CompSci 116: Lecture 13: Bias

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The Data Science Pipeline

1. Data Wrangling
   - Parsing, scraping, and formatting data

2. Data Analysis
   - Statistics, Prediction, etc.

3. Data Visualization
   - Selection

1. Preparing to run a Model

2. Running the model

3. Communicating the Resul;ts

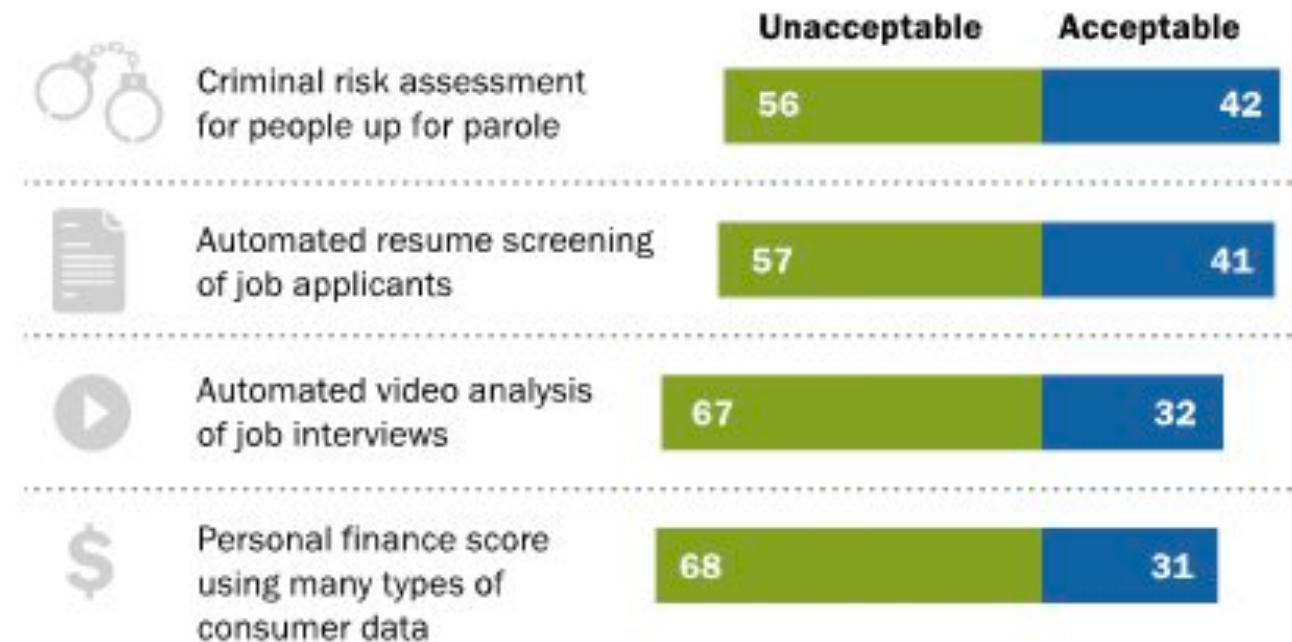# Collaborating with your partners

- Using a distributed version control system like Git

- Use a shared directory
  - Go to https://jupyterhub.cs.duke.edu
  - Look for a directory compsci116-s19-# where # is your group number
  - Warning: A Jupyter notebook is not a Google Doc. Only one person should edit at a time

- Now:
  - Go upload some data and a notebook

Using Data Science

- What's an algorithm?

- What are the advantages?
  - Efficient
  - Objective
  - Expanding access

- What are the risks?
  1. Data used as input
  2. The algorithm itself

Majorities of Americans find it unacceptable to use algorithms to make decisions with real-world consequences for humans

% of U.S. adults who say the following examples of algorithmic decision-making are ...

