

School Funding in the Spotlight

Data Science for Educational Equity

UDS, Sept 2024

Todays Agenda

- Introductions
- A Critical Perspective
- A Case Study
- Funding disparities
- Our data
- Looking ahead

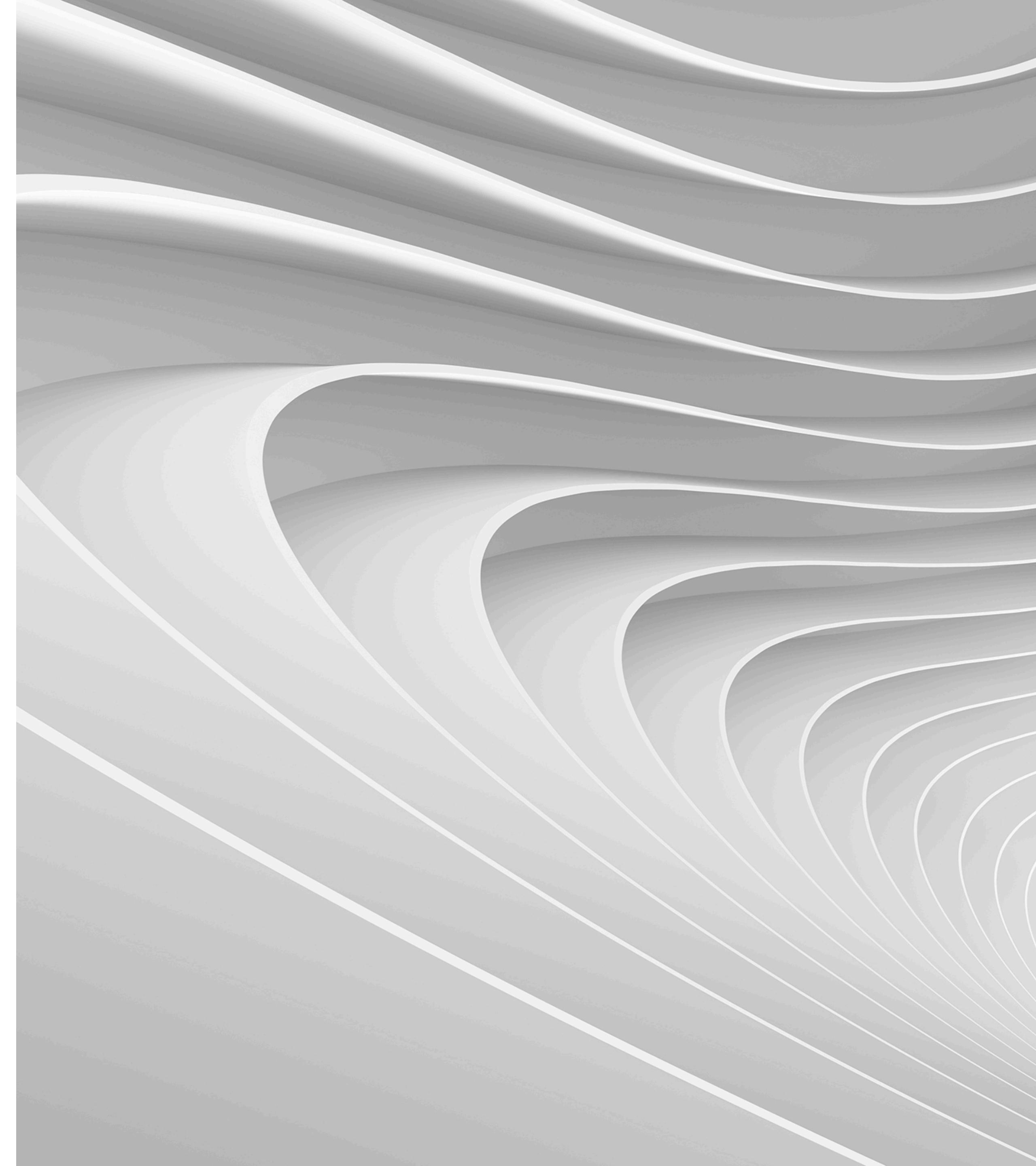
Introductions

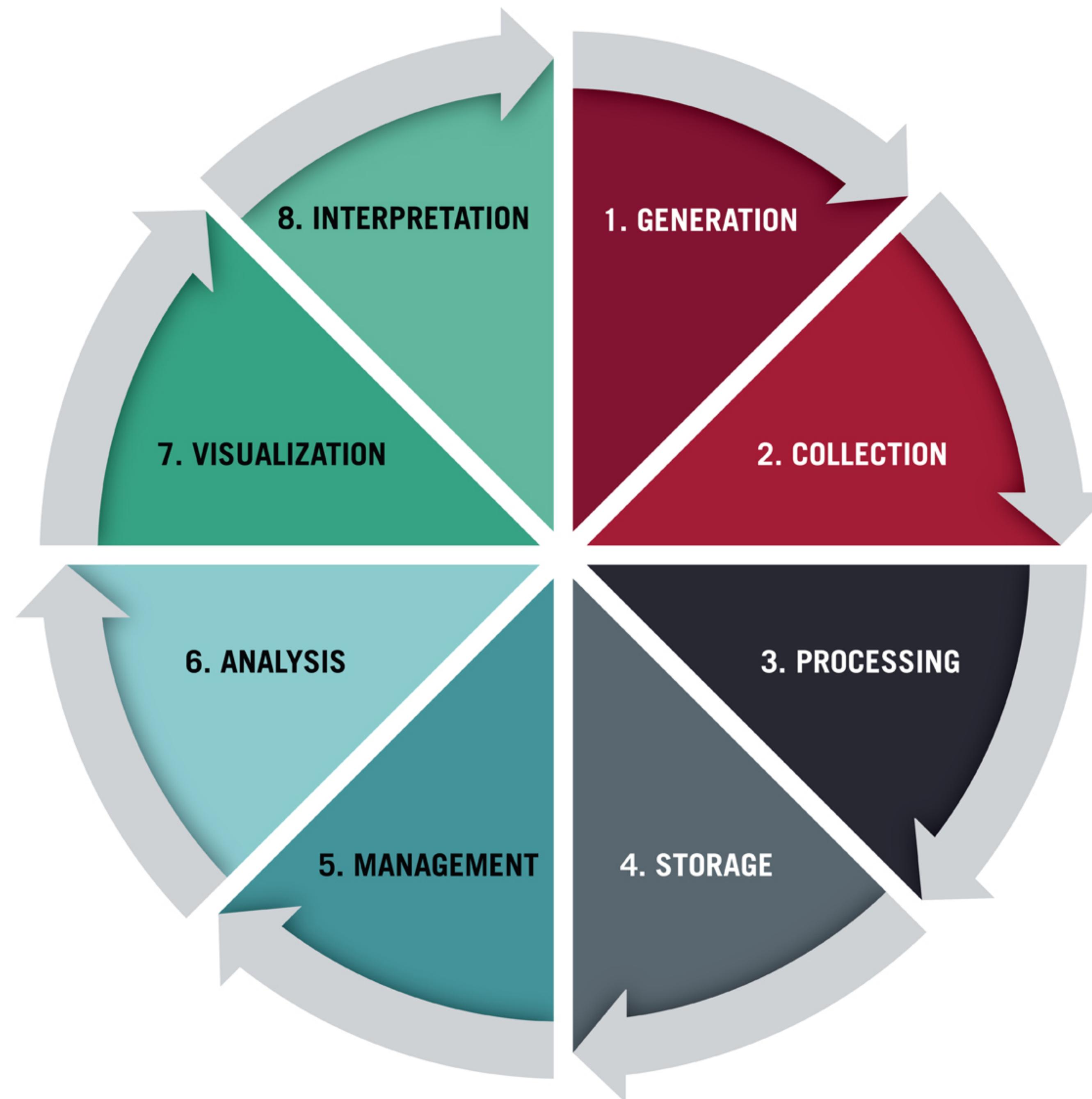
Let's get to know each other!

