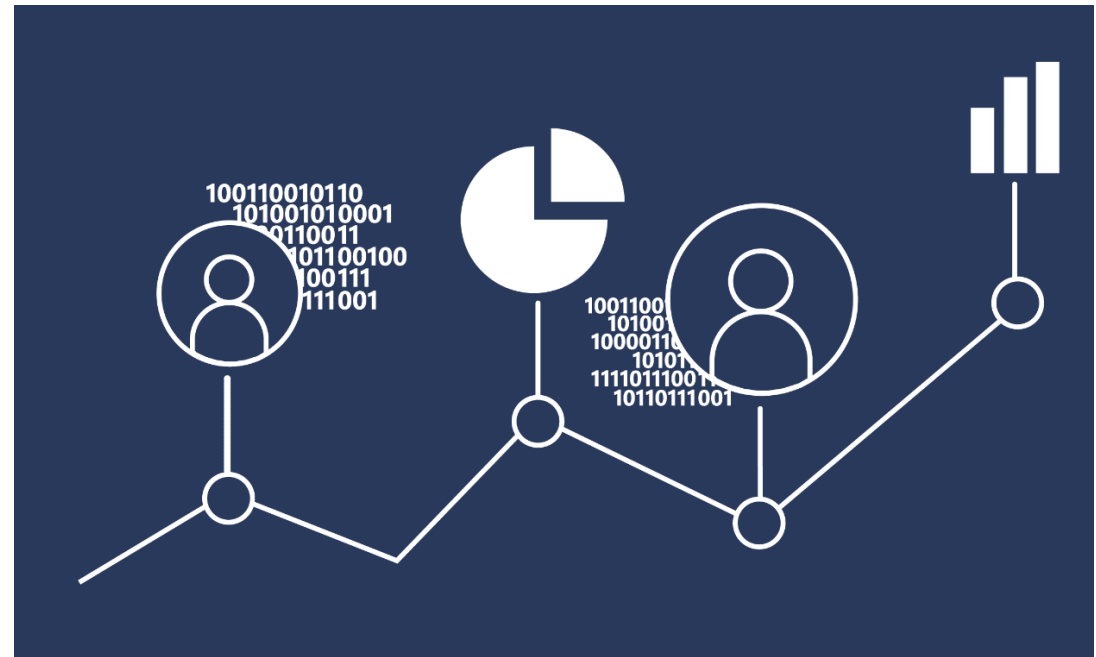


Using DS skills for Social Impact: Computational Social Science

Chau Tong, PhD
School of Journalism
MU IDSI



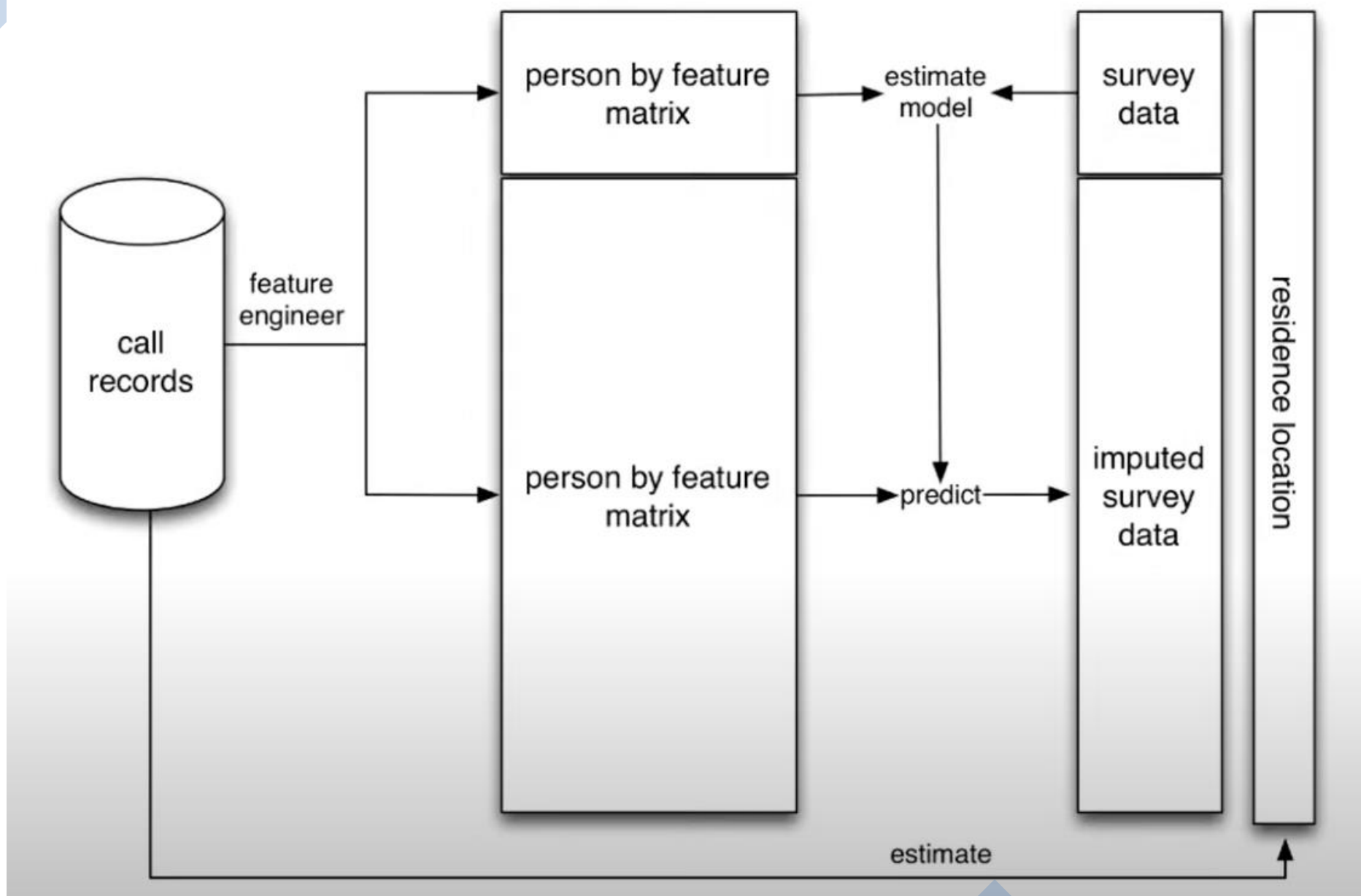


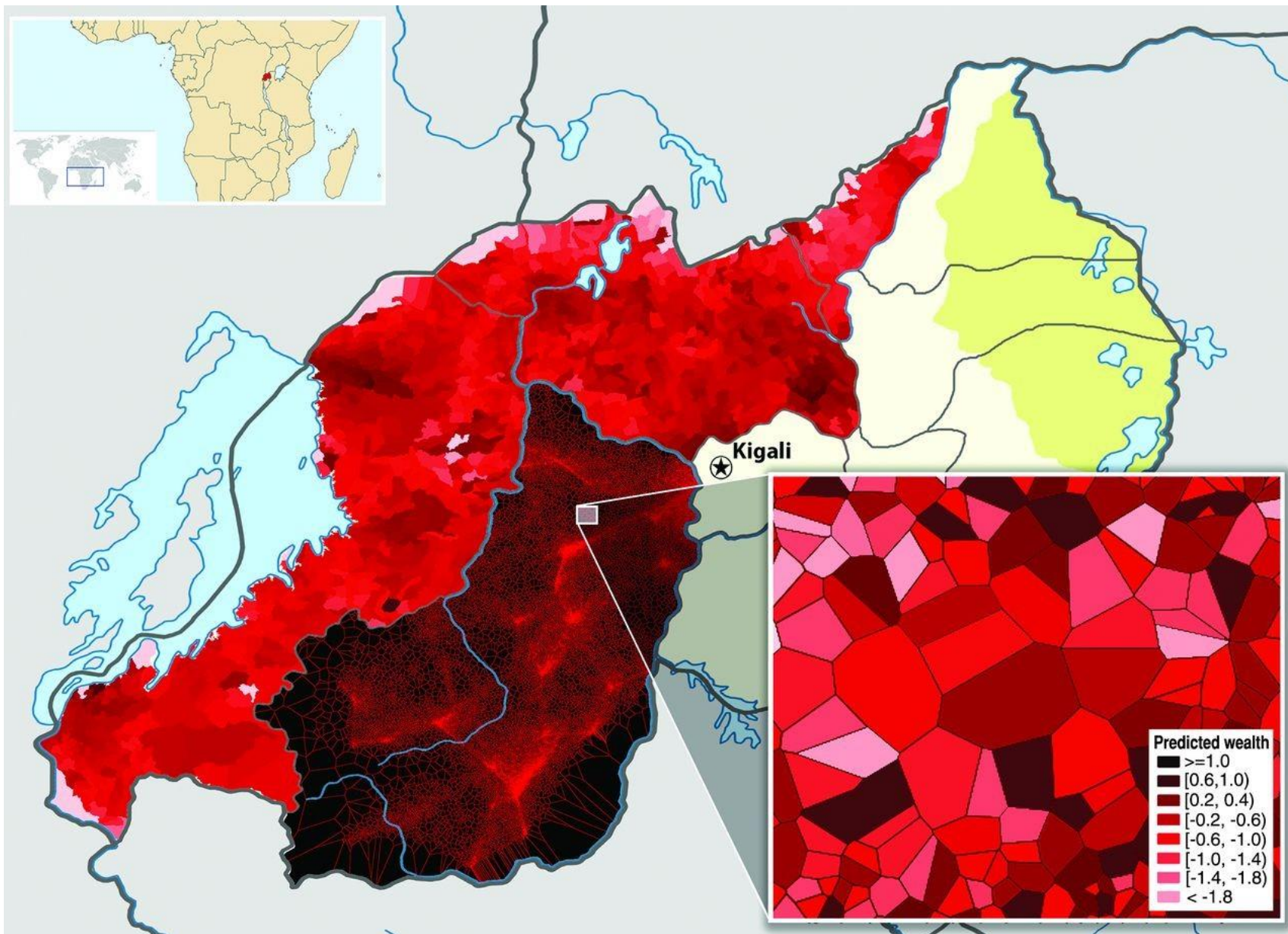
Predicting poverty and wealth from mobile phone metadata

JOSHUA BLUMENSTOCK , GABRIEL CADAMURO, AND ROBERT ON [Authors Info & Affiliations](#)

SCIENCE • 27 Nov 2015 • Vol 350, Issue 6264 • pp. 1073-1076 • [DOI: 10.1126/science.aac4420](#)