	Unacceptable	Acceptable
Criminal risk assessment for people up for parole	56	42
Automated resume screening of job applicants	57	41
Automated video analysis of job interviews	67	32
Personal finance score using many types of consumer data	68	31

Note: Respondents who did not give an answer are not shown.
Source: Survey of U.S. adults conducted May 29-June 11, 2018.
"Public Attitudes Toward Computer Algorithms"

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Challenge 1: Inputs to an Algorithm

- Consider trying to generate fastest route to a destination (e.g., Google Maps). Problems include:
- Poorly selected data

- Incomplete, incorrect, or outdated data

- Selection Bias

- Unintentional perpetuation and *promotion* of historical biases

Resumé screening

Amazon scraps secret AI recruiting tool that showed bias against women
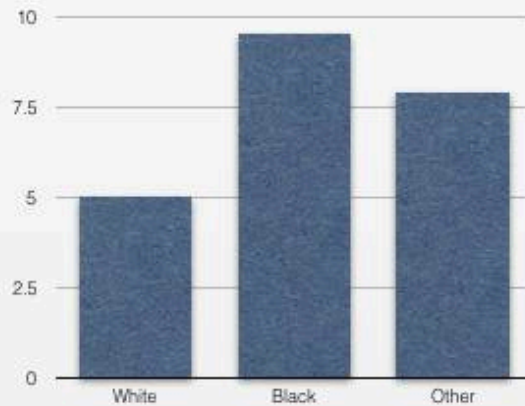
Jeffrey Dastin   8 MIN READ

SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.
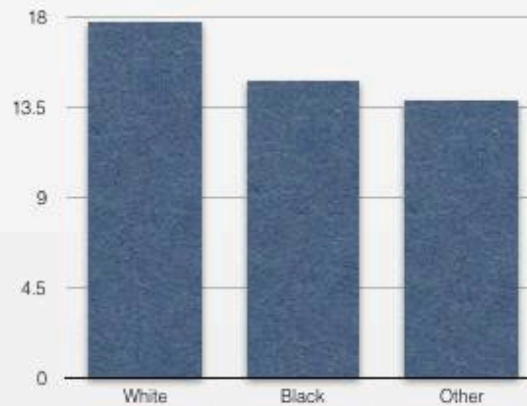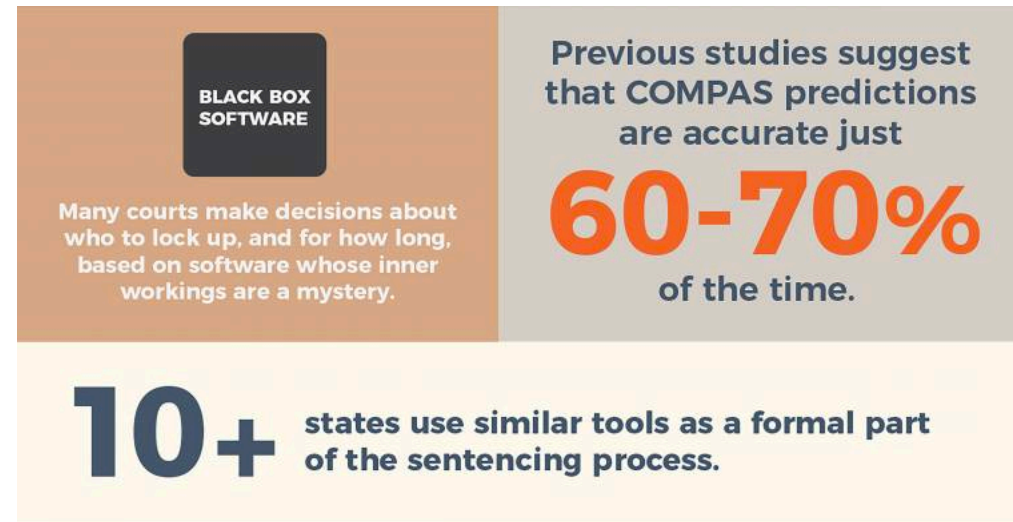
Predictive policing
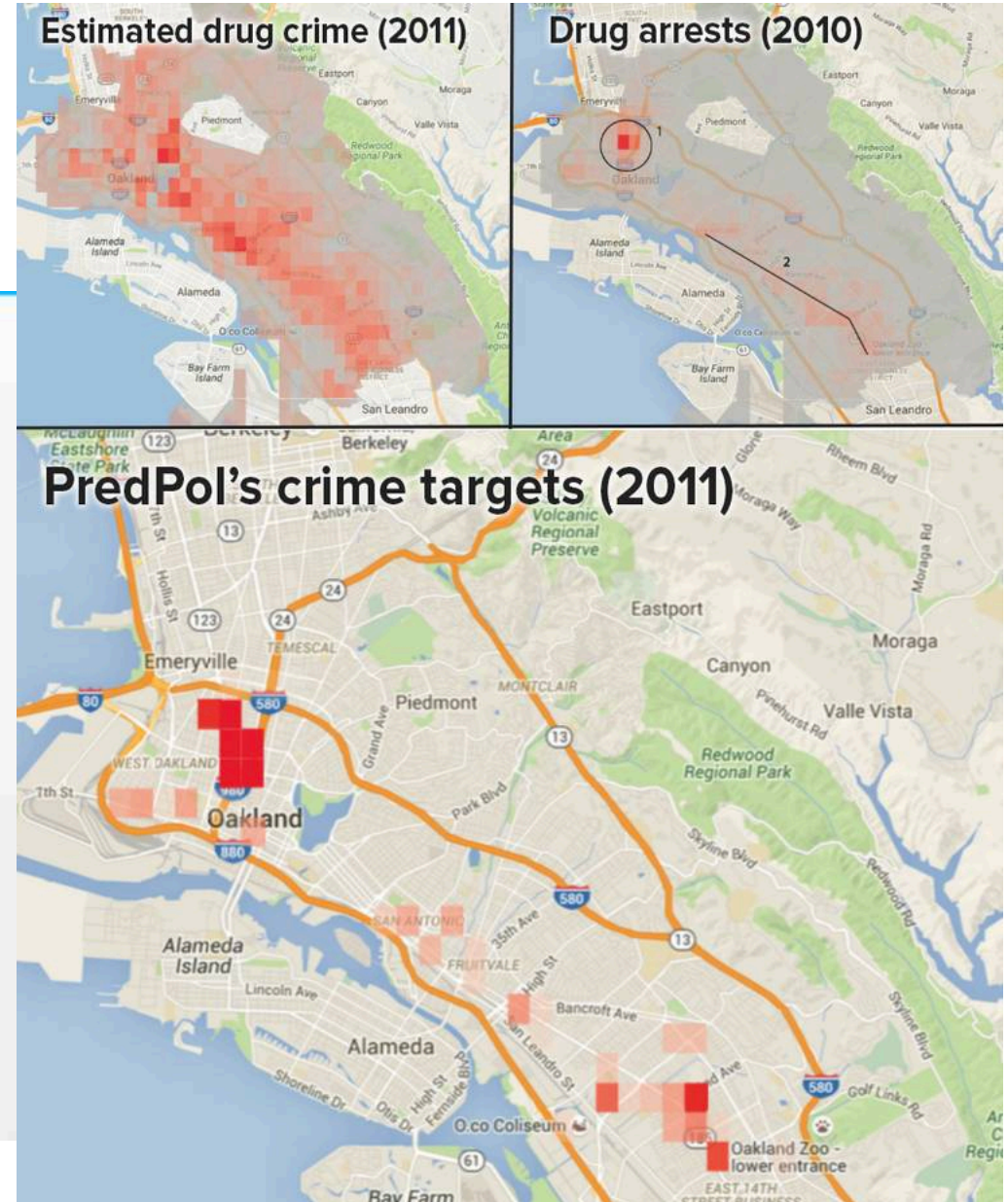
Challenge 2: The algorithm itself

• Poorly designed matching systems

• Personalization that narrow rather than expand user options

• Correlation does not imply causation!

• Beware of black boxes!

Sentencing software

- Correctional Offender Management Profiling for Alternative Sanctions

- Predict the likelihood of recidivism

BLACK BOX SOFTWARE

Many courts make decisions about who to lock up, and for how long, based on software whose inner workings are a mystery.

Previous studies suggest that COMPAS predictions are accurate just

60-70%

of the time.

