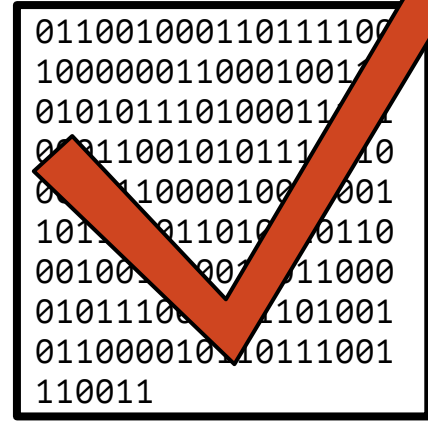


Teaching CRAAP to Robots: Artificial Intelligence, False Binaries, and Implications for Information Literacy



Kevin Seeber / @kevinseeber

Auraria Library / University of Colorado Denver

Critical Librarianship and Pedagogy Symposium / #claps2018

November 15-16, 2018 / University of Arizona

Previously on CLAPS...

I talked about first-year library instruction and how we often rely on problematic binaries.

**IT'S NOT A
COMPETITION!**

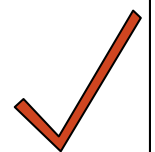
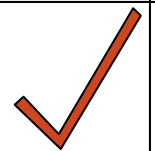

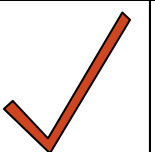

**QUESTIONING THE RHETORIC OF
"SCHOLARLY VERSUS POPULAR"
IN LIBRARY INSTRUCTION**

Kevin Seeber / Foundational Experiences Librarian Critical Librarianship and
Auraria Library / University of Colorado Denver Pedagogy Symposium
@kevinseeber / kevin.seeber@ucdenver.edu #claps2016

The slides from that presentation are available at
kevinseeber.com/claps2016.pdf

Lots of library instruction sessions that focus on “evaluation” tend to rely on checklists and binaries.

One of the more frequently used models is the “CRAAP Test,” though there are others.

	GOOD	BAD
Currency		
Relevancy		
Accuracy		
Authority		
Purpose		

CRAAP	Currency	Relevancy	Accuracy	Authority	Purpose	
RADCAB	Relevancy	Appropriateness	Detail	Currency	Authority	Bias
CARS	Credibility	Accuracy	Reasonableness	Support	also: design/style	also: electronic sources
CARDIO	Currency	Authority	Relevance	Documentation	Information Type	Objectivity
CRITIC	Claim	Role of Claimant	Info backing the claim	Testing	Independent verification	Conclusion
5 Ws	Who	What	Where	When	Why	
RADAR	Rationale	Authority	Date	Accuracy	Relevance	
BEAM	Background	Exhibit	Argument	Method		
IFIAPPLY (added before CRAAP)	Identify emotions	Find unbiased sources	Intellectual courage to seek other sources that challenge my views	Authority	Purpose	Publisher
AAOCC	Authority	Accuracy	Objectivity	Currency	Coverage	
RUSA	Author	Biases/Influences	Intended audience	Origin	Significance when it was created?	Edited/Translated?
USC Social Sciences	Author	Date	Edition/Revision	Publisher	Title of source	Intended audience
6 Cs of primary source analysis	Content	Context	Citation	Connections	Communications	Conclusions
CARBS	Currency	Authority	Relevancy	Bias or Factual	Scholarly or Popular	
DUPED	Date	Unambiguous	Purpose	Expertise	Determine (Source)	
IMVAIN	Independent	Multiple sources quoted	Verified with evidence	Authoritative	Informed	Named sources
SCAAN	Source Type	Currency	Accuracy	Authority	Neutrality	
Purdue OWL	Authorship/Affiliations	Sources/Quotations	Bias/Special Interests	Author Qualifications	Publication Info	also: evaluating while reading
Berkeley	Authority	Purpose	Publication and Format	Relevance	Date	Documentation
Georgetown Tutorial	Authority	Purpose	Objectivity	Accuracy	Reliability/Credibility	Currency
Big 6	task definition - identify your research question and then info needed	info seeking strategies: determine all possible sources, and select sources that are available and understandable to you	location and access of sources: where/how will you gain access to these sources? identify keywords and search strategies for using a variety of sources (books, databases, etc.)	use of information: engage your sources - read, view, listen. Skim, deep read, find the info you need from the sources gathered. extract relevant info.	Synthesize from multiple sources, present info	evaluate the product and the effectiveness, did you give credit to all your sources? did you cover everything? judge the efficiency - what new skills were gained, what can be used again? what info did you need but couldn't find?
Kuhlthau Guided Inquiry						Create and Share

