

How to Speak

<https://www.youtube.com/watch?v=Unzc731iCUY>

Kenneth Church

CS 7290

Say everything three times

- | | |
|--------------------------|----------------------------|
| 1. Say what you will say | 1. Promise |
| 2. Say it | 2. Connect the dots: 1 → 3 |
| 3. Say what you said | 3. Delivery |

The Promise

- Success in life depends on ability to communicate
 1. Ability to speak
 2. Ability to write
 3. Quality of ideas
- (In that order)
- Here is my promise:
 - Today you will see some examples
 - It may be that only one of these is the one that gets you the job

Outline

- How to start
 - Joke? No!
 - Promise? Yes!
- Samples/heuristics
 - Rule of 3s (cycle)
 - Build a fence around your idea
 - Distinguish from others
 - Verbal Punctuation (8 min)
 - Ask a question (example of above)
- Time: 11A (audience is awake)
- Place: not dark, cased, populated (12 min)
- Black board >> Powerpoint
 - Speed, target
 - Avoid social insults (16 min)
 - hands in pockets
 - Props: (20 min)
 - book → stove
 - bike wheel (freshman physics)

Outline (continued)

- Empathy
- Slides
 - Avoid too many slides/words
 - Don't read slides
 - Slides shouldn't upstage speaker
 - We have just one lang processor
- Pointer (breaks prop)
 - Laser pointer breaks eye contact
- Exactly 1 complicated slide
- Keep the audience engaged
- Informing
 - Promise
 - Inspiration (demos)
 - How to think (stories)
- Persuading
 - Oral Exams
 - Job Talks (44 min)
 - Getting Famous

Outline (continued)

- Job Talk
 - Vision: problem / approach
 - Done something:
 - steps → contributions
- How much time? 5 min!
- Getting Famous (55 min)
 - Example of sitting next to Julia Child: you never get used to being ignored
 - Memorable: arch learning (prop)
 - Slogan: one-shot learning
 - Surprise: one example
 - Not a million
 - Salient idea (near miss)
 - Tell a story

How to stop (53 min)

- Bad ways
 - Thank your collaborators
 - Ask for questions
 - URL (for more)
 - THE END
 - Conclusions
 - Thank you (weak move)
- Better
 - Contributions
 - Tell a joke (Doug Lenat)
 - Salute the audience (60 min)

Background

- I took his AI course as freshman
 - And first heard this talk in 1970s
- Patrick died soon after the version you listened to
 - Heavy breathing / Low energy



- Try to enjoy yourself
 - Audience is like a dog
 - If you feel good → they feel good
 - If you show fear → they will bite
- Find your own voice
 - Patrick has a formula that works for him (a bit too much for me)
 - Your mileage may vary

<https://www.youtube.com/watch?v=IE3KNOz6uo8>

<https://www.youtube.com/watch?v=Unzc731iCUY>

Cathy's Timeline: Talk (30) + Questions (30)

<https://www.youtube.com/watch?v=TQHs8SA1qpk>

- Negative Criticism: 32 minutes
 - Personal Background: 0-4
 - Loves math (because it is true)
 - Disillusion (5)
 - Algorithm = Data + Loss Function
 - Success for whom (8)
 - Audience for Book (public): (9)
 - Job/School/Loan/Insurance/Jail (10)
- Three Examples (not 12!)
 - Teaching (11-20)
 - Employment (20-25)
 - Police Practices (25-32)
- Constructive Conclusion: (32-33)
 - do no harm, oath, method to audit, transparency
- Criticism: downer (too negative)
 - more problems than solutions

What is the ask? Purpose of Talk?

- Propose: Book tour
- Ask: Please buy her book
- Different talks for different audiences
 - Book → General Public
 - Google ≠ General Public



Engage the Audience

More Challenging Audience



More Sympathetic Audience Cathy O'Neil: Do Algorithms Perpetuate Human Bias?

npr By NPR/TED Staff
Published January 26, 2018 at 8:12 AM CST



|| LISTEN • 12:27

Part 1 of the TED Radio Hour episode [Can We Trust The Numbers?](#)

About Cathy O'Neil's TED Talk

Mathematician Cathy O'Neil says algorithms embed existing bias into code – with potentially destructive outcomes. Everyone should question their fairness, not just computer scientists and coders.

About Cathy O'Neil

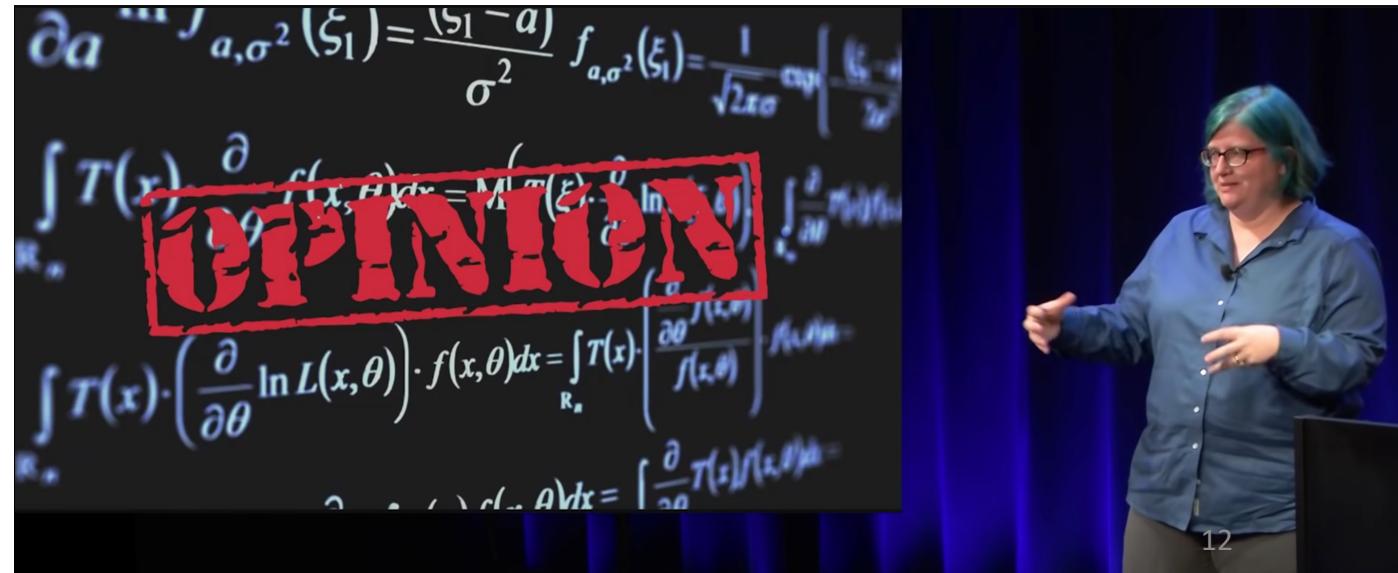
[Cathy O'Neil](#) is a mathematician, data scientist, and author of the blog [mathbabe.org](#).

