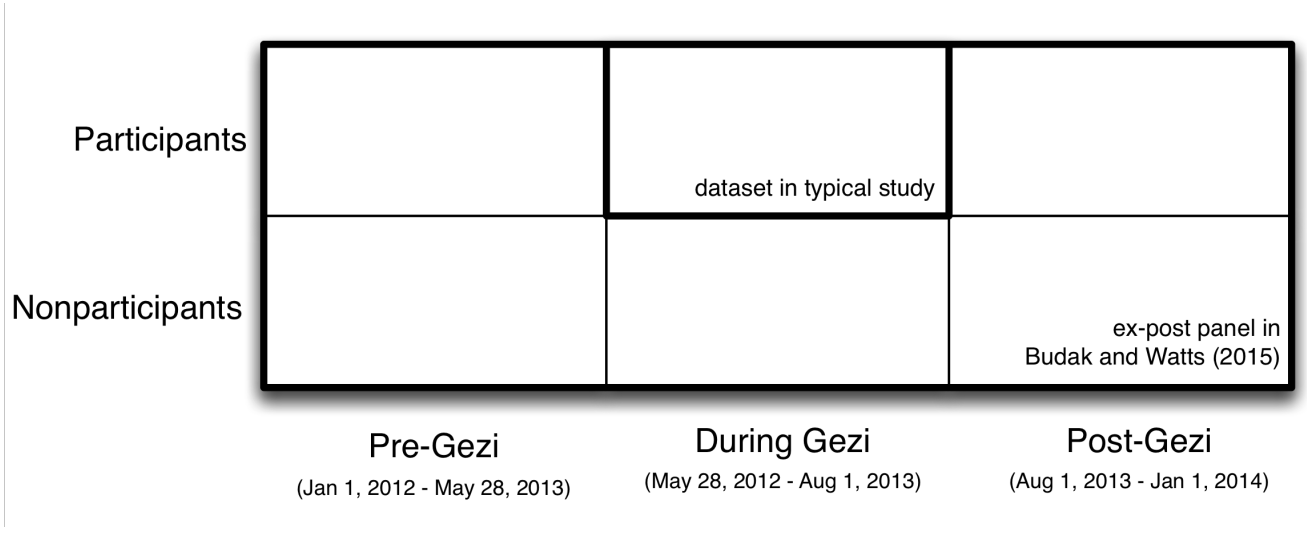
- What kinds of people were more likely to participate in the Gezi protests in 2013?
- Whether participation changed attitudes of participants and nonparticipants differently?
- Hard with survey data:
  - You cannot predict when a protest occur, and thus cannot get pre-protest information
  - It's also not easy to get samples of non-participants

Characteristics 2: Always-On

- Using geolocated posts on Twitter



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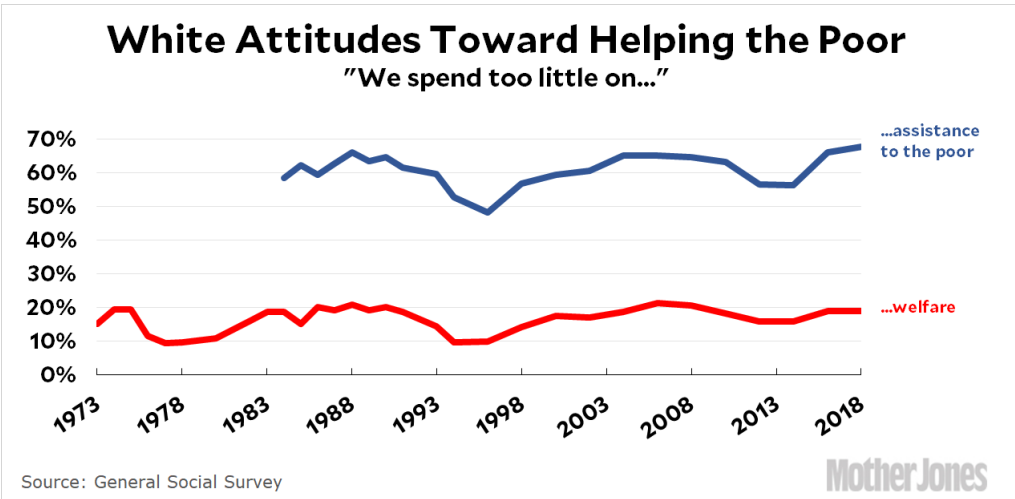