- Share the following:
 - Name
 - What program are you in? (And level, if comfortable saying it)
 - Favorite hobby + Movie + Series + Podcast

Is it important to be critical about your work with data?

Why or why not?





bias: noun, bi· as 'bī-əs

- a: an inclination of **temperament** or outlook especially: a personal and sometimes unreasoned judgment : **PREJUDICE**
- b: an instance of such prejudice
- c: **BENT, TENDENCY**
- d: (1) deviation of the expected value of a statistical estimate from the quantity it estimates
(2) systematic error introduced into sampling or testing by selecting or encouraging one outcome or answer over others

... so....can data be biased?

Figure 1. Data Life Cycle Stages; <https://online.hbs.edu/blog/post/data-life-cycle>

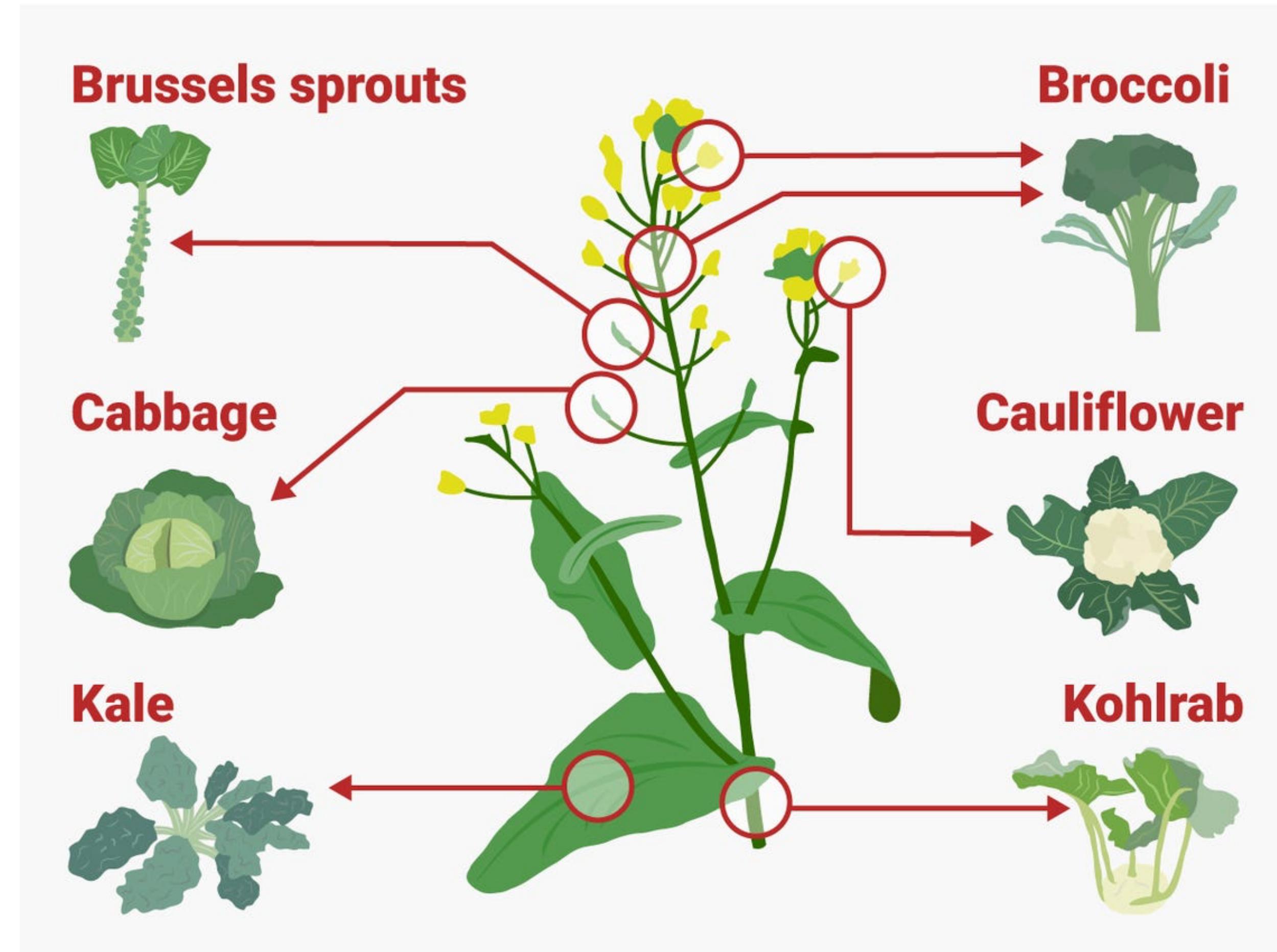
“Assumptions inevitably find their way into the data and color the conclusions drawn from it. Moreover, *they reflect the beliefs of those who collect the data*.”