After receiving a PhD in mathematics from Harvard University in 1999, she taught at Barnard and MIT. She then went on to work as a hedge fund analyst, and later a data scientist, designing algorithms for targeted ads.

O'Neil is the author of several data science books, such as [Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy](#).

How does she start?

- Establish a bridge with the audience
 - Some speakers start by pulling rank,
 - But her approach may be more affective (bond with audience)
- Personal Background: 0-4 minutes
 - Loves math (because it is true)
 - Disillusion (5 minutes)



Patrick's 5 Minute Rule:

Create the problem and solve it in 5 minutes

$$\partial_a J_{a,\sigma^2}(\xi_1) = \frac{(\xi_1 - a)}{\sigma^2} f_{a,\sigma^2}(\xi_1) = \frac{1}{\sqrt{2\pi}\sigma} \exp\left(-\frac{(\xi_1 - a)^2}{2\sigma^2}\right)$$
$$\int_{\mathbb{R}_+} T(x) \cdot \frac{\partial}{\partial \theta} f(x, \theta) dx = M(T(x), \frac{\partial}{\partial \theta} \ln L(x, \theta))$$

OPINION

$$\int_{\mathbb{R}_+} T(x) \cdot \left(\frac{\partial}{\partial \theta} \ln L(x, \theta) \right) \cdot f(x, \theta) dx = \int_{\mathbb{R}_+} T(x) \cdot \left(\frac{\partial \theta}{f(x, \theta)} \right) f(x, \theta) dx$$
$$\partial_\theta \int_{\mathbb{R}_+} T(x) f(x, \theta) dx = \int_{\mathbb{R}_+} \frac{\partial}{\partial \theta} T(x) f(x, \theta) dx$$



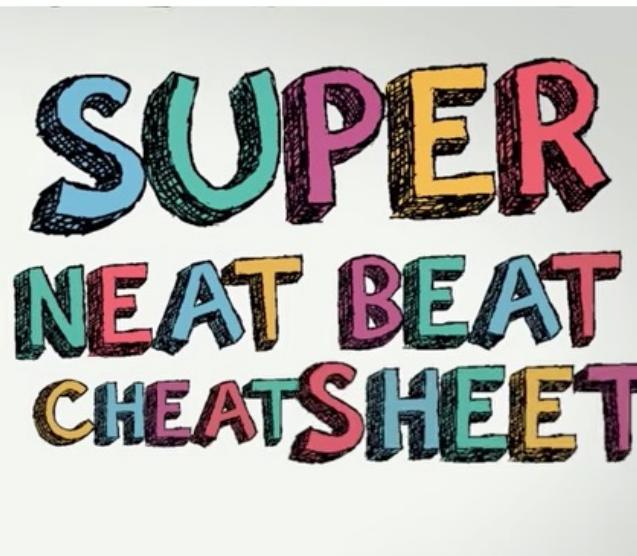
Memorable: WMD Weapons of Math (Mass) Destruction

A photograph of a woman with short, light blue hair and glasses, wearing a blue button-down shirt, standing on a stage with her hands on her hips. To her left is a large teal rectangular graphic containing the text "WIDESPREAD MYSTERIOUS DESTRUCTIVE". The background is dark.



Hook Techniques

- 1) Give 'em something to shout about
 - 2) Repeat melody phrases
 - 3) Punctuation is catchy
 - 4) Get weird



Hooks

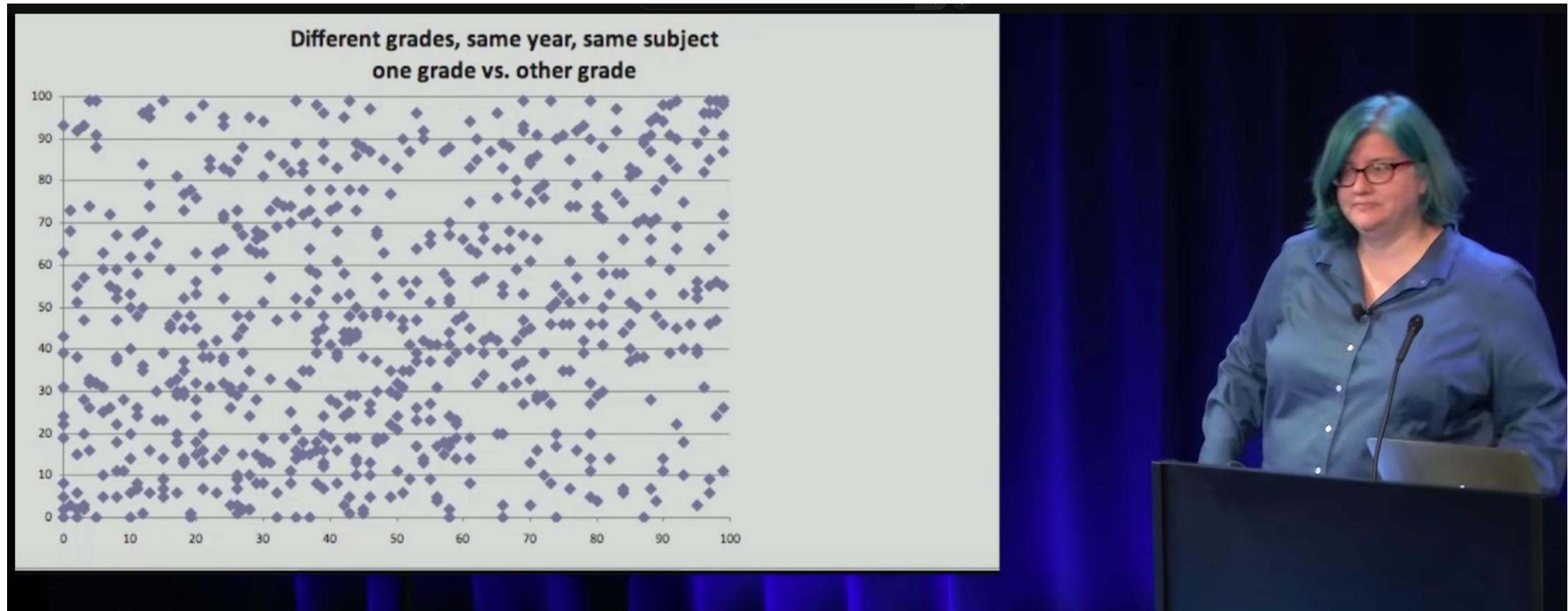
<https://www.youtube.com/watch?v=CpRkoZs1Bvc>

Hook Techniques

- 1) Give 'em something to shout about

“A hook is the thing the audience shouts back at you when you play live.”

Punch Line: Little Correlation → Laughter



How does she end?

Ans: Constructive suggestions



What is she doing now?



