Misinformation:
Diagnosis, Prevention, and Cure

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Computational approaches (~2003 –)

The great "Moon Hoax" (1835)

"let them eat cake" (1766)

"pasquinade" (1522)
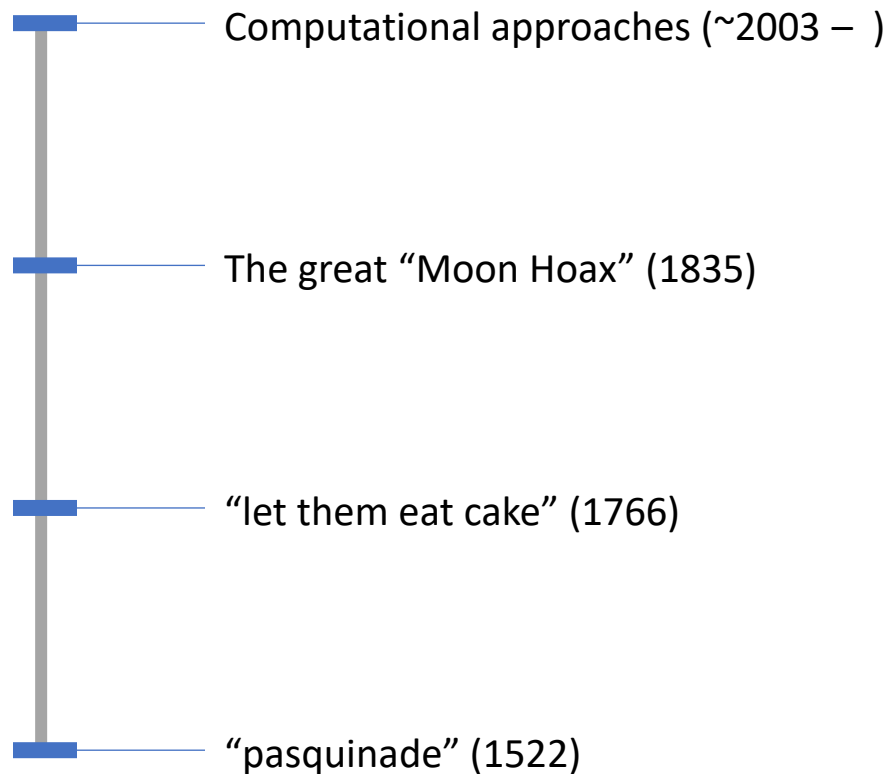
Lying Words: Predicting Deception From Linguistic Styles

Matthew L. Ne
James W. Penn
The University

Diane S. Berry
Southern Metho

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Characterizing Stylistic Elements in Syntactic Structure

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Rumor has it: Identifying Misinformation in Microblogs

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Disinformation on the Web: Impact, Characteristics, and Detection of Wikipedia Hoaxes

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MVAE: Multimodal Variational Autoencoder for Fake News Detection

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Dichotomy

Is this enough to handle the problem of misinformation in its modern avatar?

TRUE   **FALSE**

- Modern terminology that is often poorly understood

- Complex, going far beyond "prototypical instances" of deception (Fallis, 2014)

- Schauer & Zeckhauser (2009)
- Carson (2010)
- Floridi (2011)
- Fallis (2015)
- Giglietto et al. (2019)

- Much of the empirical/computational work on disinformation or misinformation have instead focused on the general idea of deception

- Subtle forms of falsehood ("spin", "half-truth", etc.) are more dangerous and prevalent, but have received little attention

Agenda

1. Scope and definition

2. Gap between current computational approaches and the problem

3. Collective research agenda to bridge this gap

Scope and definition

Absolutist

- Deception is always immoral

Utilitarian

- Deception is permissible if and only if there is no other option available to the agent "that would result in better balance of good consequences relative to bad consequences"

- Who decides what is a better balance of consequence?

- Can any such decision be moral in itself?

Any assertion of a factually incorrect statement is not permissible

Scope and definition

Intent

- the communicator intends to propagate the falsehood

Literal meaning

- the statement is false in its literal meaning

Effect

- likely to cause the listener to believe in something untrue

- Mary is a painter. Her friend John knows Mary is a painter.

- John sees a new painting in Mary's living room, and says, "This is beautiful. Perhaps your best work."