This list was compiled by Beene, Jankowski, Russo, and Townsend for their panel presentation, “The container conundrum: Using a contextual approach to source evaluation,” at Library Instruction West 2018.

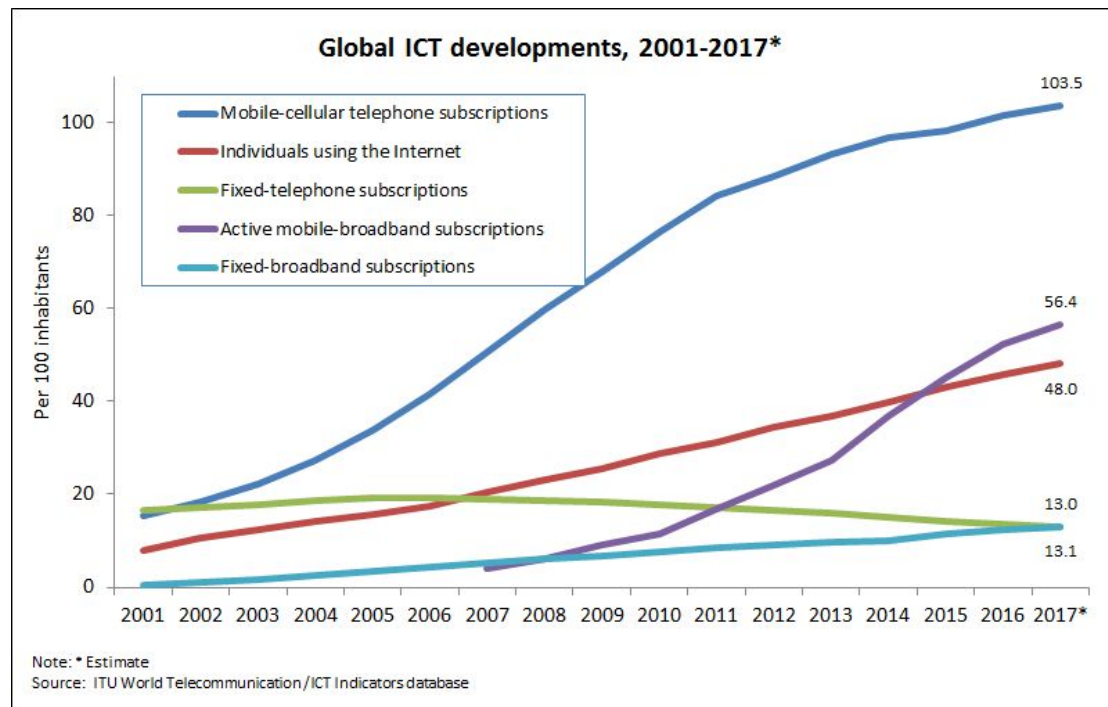
Their handout:
<http://tinyurl.com/containerconundrum>

Their list of models:
<http://tinyurl.com/ybrxzss3>

Here are some things you can read about checklists:

- Caulfield, M. (2018, February 18). Recognition is futile: Why checklist approaches to information literacy fail and what to do about it [Blog post]. Retrieved from <https://hapgood.us/2018/02/18/recognition-is-futile-why-checklist-approaches-to-information-literacy-fail-and-what-to-do-about-it/>
- Heinbach, C. (2018, July 19). Checklists are not enough: Exploring emotional intelligence as information literacy. Presentation at *Library Instruction West*. Grand Junction, CO. Retrieved from <https://bit.ly/liwfeelingsIL>
- Seeber, K. (2016, March 18). Wiretaps and CRAAP [Blog post]. Retrieved from <https://kevinseeber.com/blog/wiretaps-and-craap/>
- Meola, M. (2004). Chucking the checklist: A contextual approach to teaching undergraduates web-site evaluation. *portal: Libraries and the Academy*, 4(3), 331-344.
<https://doi.org/10.1353/pla.2004.0055>

While these kinds of checklists might have served a purpose in the past, our information context has changed.