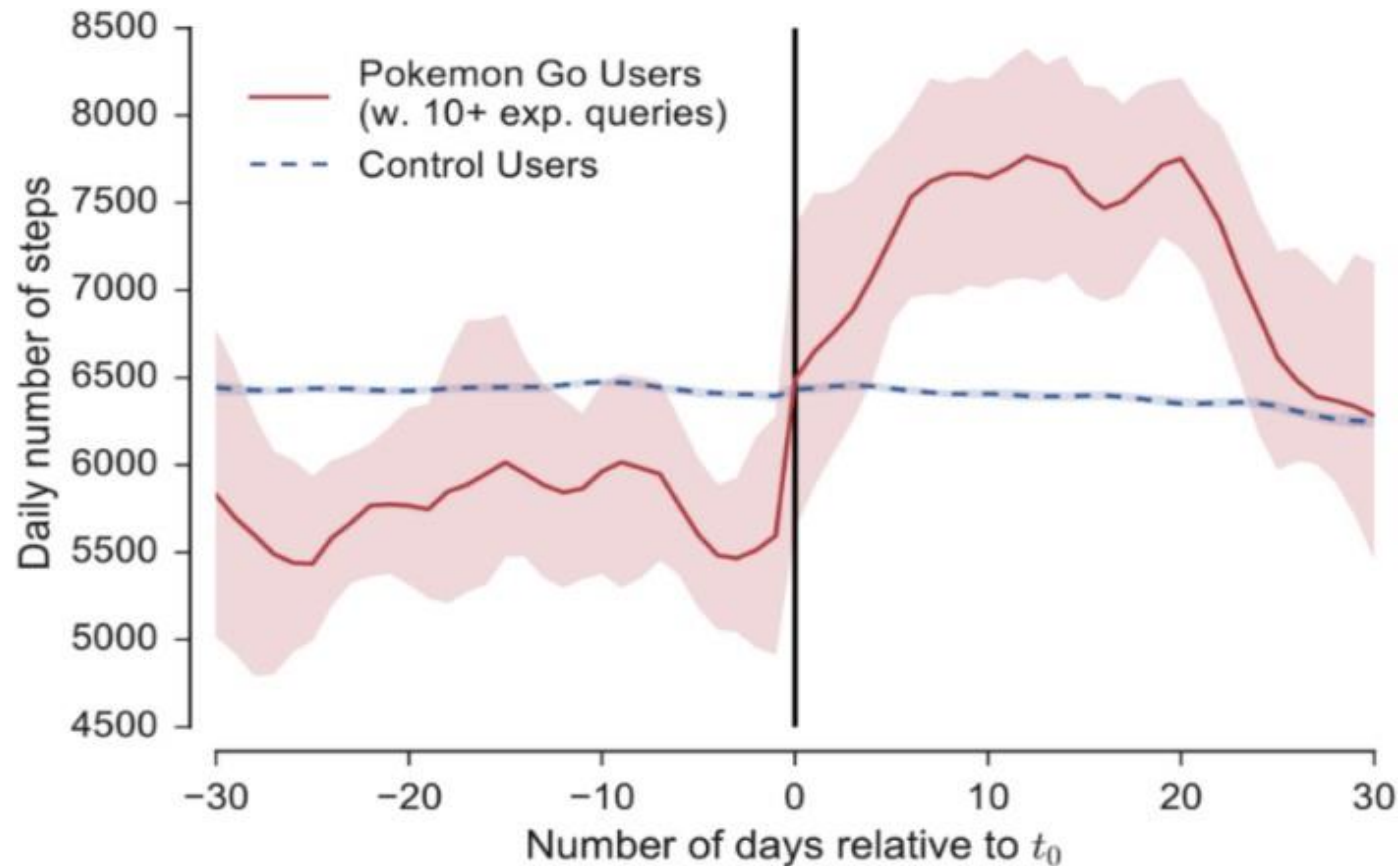


Blumenstock, Joshua, Gabriel Cadamuro, and Robert On. "Predicting poverty and wealth from mobile phone metadata." *Science* 350, no. 6264 (2015): 1073-1076.

Computational Social Science

“A field that leverages the capacity to **collect and analyze data at a scale** that may reveal **patterns of individual and group behaviors**”

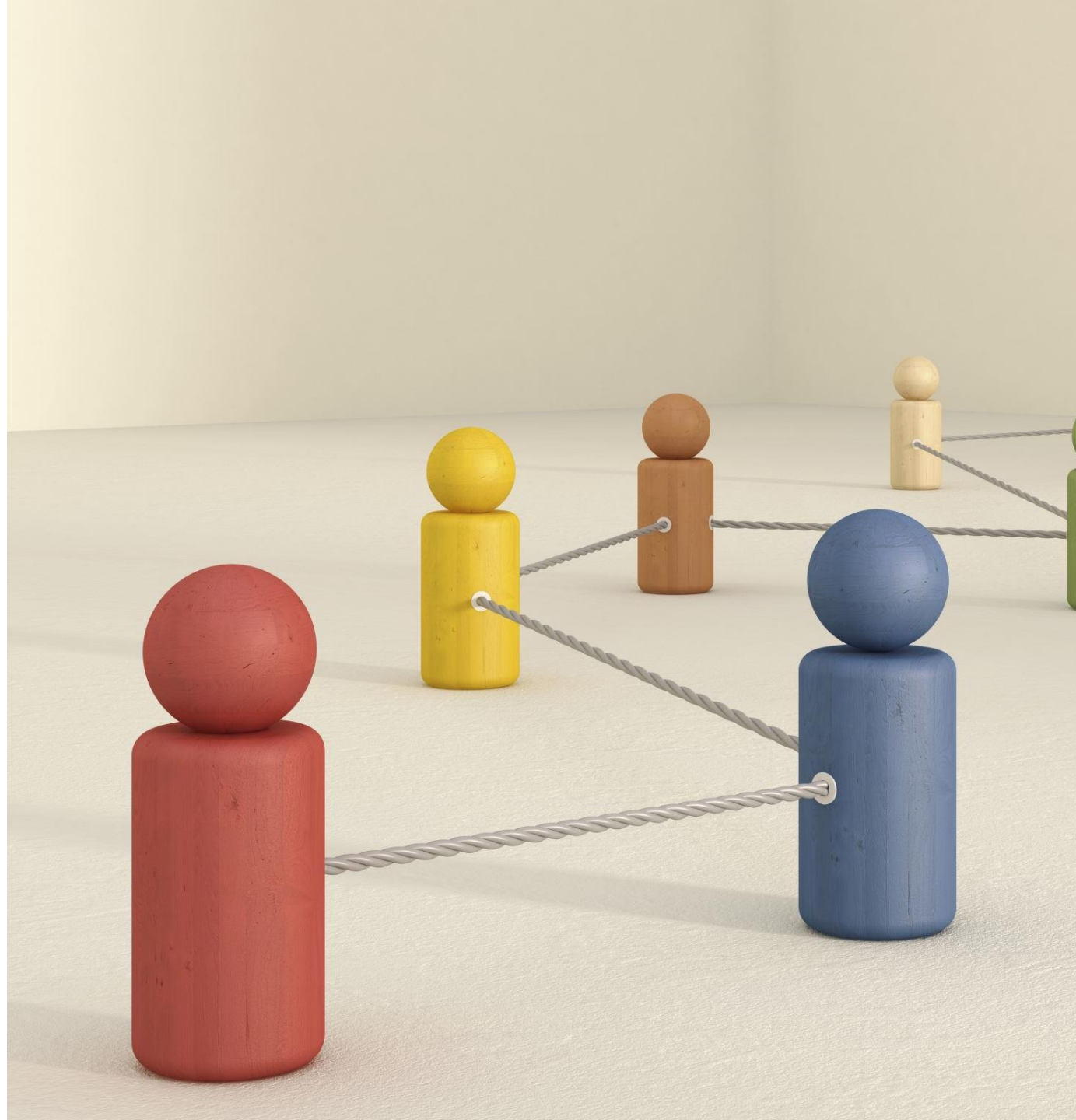
Large-scale tracing of people's movements and physical proximities