- The painting happens to be store-bought, but Mary responds, "Thank you."

Less Than Lying?

Gap

Fact-checking & credibility

1. Data-driven, frequentist

2. Taken at face-value (based on our traditional perception)
   - Assumptions derived *from* our traditional perception
     - Trustworthy sources use objective language

   DC Gazette?

   RT?

   Xinhua?

Rashkin et al. (2017)

Mantzarlis et al. (2017)

Reporters Without Borders (2016)

Gap

Pragmatics

The study of communication in a specific context, and how context contributes to, or provides, meaning to the communication.

metaphors, sarcasm, irony, satire, humor

| Communicator's intent | ←→ | Communicated content |

Figurative language? … or misinformation?

Deception
&
Cognitive load

1. Paralinguistic features

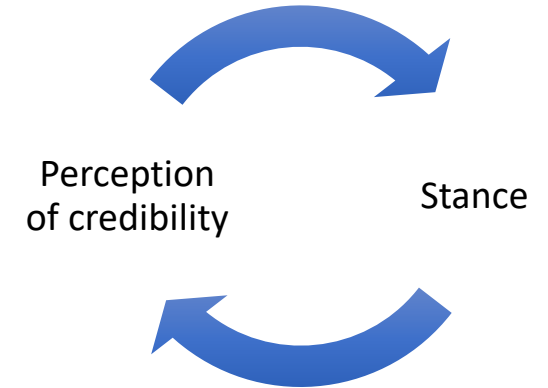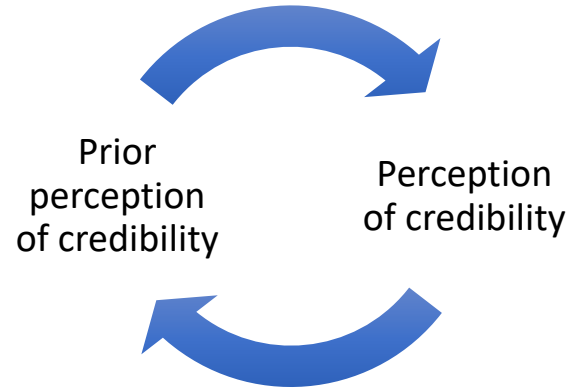2. Inconsistency creeping into a narrative over time

Ekman et al. (1991)
Newman et al. (2003)
DePaulo et al. (2003)
Vrij et al. (2008)

A research agenda for the future

A far more complex problem than a true-vs-false dichotomy

Gaps remain

- Technical difficulty of precisely modeling human communication

- Nuances of misinformation that have not yet been incorporated into any computational data-driven approach.

There **is** a single fundamental concept whose intro-duction can plug most, if not all, the gaps we find

Correct modeling of CONTEXT

Modeling context

Temporal

Linguistic and pragmatic

Extralinguistic

Domain-specific, cross-genre

Temporal context

- Longer narratives by "spin doctors" or propagandists will disclose intra-narrative inconsistency

- Theoretically sound: *successive view of semantic change*

Broad (1938)

Linguistic and pragmatic context

- Language modeling, but incorporating the larger context of a conversation

- Twitter: entire threads instead of individual Tweets

- Implication and "less than lying": the need to distinguish between causation and correlation

Thursday Mar 26 2020

Web Desk

Kanika Kapoor met Prince Charles before he tested positive for COVID-19?

Extralinguistic context

- Communication happens within a larger structure
  - The network structure in social media

- Extralinguistic features
  - User metadata
  - Local neighborhood properties in the network

Roadblocks and solutions?
  - Availability of data (lack of APIs, or reasonably cheap APIs)
  - Justified privacy concerns
  - Collaborative research with social media corporations

Extralinguistic context

Beyond social networks:

- information communicated through websites to readers

- markers of credibility offered through visual cues
    - website design
    - external references to sources

Zuo et al. (2019)

Domain-specific, cross-genre context

- How does information change when it crosses genres, even within a single domain?

- Medical information moving from research to news to social media

Is there a cure?

Detroit residents opposed to the planting of trees

- Trust deficit

- Temporal (historical) context

- Preemptive efforts such as workshops to train readers to identify misinformation

- Collaborative efforts with "boots on the ground"

- Modeling of context

Is there a cure?

Yes, there is a lot of ground to cover.

But I am optimistic!