- Nick Barrowman, 2018

“Data doesn’t speak for itself — *it echoes its collectors*”

-Lena Groeger, 2017

Data is never raw



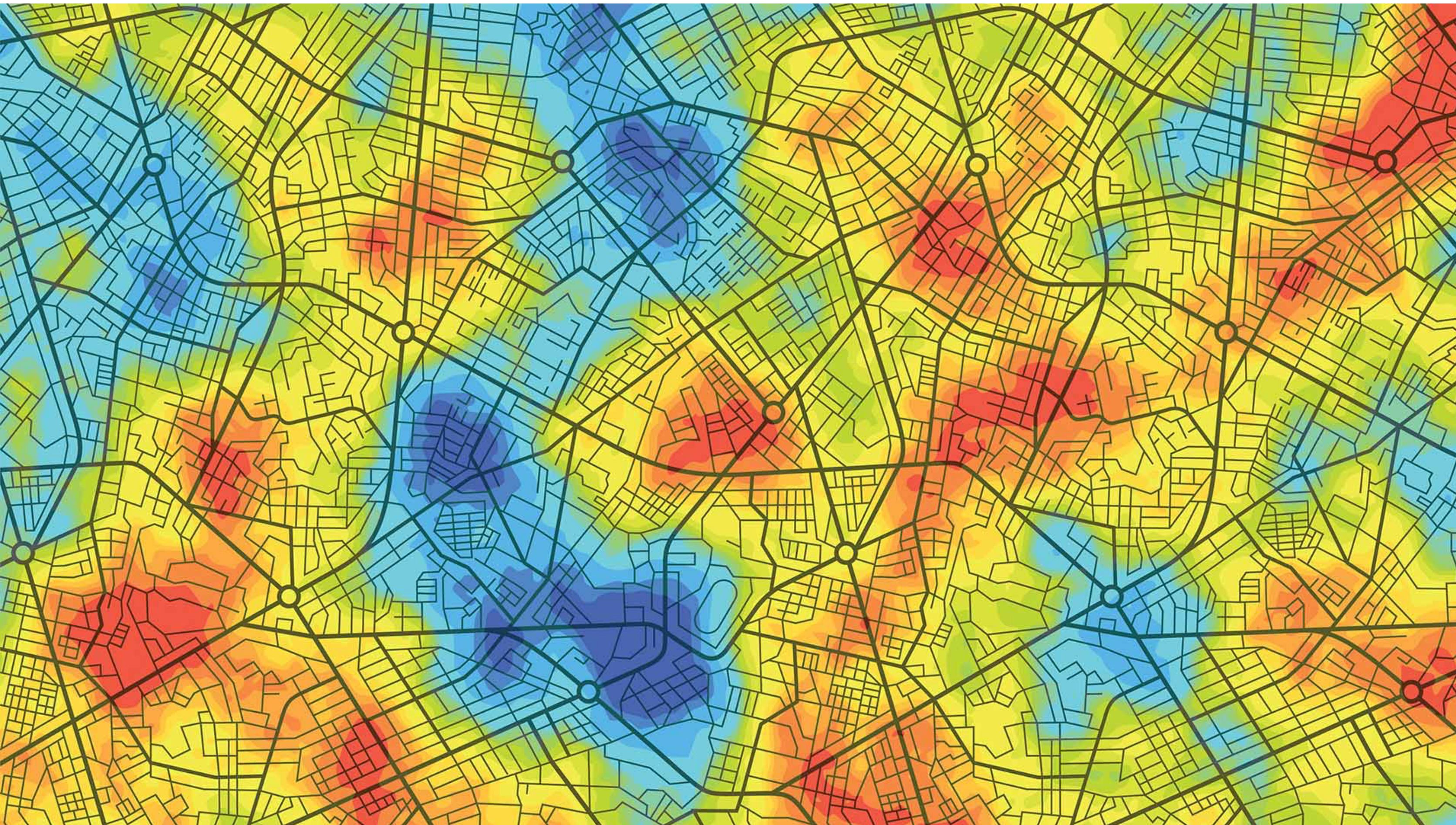
“Raw data is both an oxymoron and a bad idea; to the contrary, data should be cooked with care.”
-Dr. Geoffrey Bowker, 2006