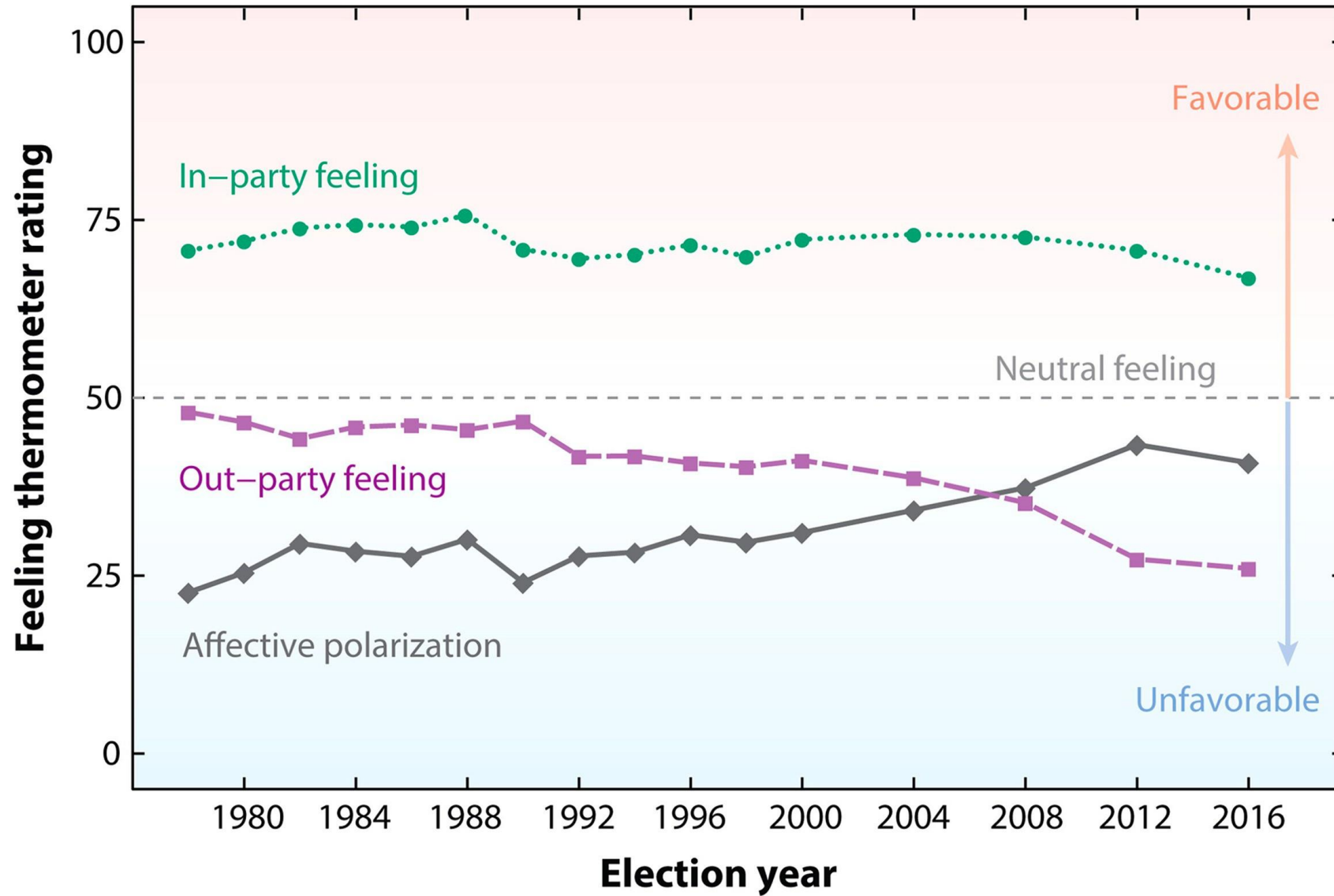


Althoff, Tim, Ryen W. White, and Eric Horvitz.
"Influence of Pokémon Go on physical activity:
study and implications." *Journal of medical Internet
research* 18, no. 12 (2016): e6759.

Online group
interactions and social
relationships are pretty
good indicators of real-
life behaviors

e.g., Political polarization





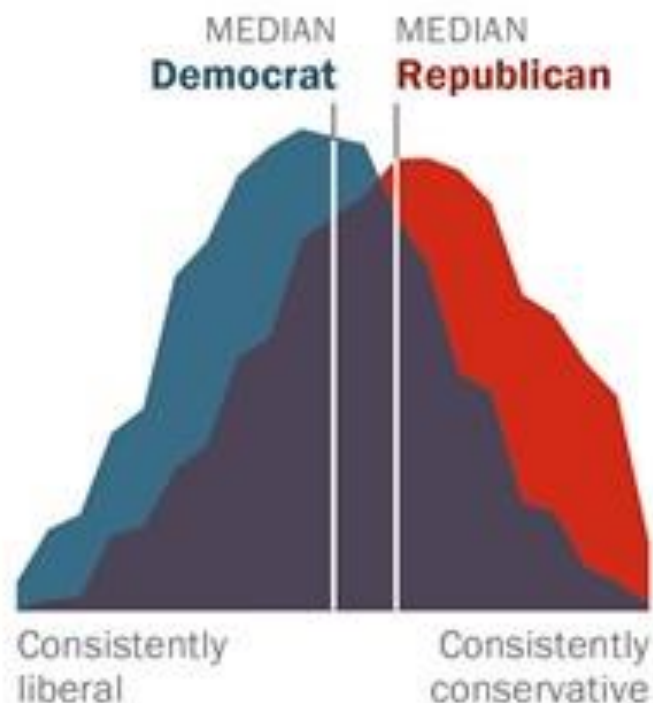
Waldrop, M. Mitchell. "Modeling the power of polarization." Proceedings of the National Academy of Sciences 118, no. 37 (2021): e2114484118.

S. Iyengar, Y. Lelkes, M. Levendusky, N. Malhotra, S. J. Westwood, The origins and consequences of affective polarization in the United States. Annu. Rev. Polit. Sci. 22, 129-146 (2021).

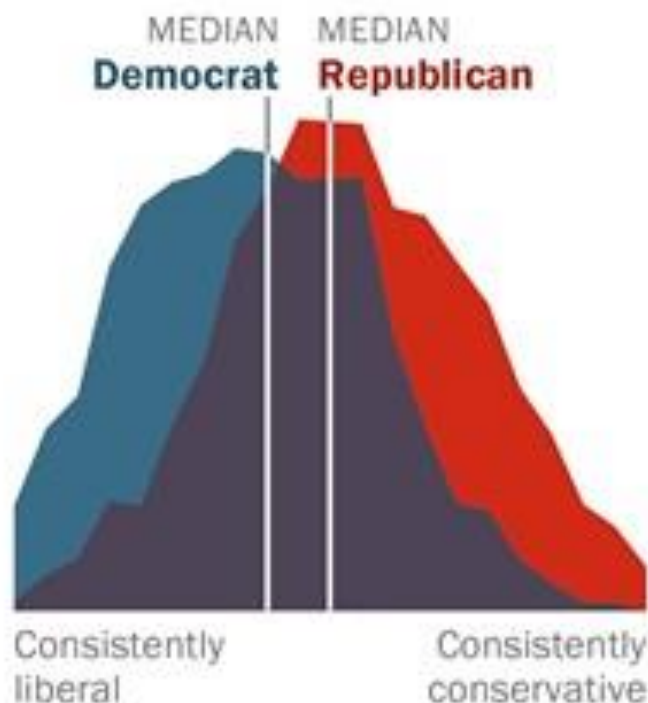
Democrats and Republicans More Ideologically Divided than in the Past