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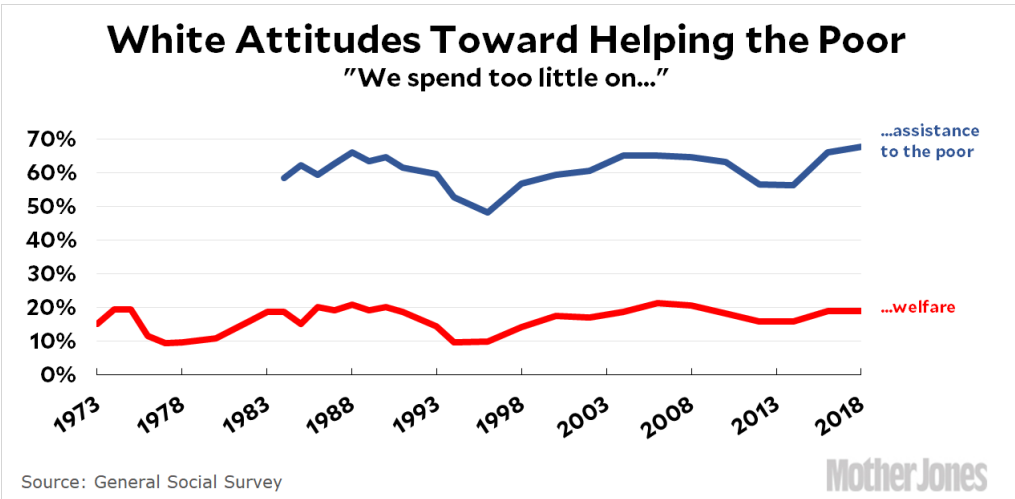

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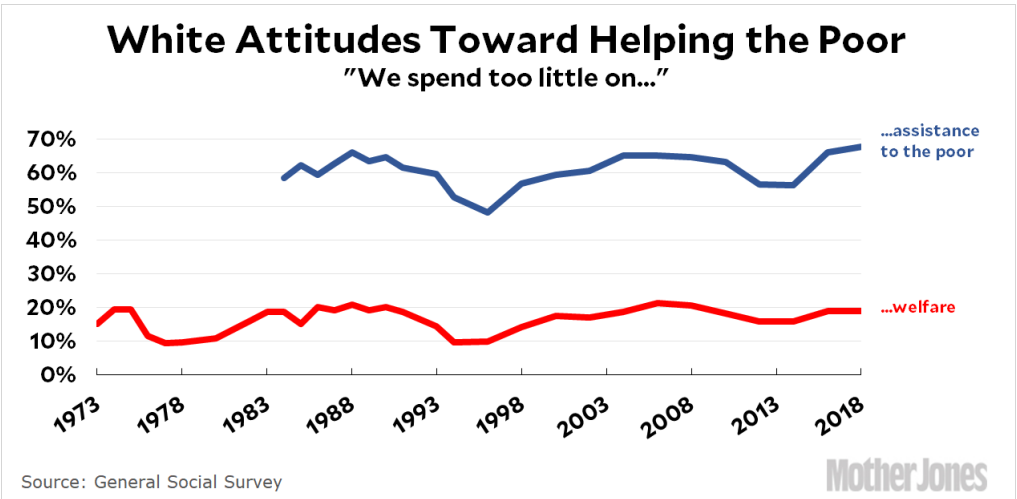

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    - how do you measure intelligence with big data? Not easy

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  - What will be the best data source you can think of?

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- Reason 3: releasing data sometimes lead to privacy concerns

Characteristics 6: Nonrepresentative

- Many big data sources are not representative samples from some well-defined population
- [in class activity] So does it mean big data are not useful? When nonrepresentative data are useful?

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- Now, are what we observe because of Facebook's recommendation or innate tendency for friends of friends to become friends?

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- No! it's because *s* in old books are often written as a long s that looks like f before and around 1800s; so Google Books treat suck as the f-word in 1800.

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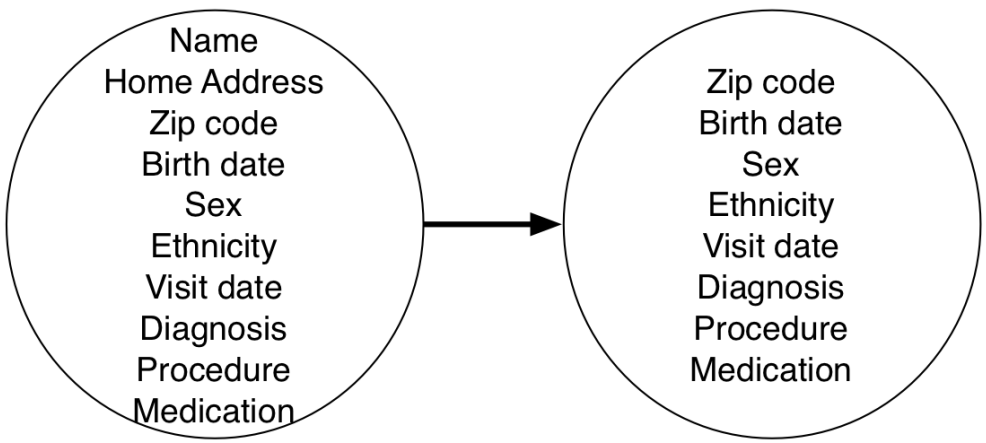

