

# Choices and Consequences in Computing

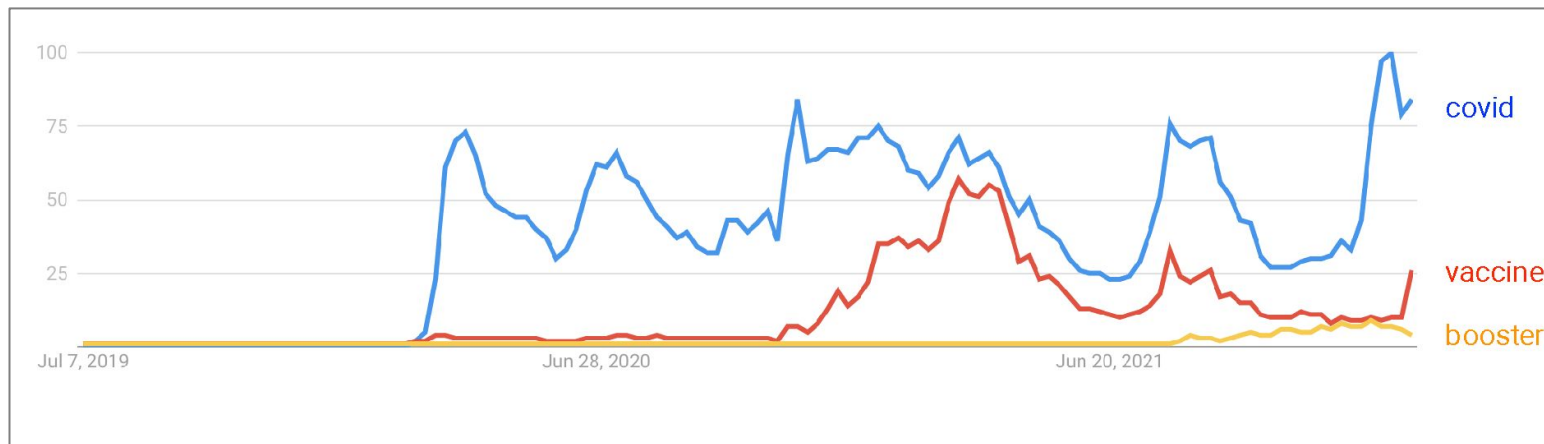
INFO 1260 / CS 1340

Lecture 2 (Themes)

January 24, 2024

# Course themes

# Relationship of computational models to the world



Start with a phenomenon in the social world:

- E.g. interest in a topic

Can we find a proxy for it in the online world?

- E.g. search volume

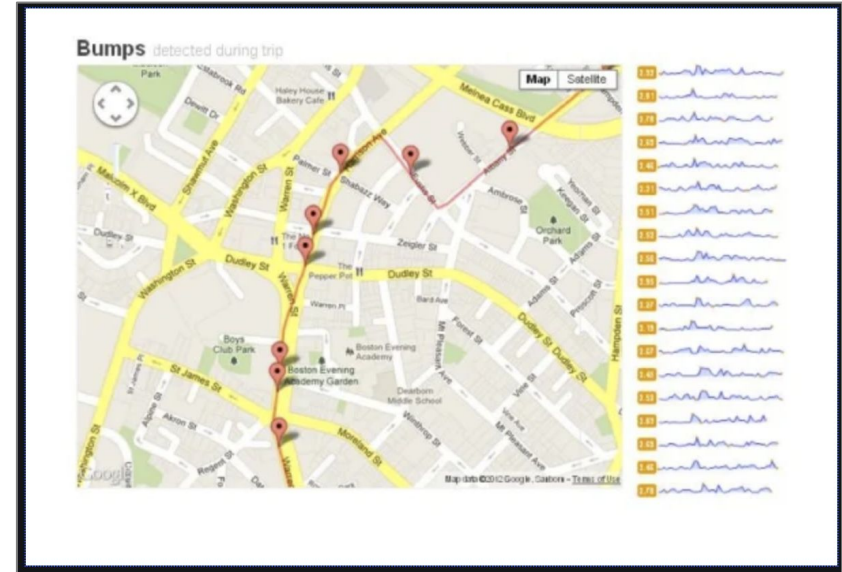
# Relationship of computational models to the world