Distribution of Democrats and Republicans on a 10-item scale of political values

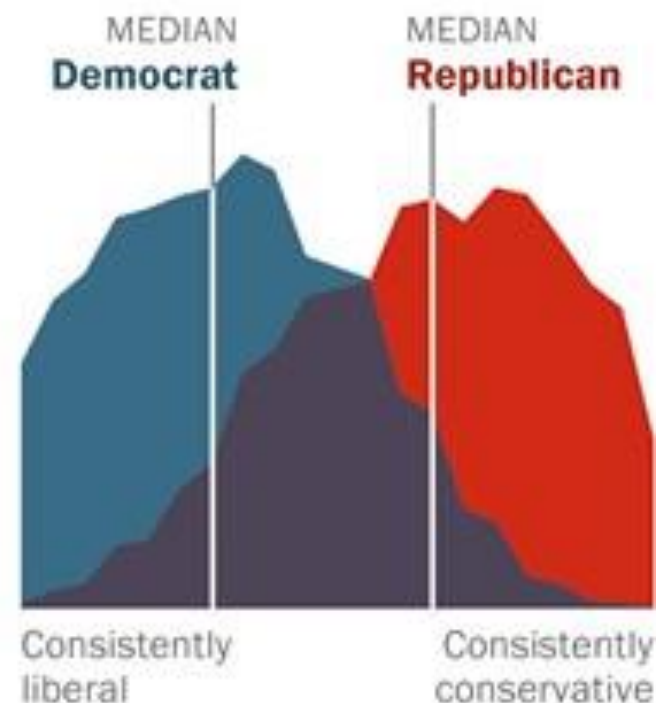
1994



2004



2014

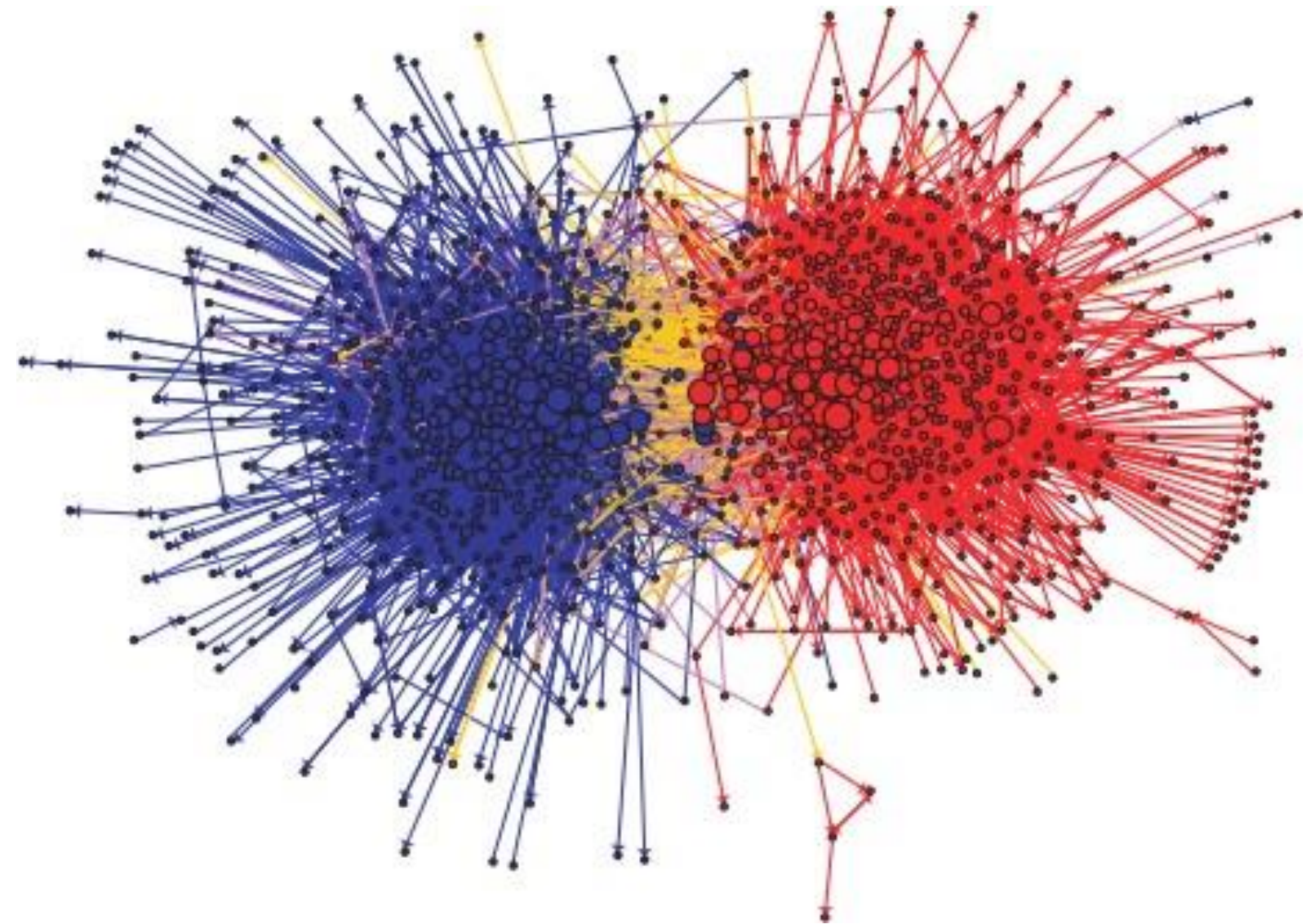


Source: 2014 Political Polarization in the American Public

Notes: Ideological consistency based on a scale of 10 political values questions (see Appendix A). The blue area in this chart represents the ideological distribution of Democrats; the red area of Republicans. The overlap of these two distributions is shaded purple. Republicans include Republican-leaning independents; Democrats include Democratic-leaning independents (see Appendix B).

PEW RESEARCH CENTER

<https://www.pewresearch.org/politics/2017/10/05/1-partisan-divides-over-political-values-widen/>



Community structure of political blogs

Adamic, Lada A., and Natalie Glance. "The political blogosphere and the 2004 US election: divided they blog." In Proceedings of the 3rd international workshop on Link discovery, pp. 36-43. 2005.