Algorithms are increasingly assisting or replacing people in making important decisions. Today, algorithms help decide who gets hired, how much to charge for insurance, who gets approved for a mortgage or a credit card. They also inform choices about sentencing, parole, and bail. We tend to hear about these algorithms when they mess up -- when they offer women less credit than men, or make it harder for people with mental health status to get jobs, or treat black defendants more harshly than white ones.

Whether made by people or algorithms, these are hard decisions. Sometimes they will be wrong. But **there is no excuse for an algorithm to be racist, sexist, ageist, ableist, or otherwise discriminatory.**

Survey of Papers on Bias in ACL Anthology

Year	Papers	Year	Papers
2010-2015	6	2019	43
2016	5	2020	58
2017	15	2021	91
2018	8	2022	76
Totals	34	Totals	268

WMD

Table 1: 89% of the 302 papers are from 2019-2022.

Do's and Don'ts (from a class 5 years ago)

You guys did

- Agree with Cathy
 - Profit ≠ Fairness
 - Lack of transparency
- Pivot from her WMD story to topics we've discussed recently
 - Word embeddings
 - Deep Nets
 - Adversarial Attacks
 - Speech recognition
 - How to get citations
- Some mentioned specifics
 - loans, teaching, college admissions...
- Citations ranged from 107 to 170
 - Not yet seminal (more recent; less cited)

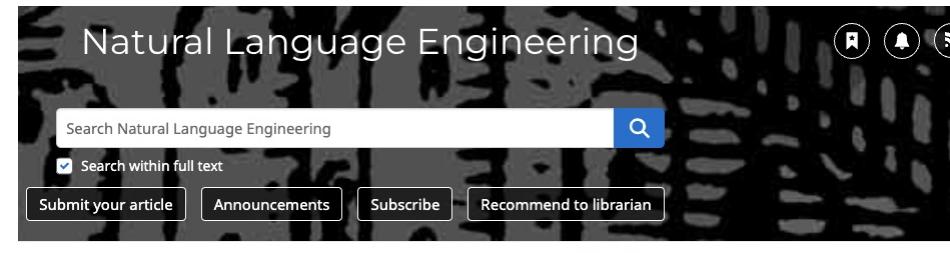
You guys (mostly) didn't

- Disagree with Cathy
- Get defensive / Attack her
- Cite the same references
 - Many of these issues have been raised before
 - Why is Cathy's work being noticed (more than others)
- Offer constructive suggestions
 - Sunlight
 - Democracy
 - Media Pushback (Social + Traditional)
 - Peer pressure, affirmative action, PC, epidemiology, quotas
 - Regulation: FDA for algorithms
 - Run studies to prove safe & effective
 - Unwind rankings-fuelled feedback loop generates an unreasonable number of college applications

Unfair, biased, addictive, dangerous, deadly, and insanely profitable

<https://www.cambridge.org/core/journals/natural-language-engineering/most-read>

- Responsible AI: Need to address both Risks 1.0 & 2.0
 - Risks 1.0:
 - Unfair and biased
 - Risks 2.0:
 - Addictive, Dangerous and Deadly
 - Root cause:
 - Toxicity is insanely profitable
- Trafficking in misinformation → more engagement → profit



Most read

This page lists the top ten most read articles for this journal based on the number of full text views and downloads recorded on Cambridge Core over the last 30 days. This list is updated on a daily basis.

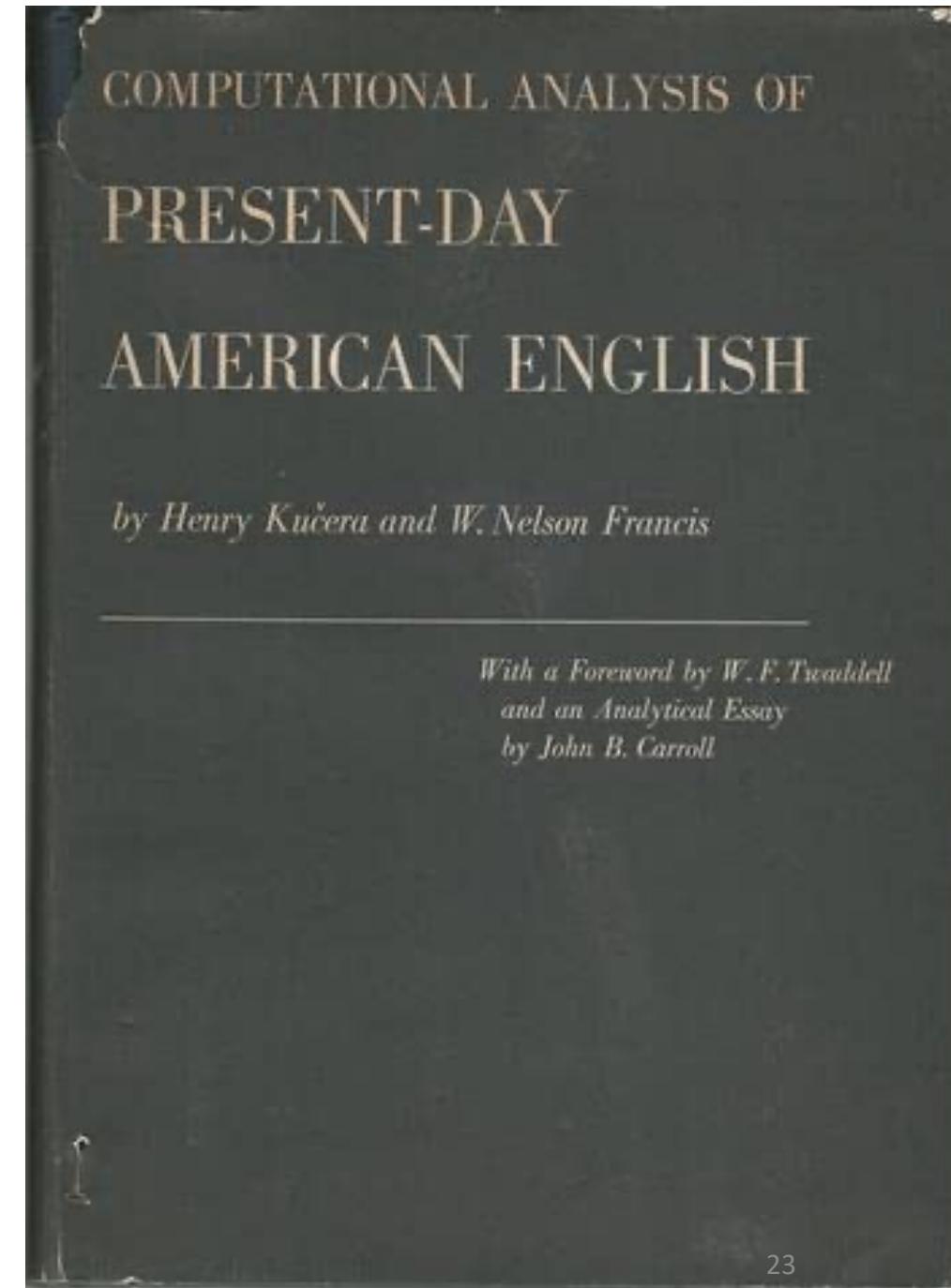
Rank	Title	Views
1	Emerging trends: Unfair, biased, addictive, dangerous, deadly, and insanely profitable	6
2	GPT-3: What's it good for?	24
3	Word2Vec	12

The table shows the top three most-read articles with their titles, abstracts, and download options. Each article entry includes a small circular badge indicating the number of views: 6 for the first article, 24 for the second, and 12 for the third.