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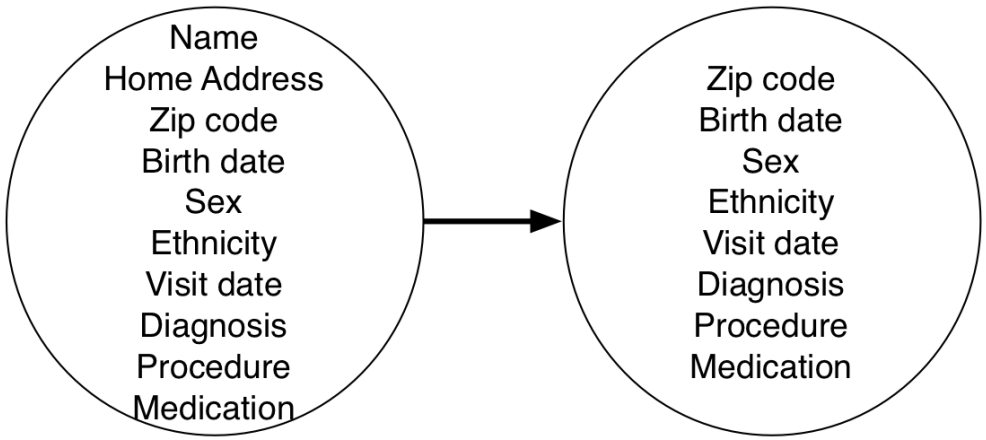

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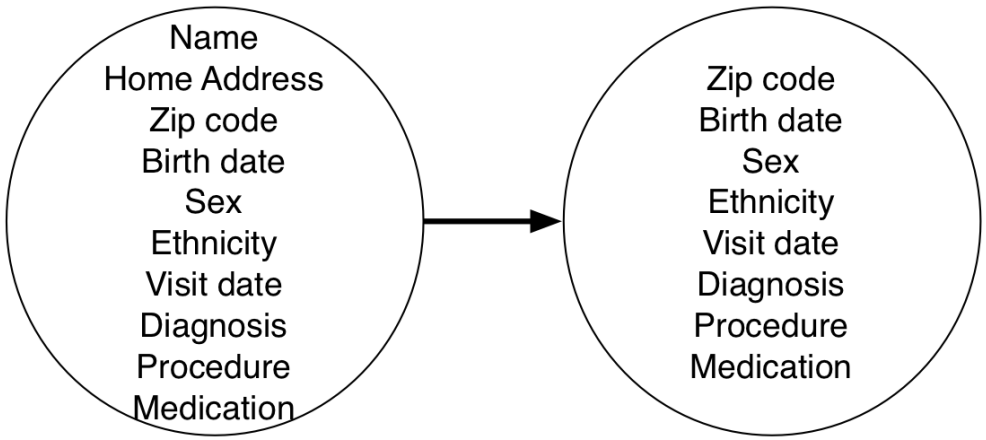

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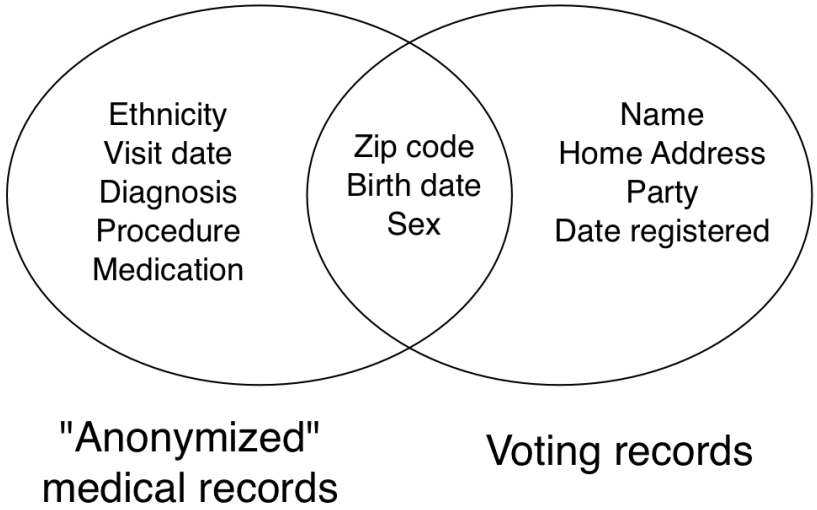