Project Insight: A case study



Project Insight PredPol: A case study

“Models are opinions embedded in mathematics.” - Dr. Cathy O’Neil, 2016



PredPol: A case study

Using historical crime data to predict future crimes

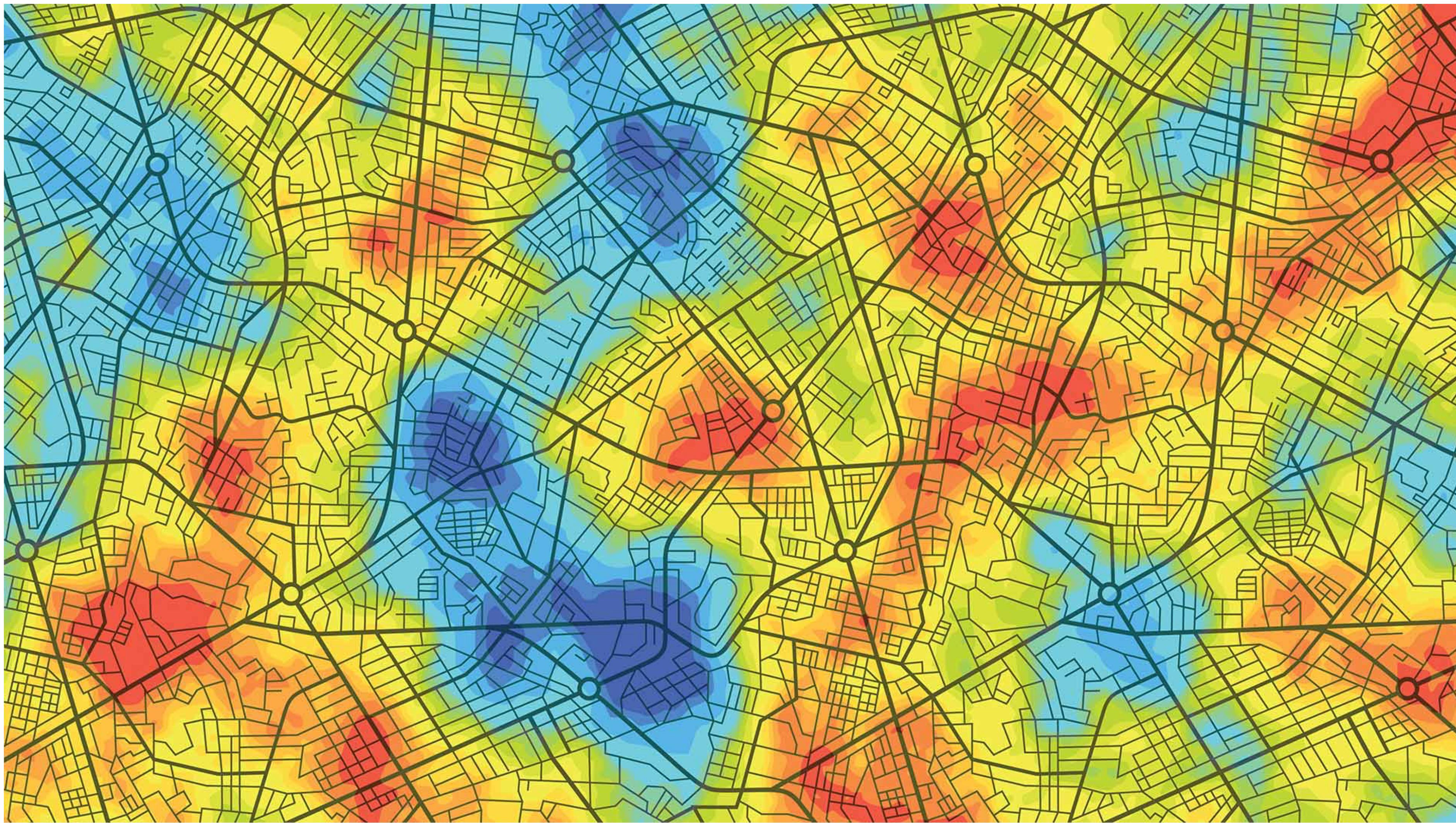
Inputs

- Time of previous crimes
- Location of previous times
- Type of crime

Outputs

- Pattern identification
- Generating predictions
- Targeting resources

PredPol: A case study



PredPol: A case study

What could possibly go wrong?

- Unjust feedback loops
- Reinforcement of existing biases
- Selective Crime Targeting
- Lack of Transparency and Accountability
- Worsening of Community-Police Relations