Panel Presentation on Bias

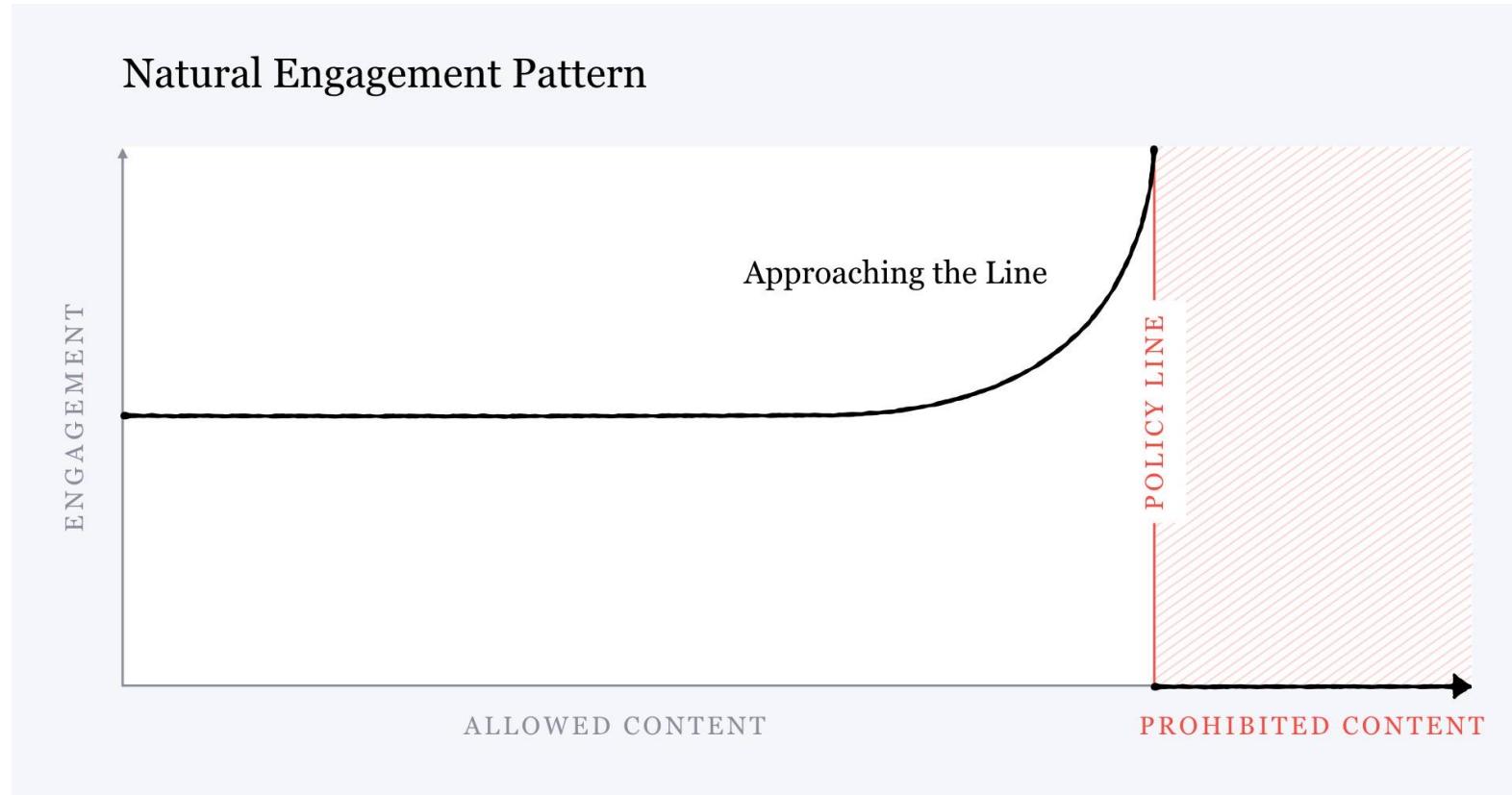
Bias and Balanced Corpora

- Super-important in Lexicography
 - PMI (Church & Hanks, 1990)
- Should a dictionary be
 - Prescriptive (e.g., RP, King's English)
 - Descriptive (e.g., a sample full of warts)
- Debiasing a corpus → Prescriptive
 - Real corpora contain 4-letter words
 - (and much worse)
- Social media → Unrepresentative
 - (algorithm → toxicity)



A Blueprint for Content Governance and Enforcement

Mark Zuckerberg <https://www.facebook.com/notes/751449002072082/>

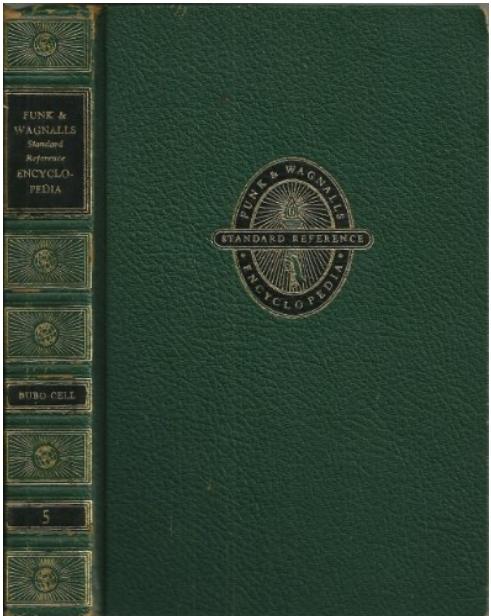


Smothers brothers get cancelled



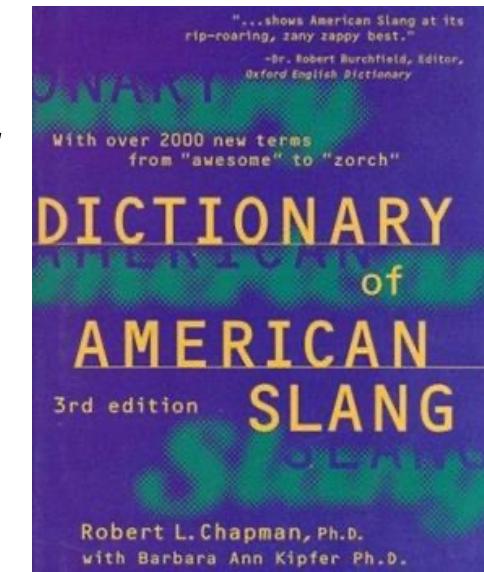
Look that up in your Funk & Wagnalls!