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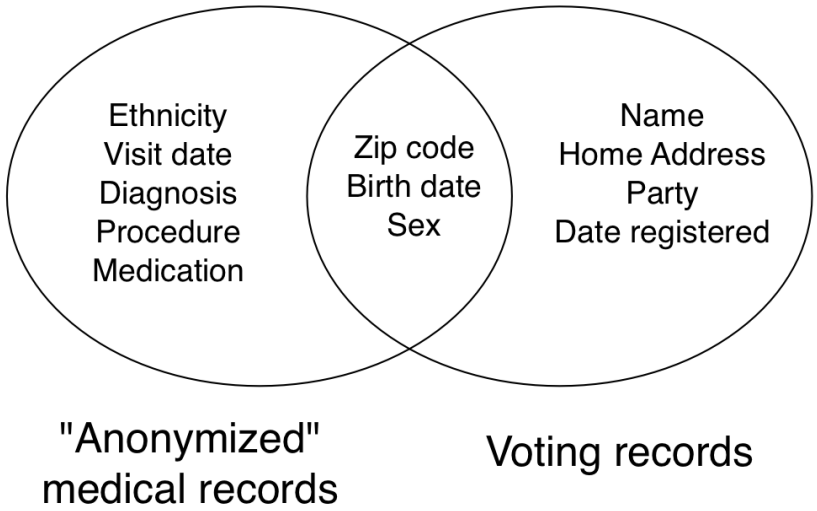

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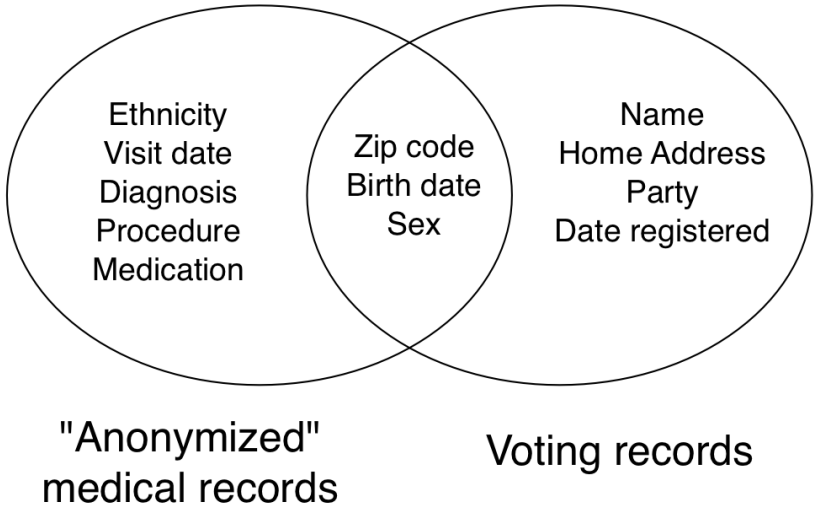

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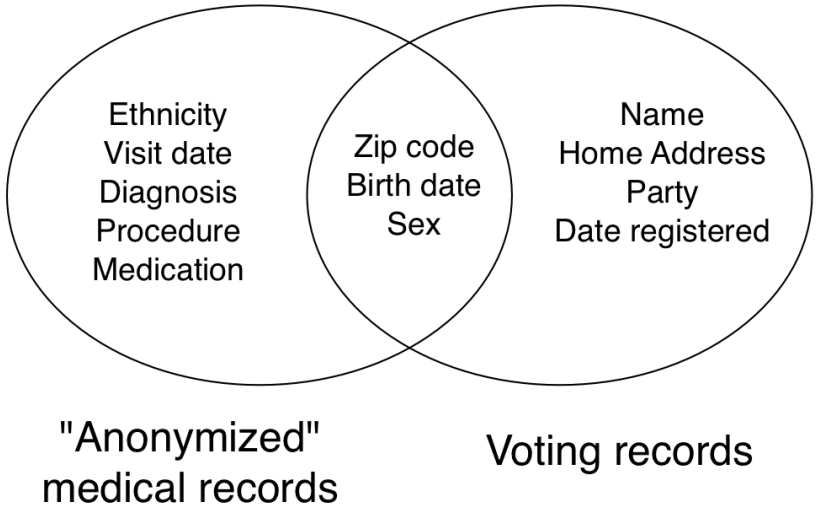

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