This chart was created by the International Telecommunications Union (ITU) and reflects the increase in Information and Communication Technology (ICT) use around the world since 2001. The ITU Statistics page has all sorts of interesting information, and is available at <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

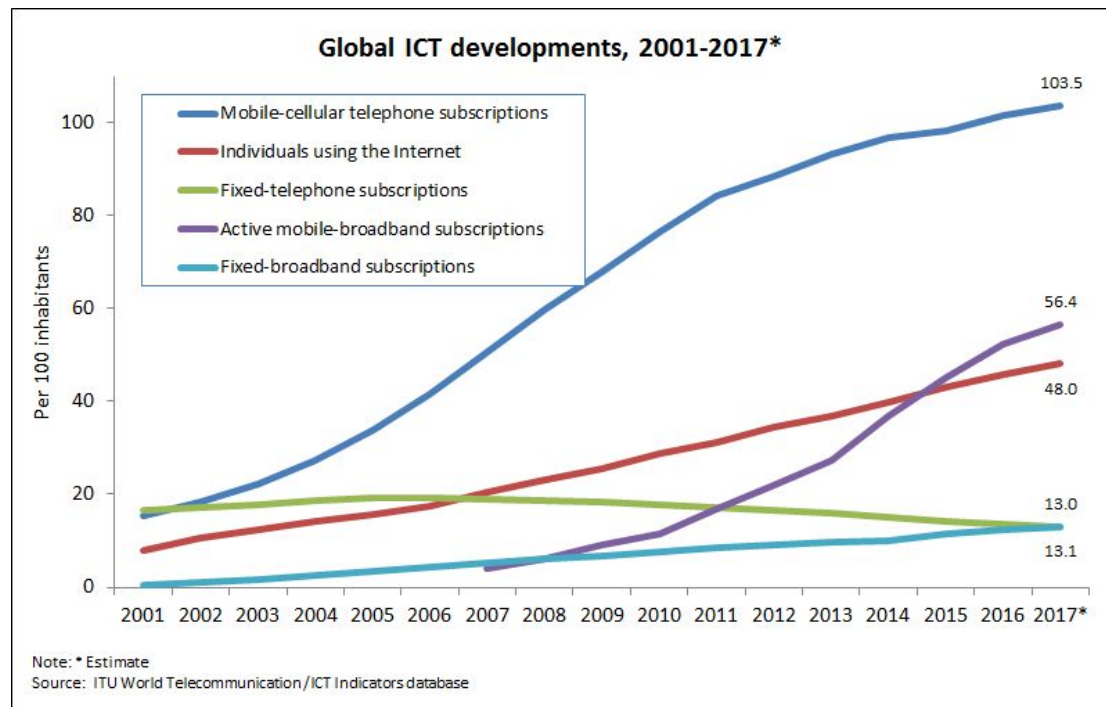
More people around the world
have more access to creating,
sharing, and retrieving
information than ever before.

The recent increase in access
has been accompanied by
growing concerns regarding
the veracity of online
information.

Be thy intents wicked or
charitable,
Thou comest in such a
questionable shape

-Hamlet, while teaching a
one-shot.

Consider the widespread
fear of “foreign actors”
seeking to exert influence
with “fake” information.



This expansion clearly predates the 2016 election. I think that much of the recent hand-wringing in the U.S. about “information overload” and accompanying concerns over quality of online information is a manifestation of techno-nationalism now that the Global South has access to internet-connected devices.

Techno-nationalism is when governments seek to have sovereignty over the (information) technology used in their countries, and build an identity around that technology.