K-12 funding in the US

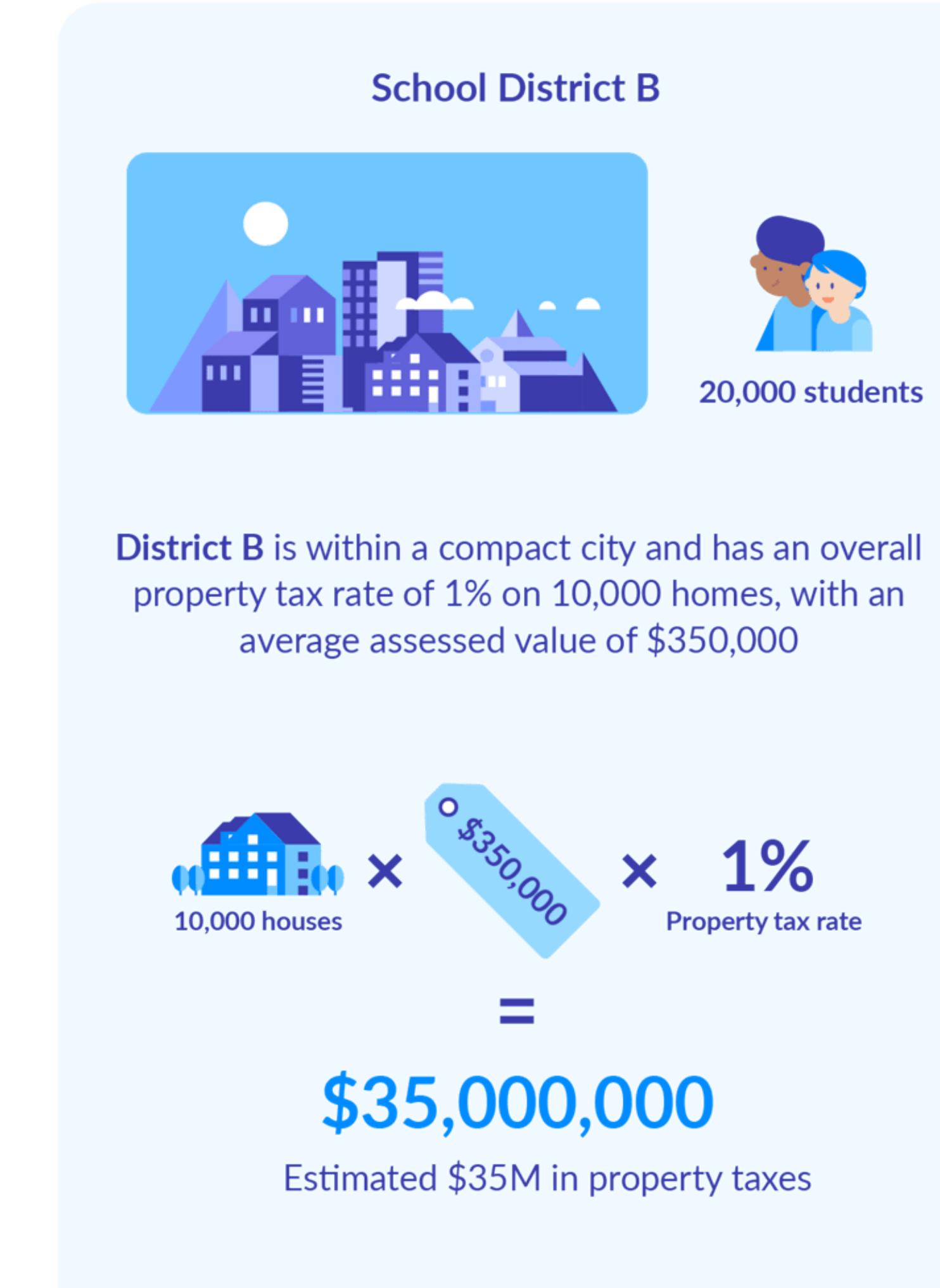
A quick intro

Congress has given all States the liberty to choose how they fund their education systems:

- Each state creates a funding formula (51 formulas counting D.C.)
- Federal, state, and local taxes are used
 - *Majority of local taxes come from property taxes

K-12 funding in the US

A quick intro



K-12 funding in the US

What does this look like?



K-12 funding in the US

Our Data

- Data sources:
 - National Center for Education Statistics
 - US Census
 - *School Finance Indicators Database*
 - *District Cost Database*
 - *State Indicators Database*

Some pathways

“Your mission, should you choose to accept it...”

Funding Disparities Analysis:

- Objective: Analyze the disparities between actual spending per pupil (ppcstot) and the required spending per pupil (predcost), and identify the districts with the largest funding gaps (fundinggap).
- Methods: Statistical analysis, clustering, regression analysis.
- Outcome: Identification of districts with significant underfunding, and patterns in underfunding across states or demographic groups.

Some pathways

“Your mission, should you choose to accept it...”

Effect of Funding on Academic Outcomes:

- Objective: Examine the relationship between funding gaps (`fundinggap`) and academic performance gaps (`outcomegap`).
- Methods: Correlation analysis, regression modeling.
- Outcome: Insights into how disparities in funding relate to disparities in academic performance.

Some pathways

“Your mission, should you choose to accept it...”

Demographic Influences on Funding and Outcomes:

- Objective: Investigate how demographic factors (e.g., poverty rate, percent special education students, percent English language learners, and racial/ethnic composition) affect funding and academic outcomes.
- Methods: Multivariate regression, ANOVA, clustering
- Outcome: Understanding of which demographic factors are most strongly associated with funding and performance disparities.

Some pathways

“Your mission, should you choose to accept it...”

Performance of Diverse Student Populations:

- Objective: Investigate the academic performance gaps (average test scores) across districts with varying racial/ethnic compositions.
- Methods: Comparative analysis, regression analysis.
- Outcome: Understanding how racial/ethnic diversity correlates with academic performance, pointing out how these districts can receive better support

How do you decide?

- For our next meeting on **Sept 27, bring at least two articles or book chapters** that can serve as references to the general problem we are tackling.
 - Explore the problem a bit deeper and get ideas that can help you choose what variables to explore in your analysis of the problem.
 - Start building a shared repository that gives the project a solid foundation for when you do your final presentation.
 - Some example keywords: “District Cost Database”, “school funding”, “k-12 funding”, “school funding equity”, “educational equity”, etc.