# Relationship of computational models to the world

Street Bump: using smartphone accelerometers

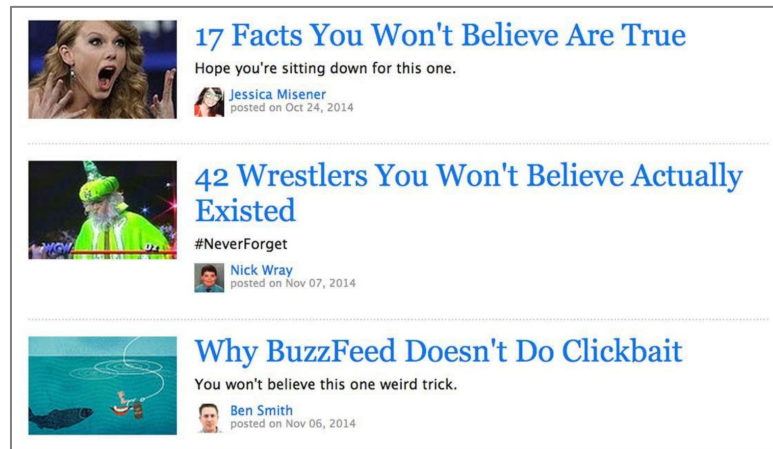
- Question: Is there a pothole in this place on the road?
- Proxy: Use output of many phone accelerometers and find a consensus
- Optimization: Fix potholes where the phones detect them.
- The gap between the representation and reality: We're fixing potholes in parts of the city with better smartphone penetration.



# Relationship of computational models to the world

The gap between the representation and the thing itself

- Question: Is a user interested in a piece of content?
- Proxy: See if they click on it.
- Optimization: Produce content that users are likely to click on.
- Exploiting the gap between the representation and reality: Clickbait



*“The map is not the territory” --Alfred Korzybski*

# Computing changes the frictions that determine what's easy and what's hard to do

- Technology can take things that were possible *in principle* and make them easy *in practice*.
- Example: superimposing publicly available data on a map interface.
- Chemical analogy: tech acting as a catalyst, lowering the activation energy for processes in society.



When I see those maps, it does leave me with a bit of a sick feeling in my stomach,” said Kim Alexander, president of the California Voter Foundation, which has advocated for open democracy. “This is not really the intention of voter disclosure laws. But that’s the thing about technology. You don’t really know where it is going to take you.”

# Computing changes the frictions that determine what's easy and what's hard to do

Traditionally, algorithms have been better at working with discrete items than complex human data:

- numbers, timestamps, clicks, individual words,
- ... in contrast to ...
- longer passages of text, audio, images, video

One of the largest changes that modern AI has produced is a disruption to this principle.



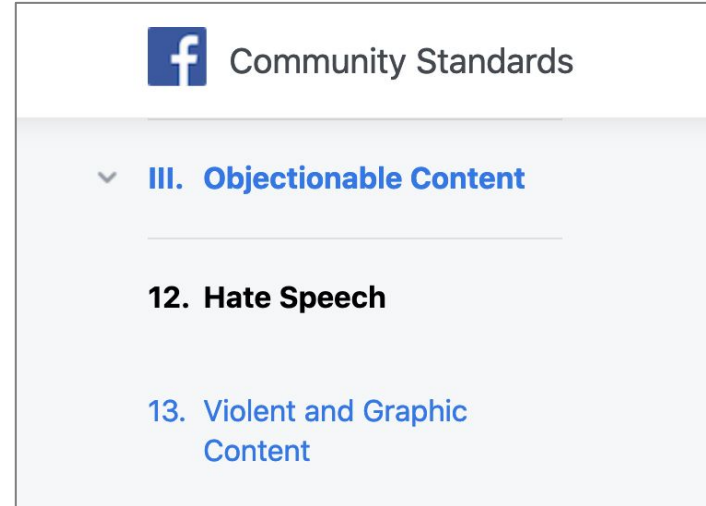


# The contrast between policy challenges and implementation challenges

Sometimes the difficulty is to specify the policy that you want.

Sometimes the difficulty is to carry out the policy.

- Specifying to other people what types of objectionable content you'd like to remove from your platform,
- versus creating algorithms and governance structures to reliably recognize and take down these types of objectionable content.



# Technical choices are never neutral

- Platforms often like to see themselves as “neutral”
- Neutrality is not an option! Not making a choice is still a choice
  - Choosing not to take down abusive content means choosing to leave that content up
- Another way to think about this: technology is inherently political. It enables some actions, not others; it empowers some people, not others; it makes some futures possible, not others
  - Robert Moses’ low overpasses -> keep people from poor neighborhoods from going to the beach
- Kranzberg’s First Law: “Technology is neither good nor bad; nor is it neutral.”