<https://www.facebook.com/watch/?v=10156729609852845>



Chapman (Chap): Blacklisting, Censorship Taboo Content is Engaging (Social Media)

- Laugh-In
 - *Sock it to me!*
 - *Here come de Judge!*
 - *You bet your sweet bippy!*
 - *Look that up in your Funk and Wagnalls!*
- Laugh-In was breaking rules
 - 7-words you can't say on TV
 - ``Funk'' sounds like one of them
- Ironic
 - Chap was blacklisted
 - He is also an expert on ``slang''
- For field work, he would listen to right-wing talk radio
 - ``guilty pleasure'': shocking (and engaging)
 - Their language is not like our language



Excellent coverage of taboo language

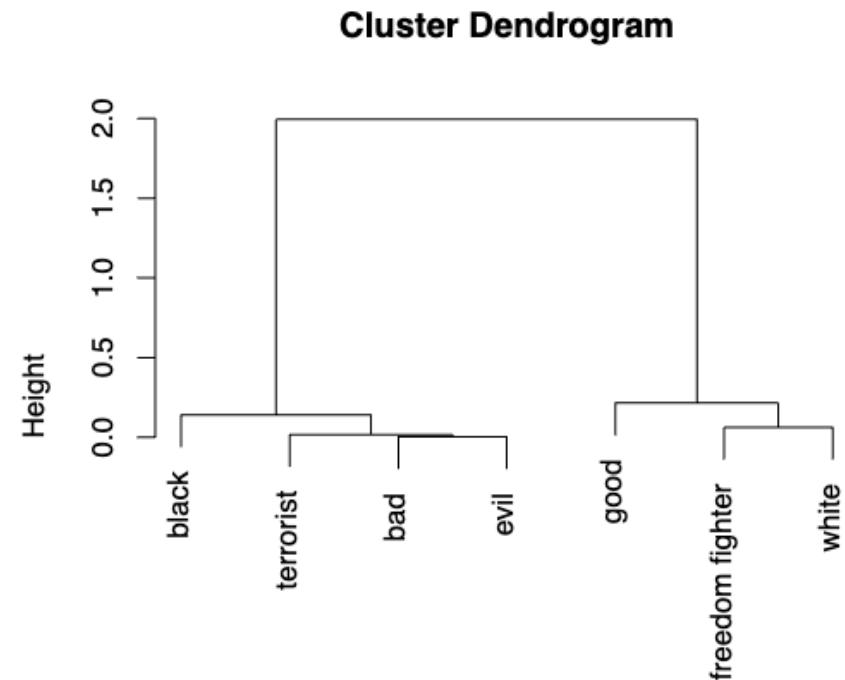
Biases are everywhere

- Training on Lexical Resources
 - Church et al, LREC-2022

$text_1$	$text_2$	y_1	y_2
good	bad	-3.95	4.54
bad	evil	4.44	-5.00
good	benevolent	4.43	-5.05
bad	benevolent	-3.44	4.16
good	terrorist	-3.43	4.10
bad	terrorist	4.48	-5.10

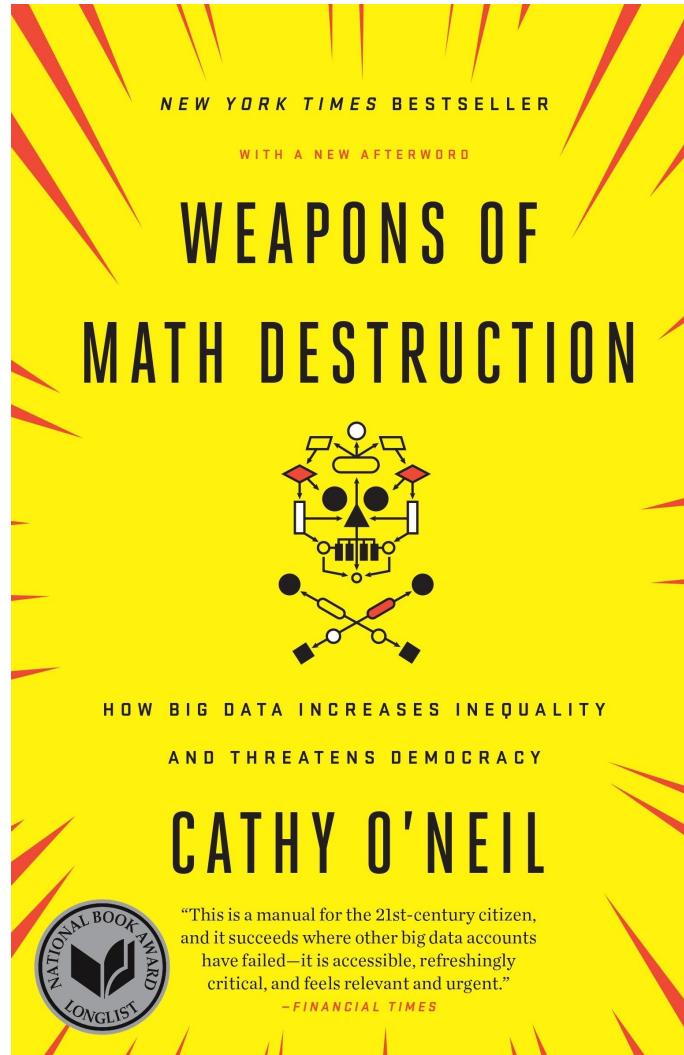
Table 1: Inference: synonymy iff $y_1 > y_2$

$text_1$	$text_2$	y_1	y_2
freedom fighter	good	2.33	-2.56
freedom fighter	bad	-1.50	2.19
white supremacist	good	-2.05	2.91
white supremacist	bad	1.67	-1.61



Taboo Content

Risk 1.0 (5 years ago) Product gets canceled



MICROSOFT WEB TL;DR

Twitter taught Microsoft's AI chatbot to be a racist asshole in less than a day

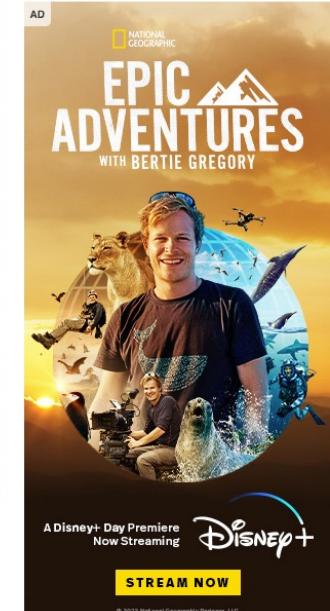
By James Vincent | Mar 24, 2016, 6:43am EDT

Via [The Guardian](#) | Source [TayandYou \(Twitter\)](#)
| 68 comments

f t SHARE



Listen to this article



Microsoft sued for 'racist' application

Microsoft says it fixed the problem -- long before the litigation.

