Users, meet your observations. Observations, meet your users. Mediation: a role for cognitive computing?

[“We TOLD you it was hard.” “Yes, but now that I’VE tried, we KNOW that it’s hard.”]
Relevant Trends in Industry

• By 2020, 85% of customer interactions will be managed without a human. (Gartner)

• By 2018, six billion connected devices will proactively ask for support. (Gartner)

• 44% of executives believe artificial intelligence’s most important benefit is “automated communications that provide data that can be used to make decisions.” (Narrative Science)

• By the end of 2018, “customer digital assistants” will recognize customers by face and voice across channels and partners. (Gartner)

• Computers already trade stocks, drive cars, fly planes, write texts and emails, call people, and win at Go and Jeopardy.
Relevant Trends in Science and Research

- 70% of experiment cost is data assembly (Longley, et al. 2001)

- “80% of time of data scientists is wasted with data management” —Peter Wittenburg, 2017 citing various recent European studies.

- We’re accessing, sharing, and using more data than ever, but we still spend the bulk of our research time trying to find, understand, and prepare data for analysis.

- And we rely very heavily on friends, colleagues, and data professionals (i.e. humans) to do this.

- Nothings really changed!
Increasing Complexity of Mediation

From: C. Borgman, 2008, NSF Cyberlearning Report
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Are we keeping up?
Increasing Complexity of Mediation

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Are we keeping up?
Can we get ahead?

Can we get ahead?
Fundamental Changes due to IoT

- Cyber infrastructure
- Humans
- Physical Objects

adapted from Chris Greer, NIST
Fundamental Changes due to IoT

- Internet
- WWW etc.
- Humans
- Actors
- Mediators
- Physical Objects

adapted from Chris Greer, NIST
Fundamental Changes due to IoT

Cyber infrastructure

Humans often bypassed

PO directly acting

adapted from Chris Greer, NIST
What is Mediation?

- Making information useful across difference
- Representation in both senses of data and perspective
- Contextual interpretation
- Reframing across difference — metaphor, scaling etc.

- It is a **central goal of data curation**, which is essential, but also acts as a **bottleneck** in the data lifecycle and reuse.
Some examples where “smarter” computing might help

- Automate more upstream curation
  - Capture more contextual info at the outset in the instrument (or the researcher) or shortly thereafter — e.g. Met stations

- First level analysis
  - Daniel K. Inouye Solar Telescope (DKIST)
  - Square Kilometer Array (SKA)

- Uncovering basic tacit knowledge—extract assumptions embedded in data (or literature)
  - SnowModel (increasingly “observations” will be modeled)

- Maybe even just a chat-bot in user services