# “Big-P” Policy and “little-p” policy

- Big-P Policy: rules that are issued by the government and backed with the force of law
- Little-p policy: company-level systems, protocols, and practices (or lack thereof!) — often implemented by engineers
- Which is preferable?
- Each operates “in the shadow of” the other
  - Mnookin and Kornhauser, “Bargaining In the Shadow of the Law” (1979)



## Facebook, Google face tough questions over white nationalism

BY EMILY BIRNBAUM - 04/09/19 10:14 AM EDT

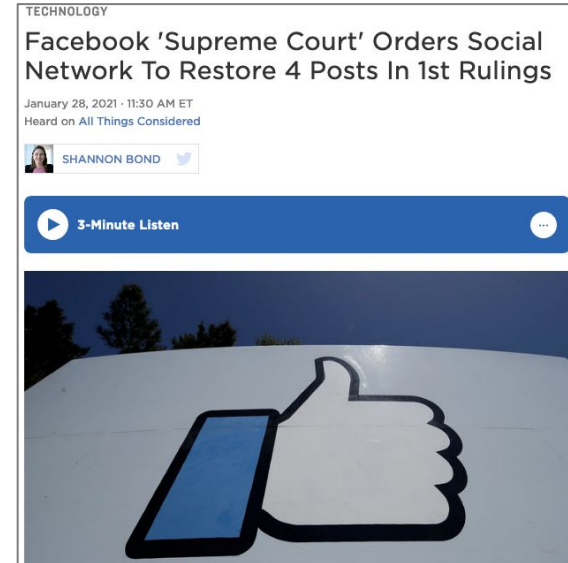
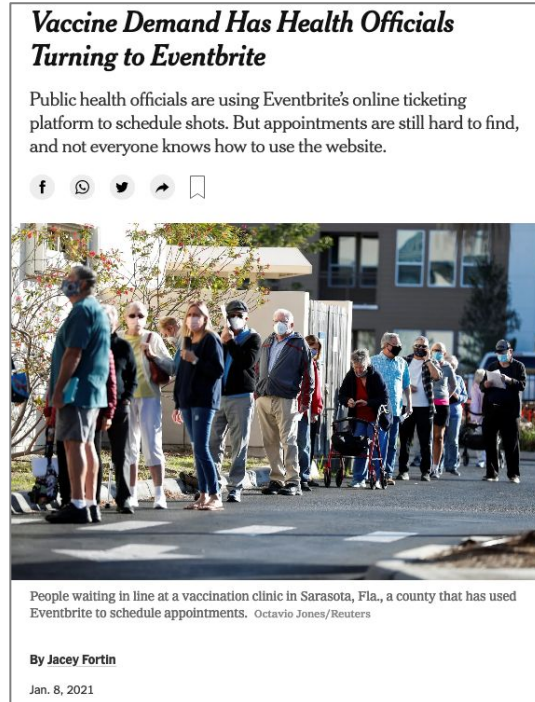
Lawmakers made it clear they would watch tech companies closely as they addressed these issues.

"Figure it out," Rep. [Cedric Richmond](#) (D-La.) warned Google and Facebook.

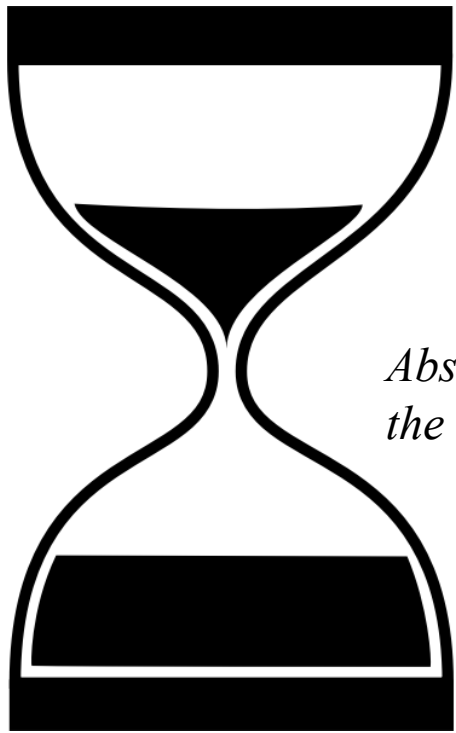
"Because you don't want us to figure it out for you."

# “Big-P” Policy and “little-p” policy

- Is it easy to draw a line between what's a government and what's a company?