Put another way, it was fine when primarily affluent white people in the west were online, but now that *other people* have Twitter, facts don't exist and the internet is a national threat.

The “fake” information discussion echoes the concerns expressed regarding so-called “predatory publishing” in scholarly communication.

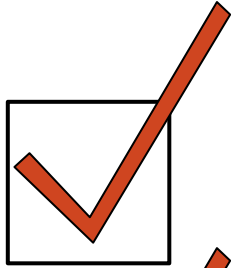
“Even when open scholarship from the margins can be found, there still exists a bias in the way we evaluate and validate it. Just take a look at the predatory publishing scare, being led in large part by Beall’s list and others like it... There is a clear anti-global south bias in the way publishers and publications get evaluated for predatory status. Materials from, say India or China or Guatemala, are viewed askance and their quality rigorously questioned, while that same material, if it came from the U.S. or Canada or the UK, would be readily accepted.”

Hathcock, A. (2016, February 8). Open but not equal: Open scholarship for social justice [Blog post]. Retrieved from <https://aprilhathcock.wordpress.com/2016/02/08/open-but-not-equal-open-scholarship-for-social-justice/>

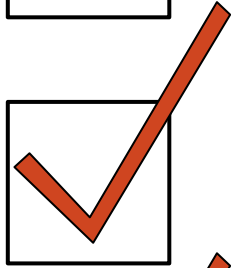
Here are some things you can read about techno-nationalism:

- Charland, M. (1986). Technological nationalism. *Canadian Journal of Political and Social Theory*, 10(1-2), 196-220. <https://journals.uvic.ca/index.php/ctheory/article/viewFile/14083/4854>
- Montresor, S. (2001). Techno-globalism, techno-nationalism and technological systems: Organizing the evidence. *Technovation*, 21(7), 399-412. [https://doi.org/10.1016/S0166-4972\(00\)00061-4](https://doi.org/10.1016/S0166-4972(00)00061-4)
- Rajan, A. (2018, September 8). Techno-nationalism could determine the 21st century. *BBC News*. Retrieved from <https://www.bbc.com/news/technology-45370052>
- Technological nationalism. (n.d.). In *Wikipedia*. Retrieved November 12, 2018, from https://en.wikipedia.org/wiki/Technological_nationalism

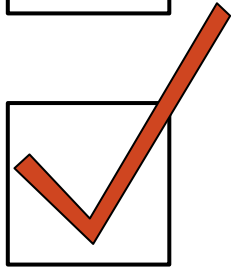
It's Time for a Check-In!



Checklists are over-simplified and problematic.



The “fake” narrative can be tied to nationalistic discourse.



I haven't even gotten to the part about artificial intelligence yet.

It turns out that lots of people care about the quality of online information.

How can we keep up when
there's just SO MUCH
information to evaluate?

This question brings us to Artificial Intelligence (AI) and a specific field called “Sentiment Analysis.”

Sentiment Analysis is “the use of natural language processing, text analysis, computational linguistics, and biometrics to systematically identify, extract, quantify, and study **affective states** and **subjective information**. Sentiment analysis is widely applied to voice of the customer materials such as reviews and survey responses, online and social media, and healthcare materials for applications that range from marketing to customer service to clinical medicine.” (Emphasis added)

Sentiment analysis. (n.d.). In *Wikipedia*. Retrieved November 12, 2018, from https://en.wikipedia.org/wiki/Sentiment_analysis

In other words, sentiment analysis is AI that reviews (lots of) text to quantify emotion and identify bias.

“With the advent of the Social Web, the way people express their views and opinions has dramatically changed. Reviews, forums and blogs now represent huge sources of information with many practical applications. However, finding **opinion sources** and monitoring them can be a formidable task because there are a large number of diverse sources and each source may also have a huge volume of **opinionated text**. Thus, **automated opinion discovery** and summarization systems are needed.” (Emphasis added)