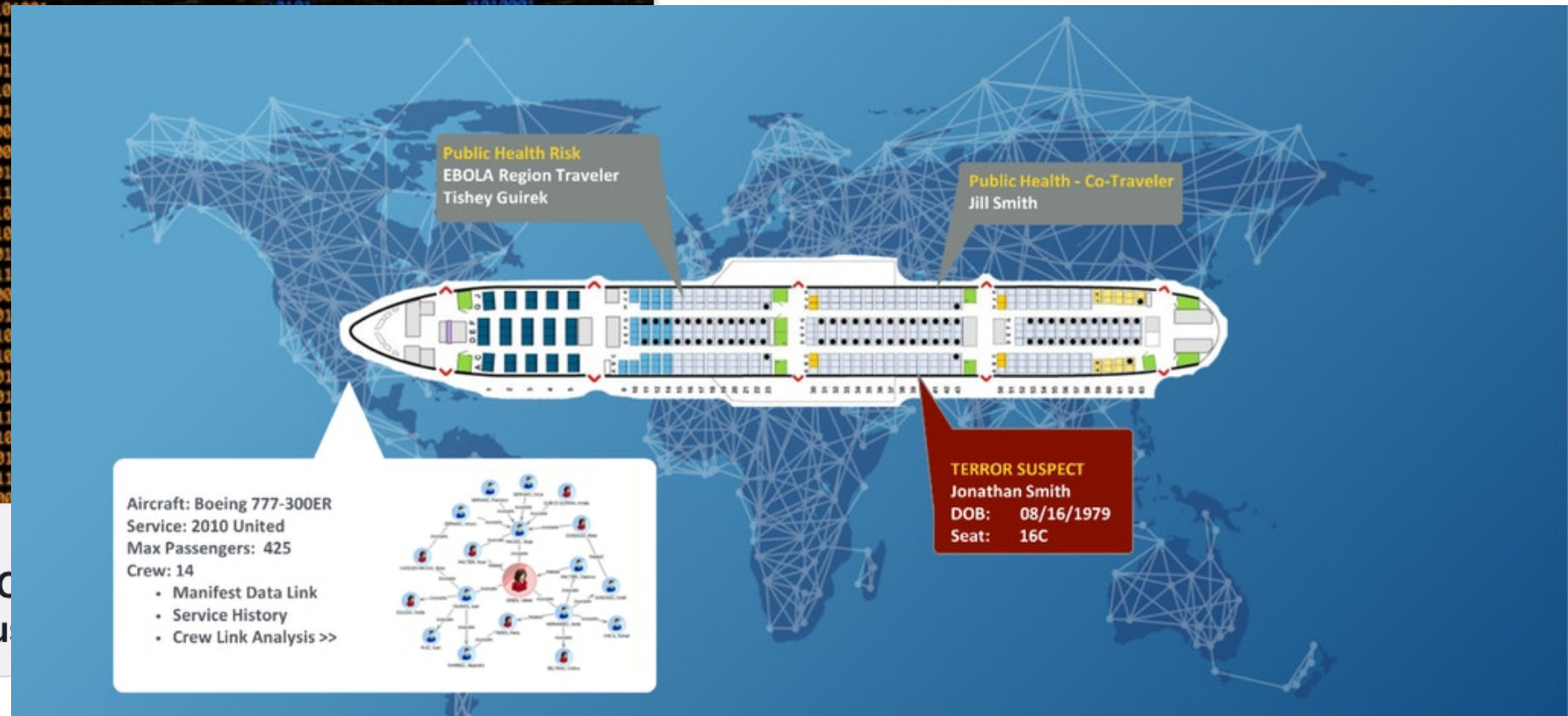10+ states use similar tools as a formal part of the sentencing process.

"People are getting different prison sentences because some completely opaque algorithm is predicting that they will be a criminal in the future," says Cynthia Rudin, associate professor of computer science and electrical and computer engineering at Duke University.

Homeland Security?

What's left?

- Grades
  - Labs 9-11 & HW 4 graded soon
  - Test 2 & Projects 1-3 graded by Monday, April 29
- Final Project
  - Submit notebook, presentation, and documents via Sakai by **noon, May 3**
  - Presentations (< 10 minutes) – **2pm on May 3**
    - Motivating questions
    - Methods to answer those questions
    - Visualizations of key results
    - Conclusions

What's next?

- CompSci 216: Everything Data

- CompSci 201: Data Structures & Algorithms
  - CompSci 371: Elements of Machine Learning afterwards

- IDM in Stats & CompSci

Thank you!

1. Please complete course evaluation on DukeHub

2. Complete CATME teammate evaluation
   - Email will go out at midnight
   - Complete before 5/3