Inleiding Data Science: Algorithmic Bias

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Nijmegen, May 16th, 2019







Opdracht van Mireille:

Kun je studenten uitleggen hoe je een ML systeem zo kunt ontwerpen dat je daadwerkelijk zo weinig mogelijk data verwerkt en toch kwaliteit levert?

KIA Digitale Technologieën – AI (ST2-1), Q2:

Op welke wijze kunnen we deep-learning architecturen data-efficiënt training door expert kennis toe te voegen?

Outline

- Big Data
 - Waarom nou juist BIG data?!
- Bias on the Web
- Bias in Search Engines
 - Quantifying Bias using Retrievability
- Bias in Word Embeddings
 - informagus.nl/edu/cpo/



Big Data: nieuwe mogelijkheden!

Om

- Data te genereren,
- Delen,
- Combineren
- Analyseren

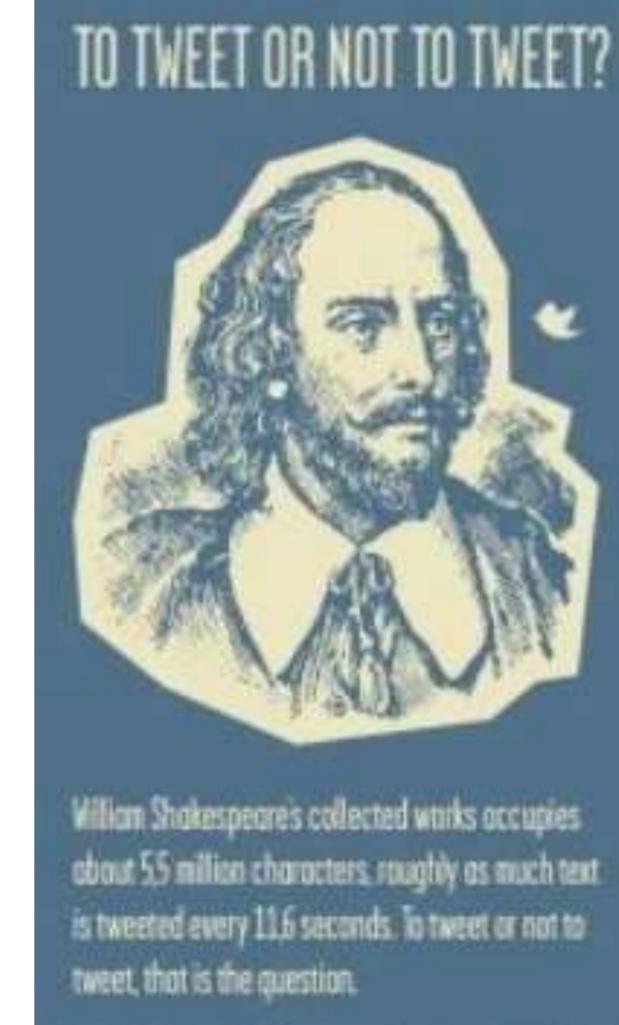
.. die leiden tot nieuwe inzichten en een nieuwe manier van redeneren.

(bron: Definitie van big data van de Nationale DenkTank)



Al het werk van William Shakespeare: 5.500.000 letters...

...wordt geschreven in slechts 11,6 Twitter-seconde!



Een wonderlijke puzzel!





Big Data in NL

- Aankopen bij bol.com
- Bestemmingen van <u>Booking.com</u> op maat
- Advertenties real-time verkopen, bv. bij nu.nl (Sanoma)
- Kinderzoekmachine <u>WizeNoze.com</u>

Etc. etc.

Cracking the Voynich Code

Two women dealing with five children in a bath

The words describe different temperaments: tozosr (buzzing: too noisy), orla la (on the edge: losing patience), tolora (silly/foolish), noror (cloudy: dull/sad), or aus (golden bird: well behaved), oleios (oiled: slippery). These words survive in Catalan [tozos], Portuguese [orla], Portuguese [tolos], Romanian [noros], Catalan [or aus] and Portuguese [oleio]. The words orla la describe the mood of the woman on the left and may well be the root of the French phrase 'oh là là', which has a very similar sentiment.



Cracking the Voynich Code

"It uses an extinct language. Its alphabet is a combination of unfamiliar and more familiar symbols. It includes no dedicated punctuation marks, although some letters have symbol variants to indicate punctuation or phonetic accents. All of the letters are in lower case and there are no double consonants. It includes diphthong, triphthongs, quadriphthongs and even quintiphthongs for the abbreviation of phonetic components. It also includes some words and abbreviations in Latin."