Opportunities: Online Interaction Generates Big Data

Volume

Velocity

2 Wikipedia revisions per second

Variety

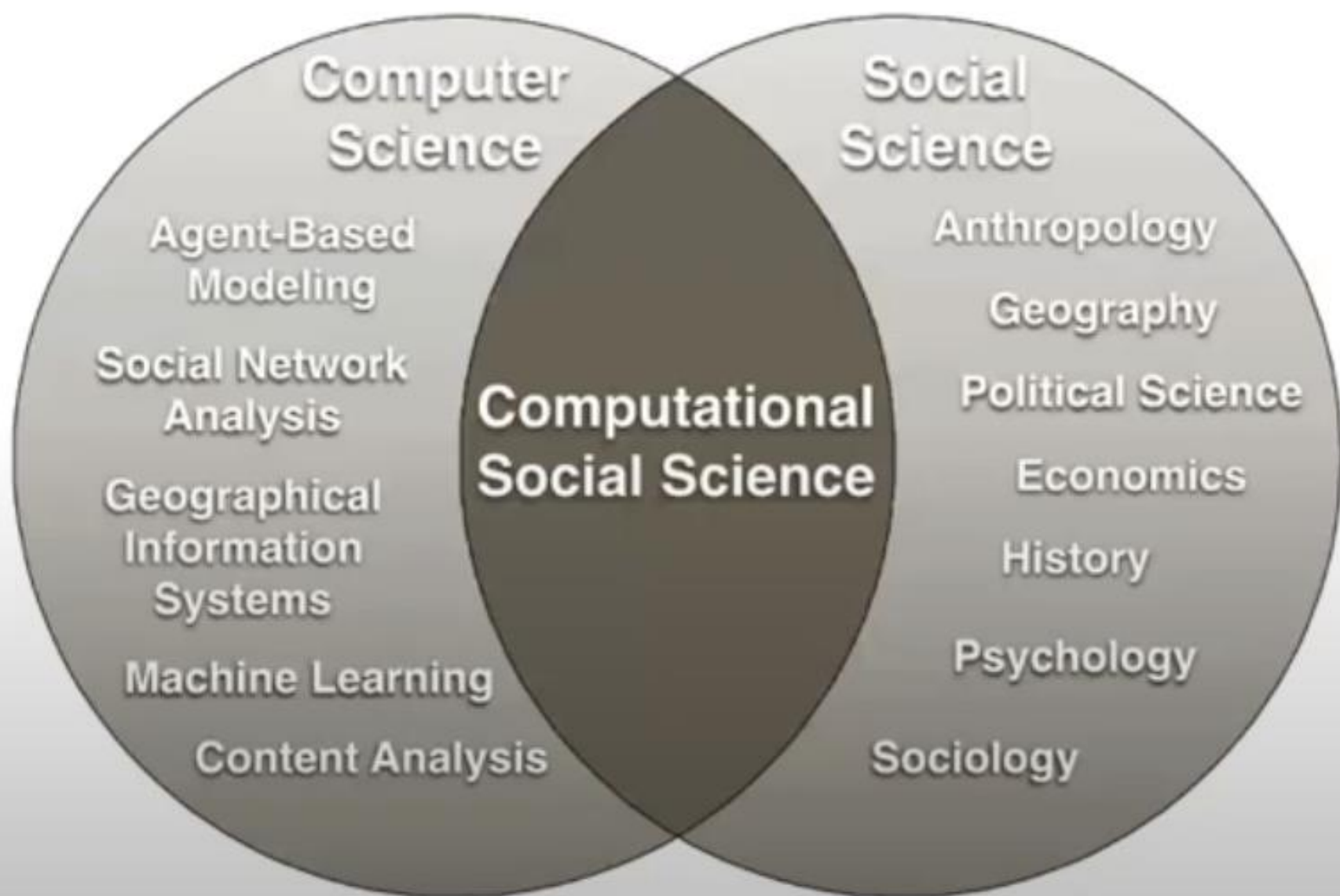
Tweets, articles, slangs, news, etc



Online Interaction in Text Format Grows Exponentially

between human and human
between human and machines





How to create CSS?

Social Scientists $\leftrightarrow$ Data Scientists

.... but might not be easy

Computer science

Study anything

Methods driven

Large found data

Prediction

Social science

Study social things

Question driven

Small designed data

Explanation

Hanna Wallach (2015) reports hearing: “I don’t get it. Why is that research?”

Computational

Data gathering, preparation,
exploration

Data representation and
transformation

Computing with data

Data visualization and
presentation

Data modelling

Computational

Data gathering, preparation, exploration

Data representation and transformation

Computing with data

Data visualization and presentation

Data modelling



Social Science

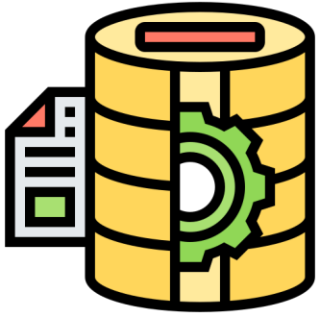
Focuses on Social Science questions, “**people**” questions

Uses (and feeds back into) social science formal theories

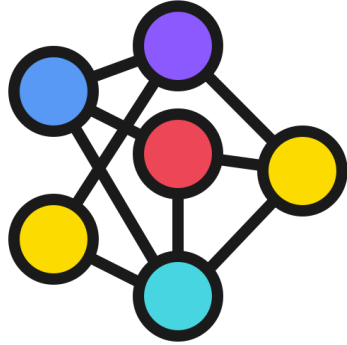
Rigorous methods to quantify and justify

Explain **why** the findings are what they are, and generating testable predictions.