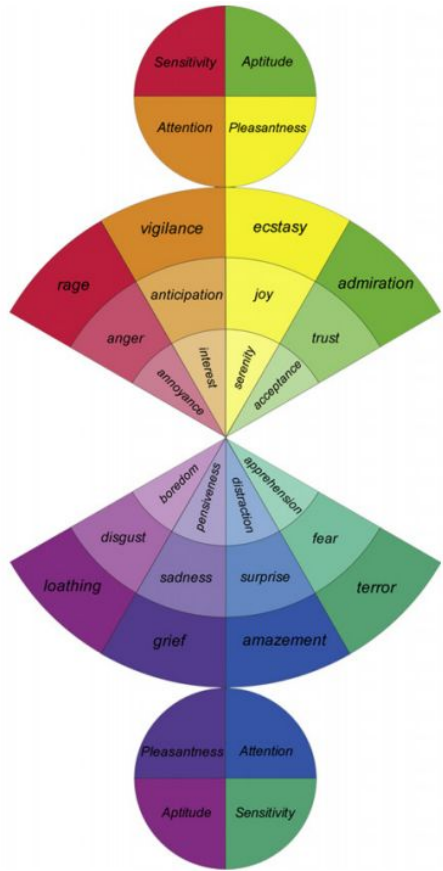
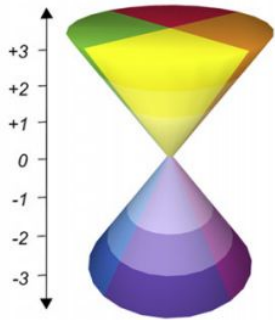
Bisio, F., Meda, C., Gastaldo, P., Zunino, R., & Cambria, E. (2017). Concept-level sentiment analysis with SenticNet. In E. Cambria, D. Das, S. Bandyopadhyay, & A. Feraco (Eds.), *A Practical Guide to Sentiment Analysis* (pp. 173-188). Cham: Springer.

How does one automate
evaluation?

“The human brain is a very complex system, maybe the most complex in nature. The functions it performs are the product of thousands and thousand of different subsystems working together at the same time. Common-sense computing involves trying to emulate such mechanisms and, in particular, at exploiting common-sense knowledge to improve computers’ understanding of the world.”

Cambria, E. & Hussain, A. (2015). *Sentic computing: A common-sense based framework for concept-level sentiment analysis*. Cham: Springer.

What does common-sense
understanding look like?



	Pleasantness	Attention	Sensitivity	Aptitude
+3	ecstasy	vigilance	rage	admiration
+2	joy	anticipation	anger	trust
+1	serenity	interest	annoyance	acceptance
0	—	—	—	—
-1	pensiveness	distraction	apprehension	boredom
-2	sadness	surprise	fear	disgust
-3	grief	amazement	terror	loathing

This figure is from the 2012 article “*Sentic PROMS: Application of sentic computing to the development of a novel unified framework for measuring health-care quality.*” It appeared in volume 39 of the journal *Expert Systems with Applications*, and was authored by Cambria, Benson, Eckl, and Hussain.

“The main advantage over other emotion categorization models is that [the Hourglass of Emotions] allows emotions to be deconstructed into independent but concomitant affective dimensions, whose different levels of activation make up the total emotional state of the mind... The model can potentially synthesize **the full range of emotional experiences in terms of four affective dimensions, Pleasantness, Attention, Sensitivity, and Aptitude.**”
(Emphasis added)

Bisio, F., Meda, C., Gastaldo, P., Zunino, R., & Cambria, E. (2017). Concept-level sentiment analysis with SenticNet. In E. Cambria, D. Das, S. Bandyopadhyay, & A. Feraco (Eds.), *A Practical Guide to Sentiment Analysis* (pp. 173-188). Cham: Springer.

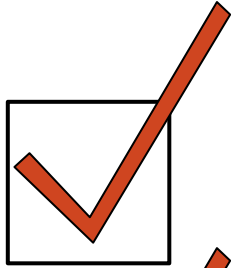
Programmers are training AI to review language and separate biased/emotional information from facts.

REMINDER: ALL
INFORMATION IS DERIVED
FROM INTERPRETATION
AND THEREFORE ALL
INFORMATION IS BIASED.