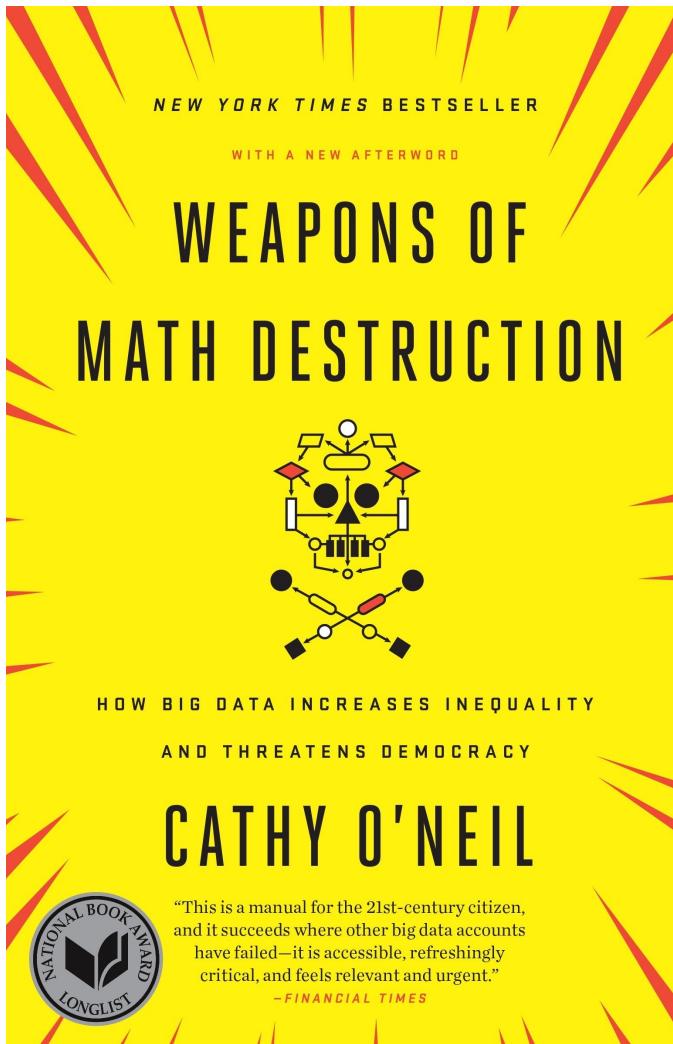


Written by [Matthew Broersma](#), Contributor on June 29, 1999

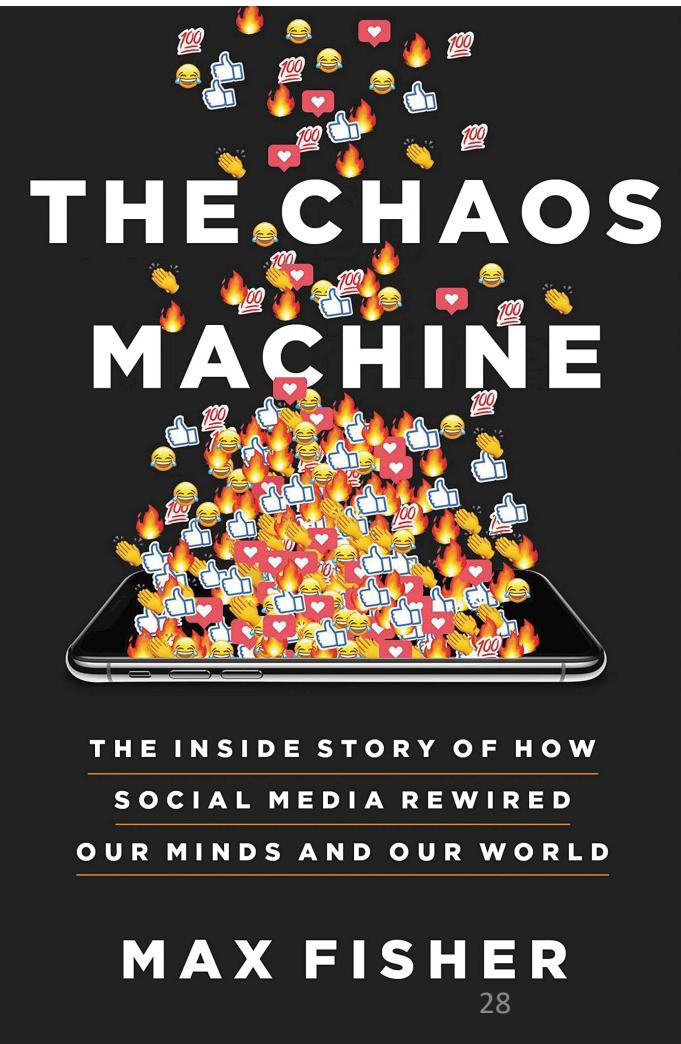
Are we losing ground??? Are we at fault???

- Risks 1.0: (work in progress)
 - Unfair, Biased
- Risks 2.0: (bigger than us)
 - Addictive, Dangerous, Deadly and Insanely Profitable
 - Root causes:
 - ML + Social Media → Addiction
 - Max Engagement → Dangerous
 - Insanely profitable:
 - Companies & Countries
 - Long book, but no mention of our efforts to address Risk 1.0