# Computing systems are built in layers



Applications built on the  
technology

*Abstraction barrier: the “thin part of  
the hourglass”*

Low-level implementation of  
the technology

# Technology (and policy) is built in layers

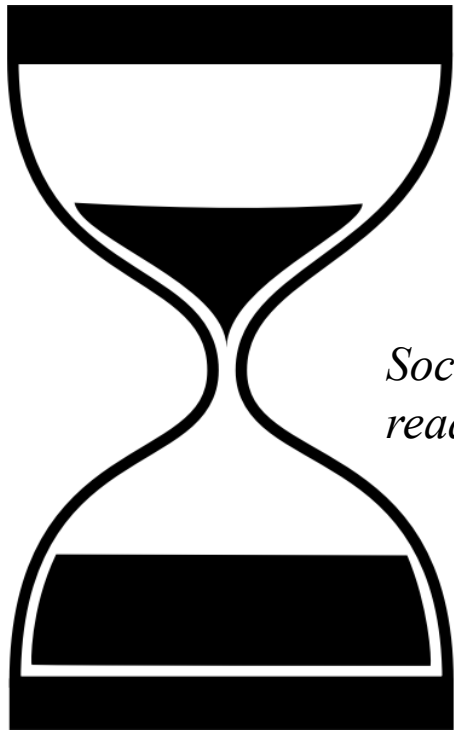


The experience of  
driving a car

*Gas pedal, brake pedal,  
steering wheel*

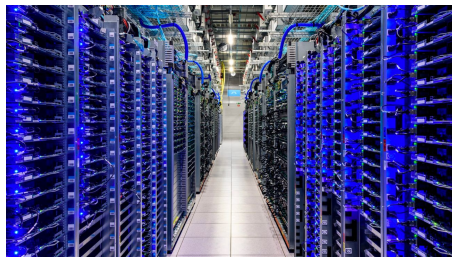
How a car is  
built

# Computing systems are built in layers



Marketing campaigns,  
political campaigns,  
new forms of  
journalism

*Social media: An interface for posting messages and  
reading messages*



Text and image  
processing  
algorithms, network  
routing

# Computing systems are built in layers



- The power of computing comes from a commitment to use abstraction barriers.
  - No one could build new applications if they needed to understand everything they were building on.
- But abstraction barriers make it even harder to anticipate the consequences of your choices.
  - Important role for people who understand things (at least partially) on both sides of the abstraction barrier



# The challenge of anticipating the long-term consequences of technical developments

It's hard to predict what people will do with the capabilities you create (but it's an important step)

- Massive amounts of Web data -> Internet search tools -> Search query logs -> Tracking of natural disasters, disease outbreaks, suspected criminal activity
- Digital photography -> Enormous numbers of online photos -> Training data for image labeling systems -> Major improvements in image recognition -> New capabilities for surveillance

Preview of another large consequence:

- Personalization of online content lets you read what you want and avoid spending time on things that don't interest you.
- But has this eliminated the types of common ground that were crucial for bringing people together?

# The difficulty of locating responsibility when technologies and people interact

- People often use technology to cause harm to other people, at all kinds of scales – deliberately or by accident
- Whose responsibility is it (legally)? Whose responsibility should it be (ethically)?
- Amazon CEO Andrew Jassy: “I really strongly believe that just because technology could be misused doesn’t mean that we should ban it and condemn it. ... You could use a knife in a surreptitious way.”

## Tesla Autopilot crash driver 'was playing video game'

🕒 26 February 2020



[Recode/YouTube](#)