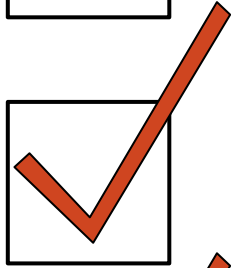
Parsing “opinionated”
information implies other
information isn’t opinionated.
But “fact” vs. “opinion” is a
false binary.

Choosing to observe something
and record it as a fact is in and
of itself a biased act.

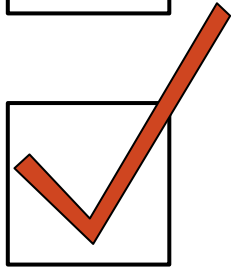
Another Check-In!



Groups other than librarians are discussing how to evaluate info.



That evaluation is informing AI developments.



These algorithms are built on false binaries.

What would it mean to deploy
AI to identify and suppress
so-called “fake news?”

We're there now.

Predicting Factuality of Reporting and Bias of News Media Sources

Ramy Baly¹, Georgi Karadzhov³, Dimitar Alexandrov³, James Glass¹, Preslav Nakov²

¹MIT Computer Science and Artificial Intelligence Laboratory, MA, USA

²Qatar Computing Research Institute, HBKU, Qatar;

³Sofia University, Bulgaria

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{georgi.m.karadjov, Dimityr.Alexandrov}@gmail.com

Abstract

We present a study on predicting the factuality of reporting and bias of news media. While previous work has focused on studying the veracity of claims or documents, here we are interested in characterizing entire news media. These are under-studied but arguably important research problems, both in their own right and as a prior for fact-checking systems. We experiment with a large list of news websites and with a rich set of features derived from (i) a sample of articles from the target news medium, (ii) its Wikipedia page, (iii) its Twitter account, (iv) the structure of its URL, and (v) information about the Web traffic it attracts. The experimental results show sizable performance gains over the baselines, and confirm the importance of each feature type.

1 Introduction

The rise of social media has democratized content creation and has made it easy for everybody to share and spread information online. On the positive side, this has given rise to citizen journalism, thus enabling much faster dissemination of information compared to what was possible with newspapers, radio, and TV. On the negative side, stripping traditional media from their gate-keeping role has left the public unprotected against the spread of misinformation, which could now travel at breaking-news speed over the same democratic channel. This has given rise to the proliferation of false information that is typically created either (a) to attract network traffic and gain financially from showing online advertisements, e.g., as is the case of *clickbait*, or (b) to affect individual people's beliefs, and ultimately to influence major events such as political elections (Vosoughi et al., 2018). There are strong indications that false information was weaponized at an unprecedented scale during the 2016 U.S. presidential campaign.

"Fake news", which can be defined as "fabricated information that mimics news media content in form but not in organizational process or intent" (Lazer et al., 2018), became the word of the year in 2017, according to Collins Dictionary. "Fake news" thrive on social media thanks to the mechanism of sharing, which amplifies effect. Moreover, it has been shown that "fake news" spread faster than real news (Vosoughi et al., 2018). As they reach the same user several times, the effect is that they are perceived as more credible, unlike old-fashioned spam that typically dies the moment it reaches its recipients. Naturally, limiting the sharing of "fake news" is a major focus for social media such as Facebook and Twitter.

Additional efforts to combat "fake news" have been led by fact-checking organizations such as Snopes, FactCheck and Politifact, which manually verify claims. Unfortunately, this is inefficient for several reasons. First, manual fact-checking is slow and debunking false information comes too late to have any significant impact. At the same time, automatic fact-checking lags behind in terms of accuracy, and it is generally not trusted by human users. In fact, even when done by reputable fact-checking organizations, debunking does little to convince those who already believe in false information.

A third, and arguably more promising, way to fight "fake news" is to focus on their source. While "fake news" are spreading primarily on social media, they still need a "home", i.e., a website where they would be posted. Thus, if a website is known to have published non-factual information in the past, it is likely to do so in the future. Verifying the reliability of the source of information is one of the basic tools that journalists in traditional media use to verify information. It is also arguably an important prior for fact-checking systems (Popat et al., 2017; Nguyen et al., 2018).