2016

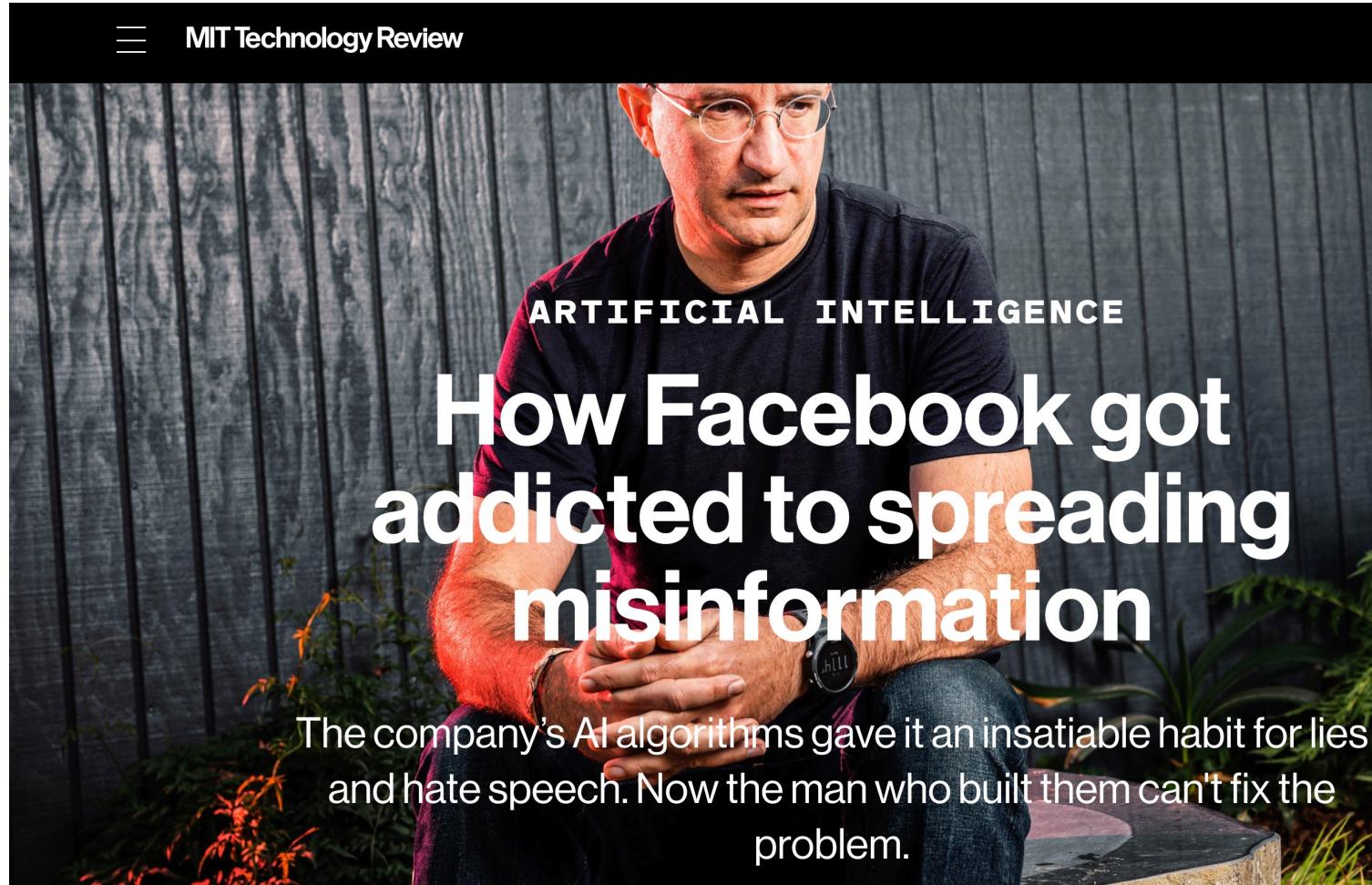


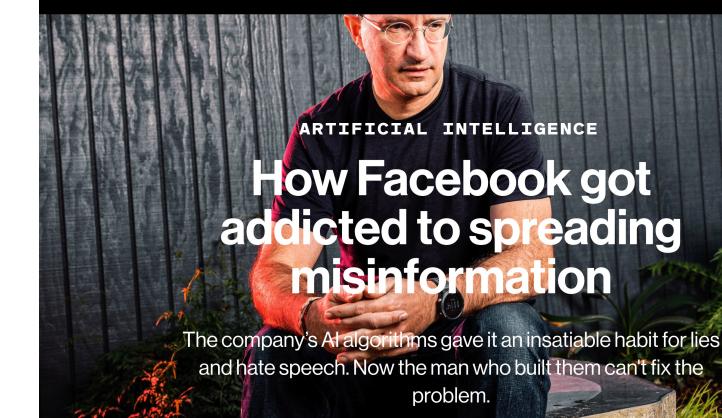
2022



Reporter wanted to talk about 2.0 risks; Accused Facebook of pivoting to 1.0 risks

<https://www.technologyreview.com/2021/03/11/1020600/facebook-responsible-ai-misinformation/>





Pivot Criticism

- *But Entin and Quiñonero had a different agenda.*
- *Each time I tried to bring up these topics [2.0 risks],*
 - *my requests to speak about them were dropped or redirected.*
- *They only wanted to discuss [1.0 risks],*
 - *the Responsible AI team's plan to tackle one specific kind of problem:*
 - *AI bias, in which algorithms discriminate against particular user groups.*
- *An example would be an ad-targeting algorithm*
 - *that shows certain job or housing opportunities*
 - *to white people but not to minorities.*

<https://www.technologyreview.com/2021/03/11/1020600/facebook-responsible-ai-misinformation/>

How did Omar start?