W YOUR ROLL —

o, someone hasn't cracked the code one mysterious Voynich manuscript

lieval scholar: "Sorry, folks, 'proto-Romance language' is not a thing."

FER OUELLETTE - 5/15/2019, 11:03 PM



SOUMSONM → H+ SO MUONH■SO → HU■ UX ◆■200H●H90 0■A 000M 200H●H90 +M080●+40 $\mathbb{C} \diamond \mathcal{C} + \mathbb{C} = \mathbb{C} \diamond \mathbb{C} \diamond$ ◆△○Λ□● ❖໑□米໑■◆• ◆□ 米■≗米ϻ૭♦୩ □◆■ϻ♦◆១♦米□■ $\mathcal{A} \square \square \qquad \Diamond m \qquad \mathfrak{S} \mathcal{Q} \mathcal{Q} \square m \Leftrightarrow \mathcal{H} \mathfrak{S} \Diamond \mathcal{H} \square \blacksquare \qquad \square \mathcal{A} \qquad \square m \square \blacksquare m \Diamond \mathcal{H} m$ Just like Latin to me!

Computers do this all the time!

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Wat is data?!

Byte = getal tussen 0 en 255



Wat is data?!

Byte = getal tussen 0 en 255 of een getal tussen -128 en +127 ©

Hoe zit dan dan met letters?

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3	0	1	2	3	4	5	6	7	8	9		;	٧	=	۸	?
4	@	Α	В	С	D	Ε	F	G	Н	I	J	K	L	М	N	0
5	Р	Q	R	S	T	U	V	W	Х	Υ	Z		\]	^	_
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UTF-8

The king of encodings

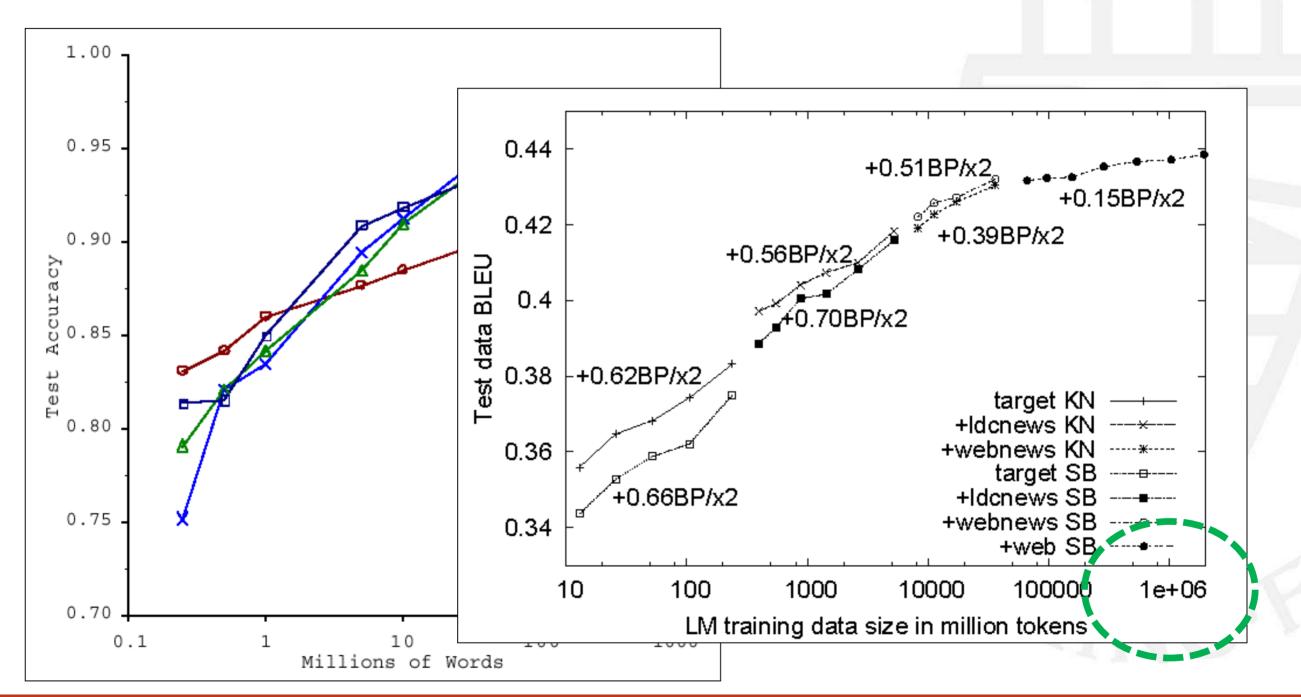
Variable length

ASCII characters are still one byte

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s/knowledge/data/g;

Waarom BIG data? Well... there's NO data like MORE data!