This is how programmers are
teaching their algorithms to
evaluate information:

“Model the website’s URL credibility by analyzing whether it (i) uses https://, (ii) resides on a blog-hosting platform such as blogger.com, and (iii) uses a special top-level domain, e.g., .gov is for governmental websites, which are generally credible and unbiased.”

Baly, R., Karadzhov, G., Alexandrov, D., Glass, J., & Nakov, P. (2018). Predicting factuality of reporting and bias of news media sources. *arXiv preprint*. arXiv:1810.01765.


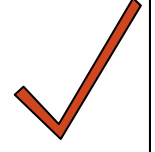

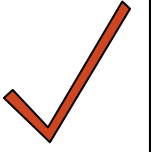

“We argue that analysis of the content of the news articles... should be critical for assessing the factuality of its reporting, as well as of its potential bias.”

“These features are used to analyze the following article characteristics:”

- **Structure:** POS tags, linguistic features based on the use of specific words (function words, pronouns, etc.), and features for clickbait title classification from (Chakraborty et al., 2016);
- **Sentiment:** sentiment scores using lexicons (Recasens et al., 2013; Mitchell et al., 2013) and full systems (Hutto and Gilbert, 2014);
- **Engagement:** number of shares, reactions, and comments on Facebook;
- **Topic:** lexicon features to differentiate between science topics and personal concerns;
- **Complexity:** type-token ratio, readability, number of cognitive process words (identifying discrepancy, insight, certainty, etc.);
- **Bias:** features modeling bias using lexicons (Recasens et al., 2013; Mukherjee and Weikum, 2015) and subjectivity as calculated using pre-trained classifiers (Horne et al., 2017);
- **Morality:** features based on the Moral Foundation Theory (Graham et al., 2009) and lexicons (Lin et al., 2017)

There's something very familiar
about all of this...

Oh, right.

	GOOD	BAD
Currency		
Relevancy		
Accuracy		
Authority		
Purpose		

Programmers are teaching
their algorithms using
the same over-simplified,
problematic infolite checklists
that instruction librarians
have been using for the
past two decades.

Who would think that more AI is
the solution to this situation?

“But what, exactly, can be done? Nobody is really sure what will work, but [tech leaders] had a few ideas.

J. Galen Buckwalter, best known as the brains behind eHarmony’s patented algorithm for matching singles profiles on its dating site, suggested that **AI could potentially revamp social media ‘into an antidote for authoritarian thinking.’**

However, [Danah] Boyd [a researcher at Microsoft and founder of the Data & Society Research Institute] expressed concern that **AI could be subverted as well.** She noted that groups of social media hackers that use the dark web to share tools and strategies have started to address AI. Among the thought experiments they’re now toying with is how to affect ‘core data sources to **mess with the natural language processing systems.’”**

Perry, T.S. (2017, November 14). Tech leaders dismayed by weaponization of social media. *IEEE Spectrum*. Retrieved from: <https://spectrum.ieee.org/view-from-the-valley/telecom/internet/tech-leaders-dismayed-by-weaponization-of-social-media>

“Technology is to blame,
therefore technology must
be the solution.”

-People who are wrong.

What exactly does
“information literacy” become
in a context where
“factual information”
is determined by a machine?

Over-simplification is not
the solution and technology
will not save us.
Problematize everything.

But how can we problematize
something as ubiquitous as
algorithms?

Oh, right.

why are black women so



- why are black women so **angry**
- why are black women so **loud**
- why are black women so **mean**
- why are black women so **attractive**
- why are black women so **lazy**
- why are black women so **annoying**
- why are black women so **confident**
- why are black women so **sassy**
- why are black women so **insecure**

ALGORITHMS OF OPPRESSION

HOW SEARCH ENGINES
REINFORCE RACISM

SAFIYA UMOJA NOBLE

“The insights about sexist or racist biases that I convey here are important because information organizations, from libraries to schools and universities to governmental agencies, are increasingly reliant on or being displaced by a variety of web-based ‘tools’ as if there are no political, social, or economic consequences of doing so.”