We should be working on KG; no ask/promise

Introduction



Knowledge graph (KG) describes objects of interest and connections

Organizing data as nodes and edges

Examples

Microsoft Satori, Google Knowledge Graph, Amazon Product Graph

Knowledge bases (KBs): Yago, Freebase

Knowledge graph and knowledge base terms are used interchangeably

Patrick's 5 Minute Rule: Still not clear where we are going

KGs in action

Semantic search

Going beyond 10-blue links

Understanding queries and documents

Question-answering

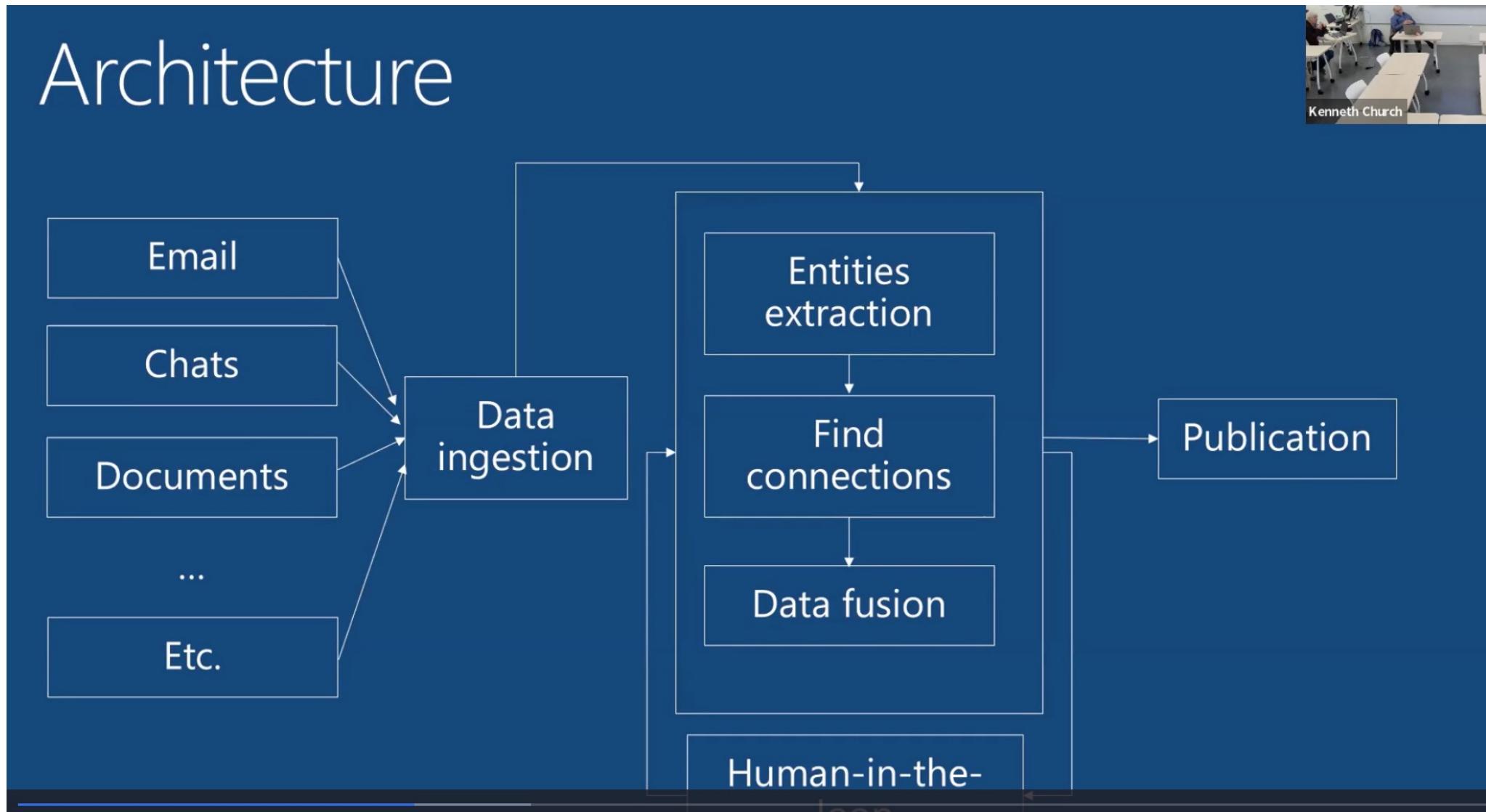
Language understanding

Data cleaning



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Patrick's Rule about 1 complicated slide



How did Omar end?

Questions?



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Discussion:

An effective talk will anticipate these issues

- What did he/she say?
 - If audience cannot summarize 30 minute talk in 30 seconds,
 - then it doesn't matter what they said
- What is the ask?
 - Ans: 1.5 months of engineer's time
- Do-able & Worth doing
- Promise / Delivery:
 - MVP (Minimum Viable Product)
 - Budget / Timeline / Evaluation / Roadmap
- Related work: Cyc, Wordnet
 - Metrics of success: downloads, engagement, citations
 - Under-promise and over-deliver
 - Credibility of team
- Different paths to successful career
 - Sales / Delivery

How did Ken start? What's new since the previous versions of this talk

New Stuff (since yesterday)

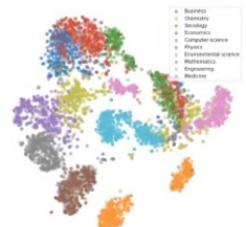
- New team member: Hui Guan
- Contribution from new team member:
 - GNNs with parallelism during training
 - Evaluation (and related downstream evaluations)



Where are we after 5 minutes? (Patrick's 1 complicated slide)

ABSTRACT

This paper introduces ArtELingo, a new benchmark and dataset, designed to encourage work on diversity across languages and cultures. Following ArtEms, a collection of 80k artworks from WikiArt with 0.45M emotion labels and English-only captions, ArtELingo adds another 0.79M annotations in Arabic and Chinese, plus 4.8K in Spanish to evaluate ‘cultural-transfer’ performance. More than 51K artworks have 5 annotations or more in 3 languages. This diversity makes it possible to study similarities and differences across languages and cultures. Further, we investigate captioning tasks, and find diversity improves the performance of baseline models. ArtELingo is publicly available, with standard splits and baseline models. We hope our work will help ease future research on multilinguality and culturally-aware AI.



CITATIONS

- Malak Abdullah and Samira Shaikh. 2018. TeamUNCC at SemEval-2018 task 1: Emotion detection in English and Arabic tweets using deep learning. In *Proceedings of The 12th International Workshop on Semantic Evaluation*, pages 350–357, New Orleans, Louisiana. Association for Computational Linguistics.
- Abubakar Abid, Maheen Farooqi, and James Zou. 2021. Persistent anti-muslim bias in large language models. In *Proceedings of the 2021 AAAI/ACM Conference on AI, Ethics, and Society*, pages 298–306.
- Lila Abu-Lughod. 1990. The romance of resistance: Tracing transformations of power through bedouin women. *American ethnologist*, 17(1):41–55.
- Panos Achlioptas, Maks Ovsjanikov, Kilian Haydarov, Mohamed Elhoseiny, and Leonidas Guibas. 2021. Artemis: Affective language for visual art. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*.
- Jean-Baptiste Alayrac, Jeff Donahue, Pauline Luc, Antoine Miech, Iain Barr, Yana Hasson, Karen Lenc, Arthur Mensch, Katie Millican, Malcolm Reynolds, et al. 2022. Flamingo: a visual language model for few-shot learning. *arXiv preprint arXiv:2204.14198*.

Semantic Scholar Specter Embeddings



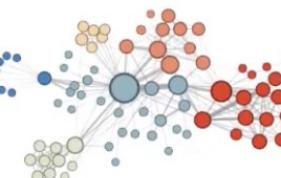
Paper Citation
Graph

TEXT EMBEDDINGS



Kenneth Church

BETTER TOGETHER PROPOSAL



CONTEXT EMBEDDINGS

How did we end?

Bigger Stretch: Theoretical combinations of deep nets & SVD



- Conjecture: More reps → more understanding
 - Unified theory of deep nets & SVD
- Compare & contrast: deep nets & SVD
 - BERT: example of deep nets
 - ProNE (node2vec): based on SVD
 - Both produce (similar) embeddings
- In speech, a spectrogram is just a different representation of wave file
 - So too, node2vec emb (M) is just a diff rep of G
 - Some representations are more convenient than others (depends on what you want to do)
 - Embeddings make it easy to estimate cos
- If M is computed from G ,
 - then M may have more parameters than G
 - but no more information: $H(M) \leq H(G)$
- In particular, SVD on sparse G increases params
 - but SVD does not create information
 - M_C has NK params, more than G (E params)
 - Since info is not created,
 - Most of the NK params must be redundant
 - Redundancy is easier to see with SVD than deep nets
- With traditional regression,
 - too many params → overfitting
 - But deep nets thrive on scale:
 - better results with more N , more K , etc. Why?
- Suggestions:
 - Larger K improves estimates of cos
 - Easier to see with node2vec (SVD) than deep nets
 - More K → Less dimension reduction
 - Network effects (Metcalfe's law)
 - Larger N makes search easier (not harder)
 - Web search ≫ Enterprise search
 - Easier to see with G than other representations

Discussion

- It is all over the place
 - Systems, Information Retrieval, etc.
 - Hybrid of merged projects:
 - looks chaotic because it is
- Embeddings can represent almost anything
 - Doesn't mean much
 - Make it very obvious that an embedding is just a spectral representation of almost everything
- Evaluation: opportunity for improvement