Computational Social Science



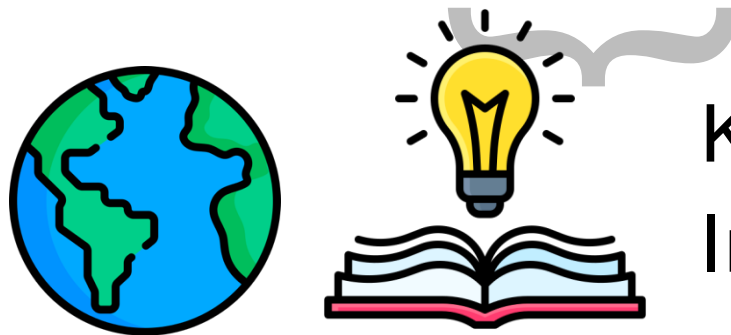
Data



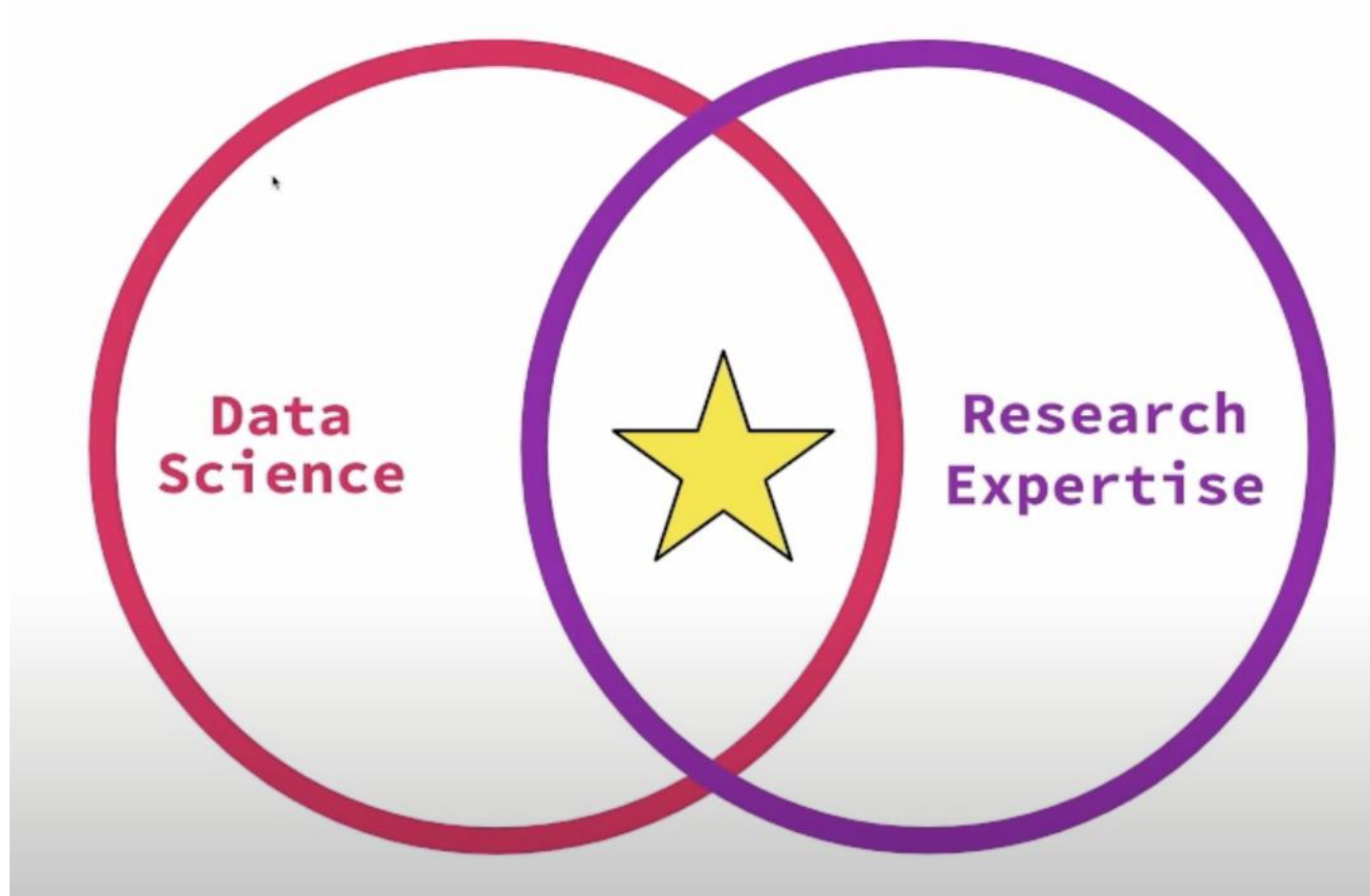
Algorithm



Problem



Knowledge
Impact

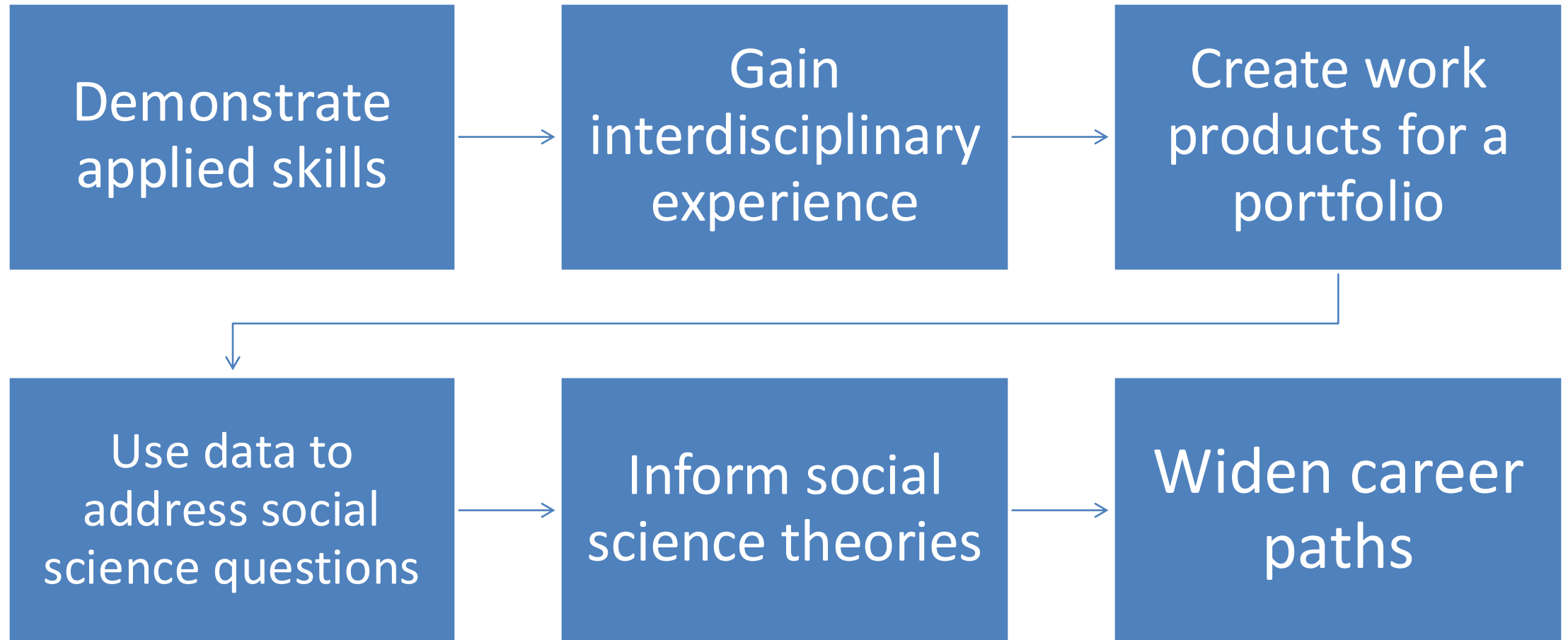


Who might consider CSS methods?

DSA Students and
related majors
looking for social
science applications!

Any student
interested in technical
skills and learning
programming

Why should you be interested in CSS?