Noble, S.U. (2018) *Algorithms of oppression: How search engines reinforce racism*. New York: NYU Press.

Unlike the Google Search algorithm addressed by Noble, this “fake news” AI is being developed in the open.

Let's return to that example of the “fake news” algorithm:

Predicting Factuality of Reporting and Bias of News Media Sources

Ramy Baly¹, Georgi Karadzhov³, Dimitar Alexandrov³, James Glass¹, Preslav Nakov²

¹MIT Computer Science and Artificial Intelligence Laboratory, MA, USA

²Qatar Computing Research Institute, HBKU, Qatar;

³Sofia University, Bulgaria



“Qatar Computing Research Institute (QCRI) is a national research institute... [that] supports Qatar Foundation’s mission by helping to build Qatar’s innovation and technology capacity. It is focused on tackling large-scale computing challenges that **address national priorities** for growth and development... In doing this, QCRI conducts world-class multidisciplinary computing research that is relevant to the needs of Qatar, the wider Arab region, and the world. We perform cutting-edge research in such areas as Arabic language technologies, social computing, data analytics, distributed systems, cyber security and computational science and engineering.” (Emphasis added)

Qatar Computing Research Institute. (2018). *About us*. Retrieved from <https://www.qcri.org/about-qcri>

One of the organizations responsible for this research is committed to supporting the government of Qatar.

“The outspoken Qatari TV broadcaster, Al Jazeera, has transformed the media landscape in the rest of the Arab world but ignores what happens in Qatar itself. The Doha News website continues to be blocked within Qatar. Journalists in this small emirate are left little leeway by the oppressive legislative arsenal and the draconian system of censorship. **The government, the royal family, and Islam are off limits to reporters** (as in the rest of the Persian Gulf) and **violators risk imprisonment**. A cyber-crime law adopted in **late 2014** imposed additional restrictions on journalists and **criminalized posting ‘false news’ online.**” (Emphasis added)

Reporters Without Borders. (2018). *Qatar*. Retrieved from <https://rsf.org/en/qatar>

This algorithm is designed to detect “fake news.” It is being developed in a country that does not have a free press, where “fake news” is a crime.

Remember, this is how they
have programmed their algorithm
to evaluate information:

**“.gov is for governmental websites,
which are generally credible and unbiased.”**

Baly, R., Karadzhov, G., Alexandrov, D., Glass, J., & Nakov, P.
(2018). Predicting factuality of reporting and bias of news
media sources. *arXiv preprint*. arXiv:1810.01765.

“Fake news” became a crime
in Qatar a full two years
before the American
Presidential Election of 2016.

I'm not picking on Qatar.

The weaponization of algorithms is a global concern, this is just a recent example.

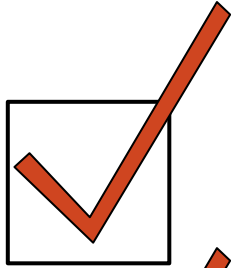
This issue of “fake”
information goes beyond the
current situation in the U.S.
This is about authoritarian
control of information access.

These algorithms can and will
be exploited by authoritarians
with nationalistic aims.

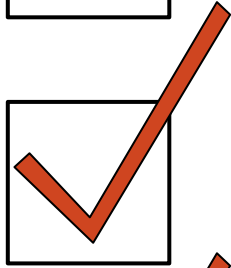
That's a lot to hit you with, so here's a picture of my orange tabby, Oscar J. Computer, whom we affectionately call "Bill." He is on a table next to a dozen white roses.



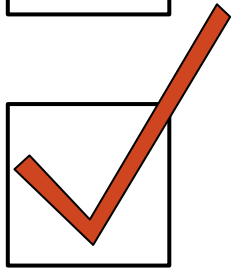
What do we do?



Remember that while the focus is on tech, this is about humans.



Reject over-simplified and ahistorical explanations.



Problematize the processes that got us here, and now claim to save us.

What questions do you have?

These slides are available online:

<https://kevinseeber.com/claps2018.pdf>

Email: kevin.seeber@ucdenver.edu

Twitter: [@kevinseeber](https://twitter.com/kevinseeber)