Use Google Data?!

■ E.g., Google releases *pre-trained word and phrase vectors:*

"We are publishing pre-trained vectors trained on part of Google News dataset (about 100 billion words). The model contains 300-dimensional vectors for 3 million words and phrases. The phrases were obtained using a simple data-driven approach described in [2]. The archive is available here: GoogleNews-vectors-negative300.bin.gz."

Hier komen we op terug in de case!



Machine Learning & Search



"Computational Relevance"

"Intellectually it is possible for a human to establish the relevance of a document to a query. For a computer to do this we need to construct a model within which relevance decisions can be quantified. It is interesting to note that most research in information retrieval can be shown to have been concerned with different aspects of such a model."

Retrieval Model

Van Rijsbergen, 1976





radboud university

4 Q

UII Images Maps Videos News More - Search books

About 2 160,000 results (0,53 seconds)

Radboud University - Radboud University

www.ru.mi/English *

Radboud University is studied in the oldest city in the Netherlands. It has seven faculties and enrols over 18000 students. Radboud University has grouped its ...

Master's programmes - PhD - English-taught Master's - Education

Institute for Computing and Information Sciences - Institute for ...

Radboud University: Faculty of Science - Institute for Computing and __ 1016 Radboud University: Discaimer - Stemap. print payoff. Terug near boven __

You've visited this page many times. Last visit: 9/27/16

University Library - University Library

www.ru.ni/ifprary/ **

This is the nonrepage of the University Library (US), Radbould University, Nijregen, Netherlands. You've visited this page 4 times, Last visit: 3/9/15.

Master's programmes - Radboud University

www.ru.nl., Radboud University , Education *

Ten Master's programmes at Radiooud University have been named the best in ...

Radboud University Nijmegen - Wikipedia, the free encyclopedia

https://en.wikipedia.org/wiki/Radboud_University_Ni/megen *

Radboud University Nijregen is a public university with a strong focus on research located in Nijregen, the Netherlands. It was established on 17 October 1923 ...

Radboud University | Facebook

www.facebook.nl : College & University * Translate this page

Contentusiaan 4, Nijmegen 6525 HP ... Radboud University, Nijmegen, Netherlands, 30175 likes 892 ... 18225 were here. The official Radboud University page.

Radboudumc - Research

https://www.radboudumc.ni/research *

Research. Researchers of the Radboud university medical center focus on scientific health challenges of today, with an eye on emerging diseases of the future.

Radboud University Nijmegen World University Rankings | THE

https://www.simes.highereducation.com/world-university.../radboud-university-nij.meg...*
Phd the latest world ranking position for Radboud University Nijmegen and key information for prospective students here today.

Radboud University | Top Universities

www.topuniversities.com/universities/radboud-university *

Radboud University is a student-oriented research university. Its teaching is geared to students who are actively participants in the academic community.

Radboud University | LinkedIn

https://www.linkedin.com/company/radboud-university-nij/megen *

Radboud University is a student-ofented research university. Its teaching is geared to students as actively participating members of the academic community.

Searches related to radboud university

recoous university ranking

radiocud university medical center

redboud university library

radiooud university spholarships for international students

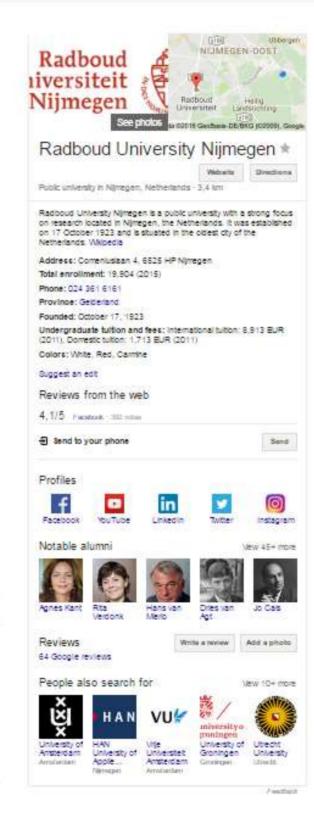
radicoud university psychology

regional university sports center

radiooid university computer science

radboud university dentistry



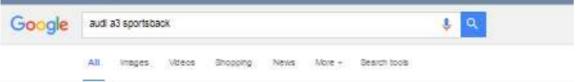


Herken eigennamen

Ordenen zoekresultaten

Voorspel wat jij wilt vinden

Suggesties andere vragen



About 13,100,000 results (0.95 seconds)