**Incoming Amazon CEO said you can't 'assume' police will abuse facial recognition tech**

# The power (and peril) of analogical reasoning

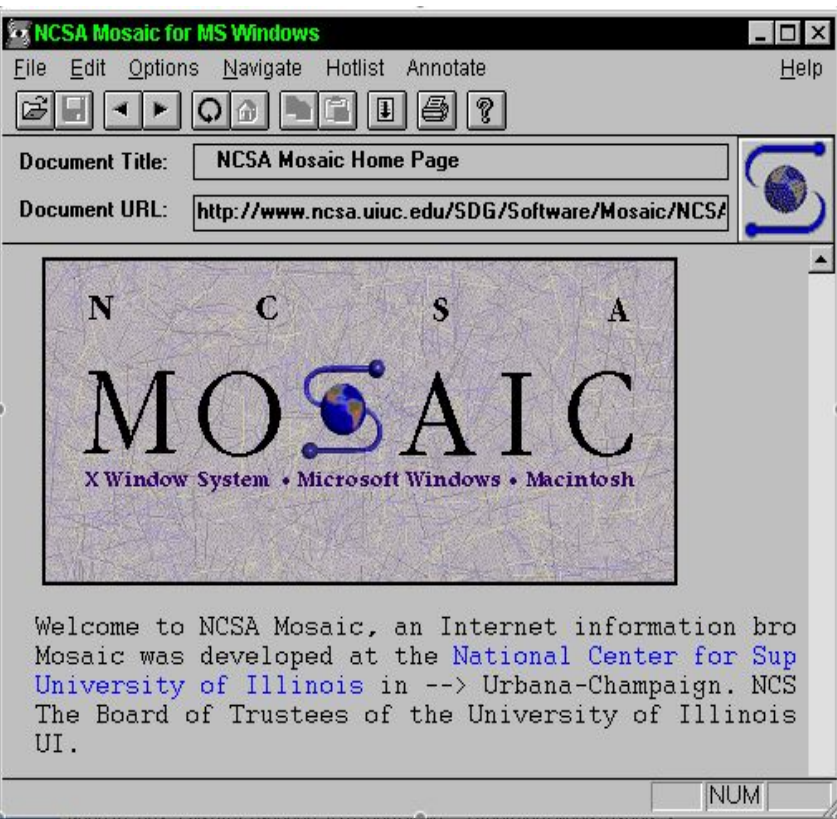
- We often *reason by analogy* about how to govern new technologies
  - Is a social media platform *like* a newspaper, or *like* a newsstand?
  - Is using ChatGPT on a homework assignment *like* using spell-check, or *like* plagiarizing from a book?
- This can be helpful for stability of social expectations and for predictability of policy implementation
- But deciding what something should be compared to is hard, and potentially limits us to false binaries or path dependence



# Computing as synecdoche: computing problems as a mirror for broader social problems

- Synecdoche: a literary device where a part stands in for the whole
  - Ex: an “all-hands meeting”: not literally a meeting of hands
- Computing can be a lens to foreground longstanding social problems in a new way
  - How does racial discrimination manifest in online search?
  - How does Twitter’s content moderation shed new light on tensions in free speech that have always existed?
- It can be strategic to focus on the technical manifestations of a problem... but remember it’s only one part (and maybe not even the most important part!) of the bigger problem.
  - Abebe, Barocas, Kleinberg, Levy, Raghavan, and Robinson, “Roles for Computing in Social Change” (2020)

# Five epochs of the public Internet

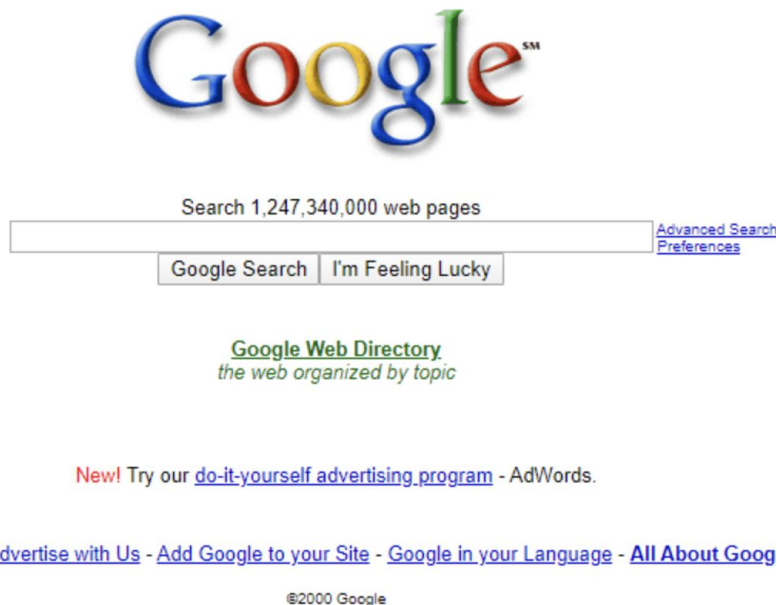


Pre-history (1970s, 1980s): Creation of the Internet and personal computing.

1991-93: Creation of the World Wide Web

# Five epochs of the public Internet

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2004-06: Emergence of social media (creation of FB, YouTube, Twitter)

Inside Facebook





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2012-14: Dramatic breakthroughs in AI for classification: images, speech, and text



# Five epochs of the public Internet

ChatGPT 3.5 ▾



GPT-3.5

Great for everyday tasks



GPT-4

Our smartest and most capable model.



Includes DALL-E, browsing and more.



Upgrade to Plus

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2020-22: Creation of generative AI (large language models, AI image generation)