Getting a Job in CSS

Academia

(R1, R2,
Liberal arts)

Industry

(Research,
Data Science,
UX)

Non-profits

(Researcher,
Analyst, Data
Scientist)

Government

(Researcher,
Analyst, Data
Scientist)

Careers using CSS

- Computational/Quantitative Social Scientist
- Computational Behavioral Scientist
- Social Science Analyst
- Quantitative Social Science Consultant
- Research Scientist
- Data Scientist
- Quantitative User Experience Researcher
- Experimentation and Analytics Researcher
- Research Data Services Lead
- Research Analytics Consultant

Sample job responsibilities

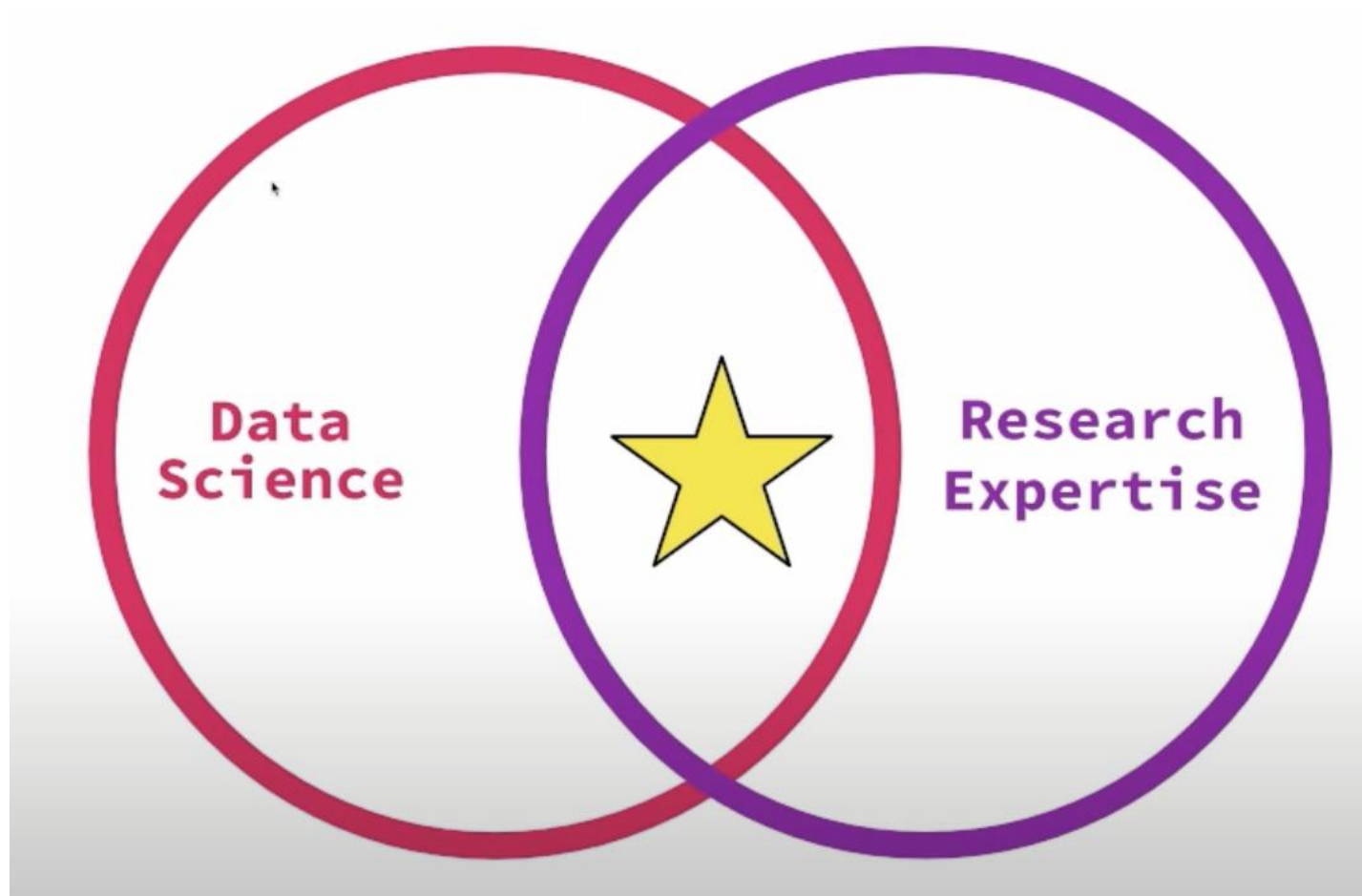
- **Synthesize and translate** complex information for technical and non-technical audiences
- Translate basic findings into actionable ideas
- **Design and develop experiments**
- Generate hypothesis, data-mine, model
- Develop funding proposals
- Develop **customized algorithms** to solve analytical problems with incomplete data sets
- Program and project management

Sample job responsibilities

- Identify patterns and execute insights from rich transactions and people data that inform decision making around people, culture, and leadership
- Generate new and innovative analytics and insights
- Use rigorous logics and methods to solve different problems
- Can see hidden problems beyond what is obvious
- Thoughtfully challenges the status quo
- Think independently to come up with novel solutions



Resources at Mizzou and beyond



**Gain
undergraduate
research
experience**

**Work with
faculty on
research
projects**

**Volunteer/
Internship**



University of Missouri-
Institute for Data
Science & Informatics
(MU-IDSi)



A&S AI and Machine
Learning Group



Computational
Communication &
Technology lab
(Journalism)

Resources

- Open-source book (field of Media/Communication): Computational Analysis of Communication: <https://cssbook.net/>
- Learning materials (general CSS): The Summer Institutes in CSS provide in-person summer workshops and online videos: <https://sicss.io/overview>
- MU-IDSi courses on campus: <https://muidsi.missouri.edu/academic-programs/certificate/>
- Conferences:
 - Computation + Journalism: <https://idi.provost.northeastern.edu/event-directory/the-2024-computation-journalism-symposium/>
 - IC2S2: <https://ic2s2-2024.org/>

Resources

- ICA Computational Methods Division

Communication Channels

Twitter/X: https://twitter.com/ica_cm

Mastodon: https://sciences.social/@ica_cm

Facebook Page: <https://www.facebook.com/icacm2020/>

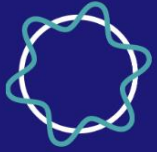
Google Group: https://groups.google.com/g/ica_cm-discussion

The Link: <https://link.icahdq.org/thelinkhome>

The Official Journal: <https://computationalcommunication.org/ccr>

Journal Twitter Account: https://twitter.com/ccr_openjournal

ICA CM Slack for Students and Early Career Scholars (Please contact our SEC Rep. Patrick Schwabl [p.schwabl@lmu.de] for details)



Academic
Data Science
Alliance



~ MENU

A community network for
academic data science
leaders, practitioners, and
educators



Events

Jobs



academicdatascience.org

SEARCH



REMOTE WORK



JOB TYPE



Tenure Track Faculty

Non-Tenure Faculty/Staff

Postdocs

Internships

Temporary Postions

Outside of Academia

Volunteer

Senior Manager, Biomedical Data Science Initiative

UNIVERSITY OF UTAH

The Senior Manager will organize and oversee the Data Exploration and Learning for Precision Health Intelligence (DELPHI) Initiative, which aims to catalyze interdisciplinary data-science driven research to drive innovation in health and medicine.



IC²S²
PHILADELPHIA 2024

ABOUT

10th International Conference on Computational Social Science



JQD:DM
Journal of Quantitative Description:
Digital Media





Thanks for listening!



Interested in the CCT lab? Email me: ctong@missouri.edu