Showing results for audi a3 sportback Search instead for audi a3 sportsback

A3 Sportback > Home > Audi Nederland

https://www.audi.nli/nli/web/nl/modellen/a\$/a\$-sportback.html ** Translate this page De Audi A\$ \$portback bount zin voorsprong uit. Zin technologie is intuitief te bedienen, hij heeft, een strak design en het gebruiksgemak is state of the art.

New Audi A3 Sportback - Audi UK

https://www.audi.co.uk/new-cars/a3/a3-sportbaok.html *

The New Audi A3 Sportback - browse priding, offers, specifications, equipment and CC2 details. Arrange a test drive, request a prochare or calculate finance.

Images for audi a3 sportback

Report images



More images for audi a3 sportback

Audi A3 - Sportbaok etron 1.47F3 150pk PHEV, B Line, Trekhaak, Opp. L. Bouwjsan ... Audi A3

- Sportback 1.4 Tfsl 150pk Stronic CCD Sport pro line 3 Navig.

2016 Audi A3 TDI Sportback Photos and Info - News - Car and Driver www.carenddriver.com : News : Audi : A3 "

Audi Americanized its A3 models for U.S. consumption, but at least it's bringing us one very European version. Read more about the A3 TOI Sportback at Car ...

Audi A3 Sportback - Occasion, Tweedehands auto, Auto kopen www.autoscout24.nl/auto/audi/audi-a3/audi-a3-sportback/ * Translate this page Tweedehands Audi A3 Sportback kopen of verkopen. Op AutoScout24 vergelijk u spei en een/oudig te koop aangeboden Audi A3 Sportbacks. Vind uw ...

Audi A3 Sportback hatchback review | Carbuyer

www.carbuyerco.uk / Car Companies / Audi *

**** Rating: 4,3 - Review by Carbuyer

Sep 23, 2016 - Audi wants us to think of the A3 Sportback as a standardne model but its essentially the name for the five-door model of the standard three-door...

Audi A3 Review | Top Gear

www.topgearcom/carreviews/audi/a3 **

*** Rating: 7/10 - Review by Top Gear

Road Test: Audi A3 1.4 TFSI e-from Sdr S Tronic (2014-2016), £35,635 when new: About as good as petrol hybrid hatches get right how: 5 May 2015, Road Test:

2016 Audi A3 driven: better than a VW Golf? - The Telegraph

www.telegraph.co.uk - Lifestyle - Cars - Audi reviews *

May 24, 2016 - The new Audi A3's facelff is subtle... This new Audi A3 is just a Goff in a posh frox. snf 8? Audi A3 aportback 1.0 TPG Sport S-tronic.

Audi A3 Sportback | Auto Express

www.autoexpress.co.uk - Audi - A3 *

** * * * Rating: 4 - Review by Auto Express

Feb 19, 2016 - The latest Audi A3 aportback is a big improvement over the model t replaces, which wasn't much more than a three-door version with two extra ...

Searches related to audi a3 sportback

audi a3 sportback for sale audi a3 sportback wiki

audi g3 sportpack 2014 autotrader

audi a3 sportback review audi a3 sportback 2016 review audi a3 sportback speed audi a3 sportback opposition

Spelfouten corrigeren

Wat zou de gebruiker willen? Orden de "verticals"



Suggesties zoekvragen

Search & Privacy



AOL Search Dataset

- August 4, 2006: Logs voo
 - □ 3 maanden, 650 duizend Published: August 9, 2006
 - Anonieme User IDs

d	AnonID	Query
	1234567	uw cse
	1234567	uw admissions process
	1234567	computer science hci
	1234567	computer science hci
	1234567	seattle restaurants
	1234567	perlman montreal
	1234567	uw admissions notification
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- Ineima Arnoia bevestigt
- August 21, 2006: 2 AOL
- September, 2006: "Class

A Face Is Exposed for AOL Searcher No. 4417749

By MICHAEL BARBARO and TOM ZELLER Jr.

Buried in a list of 20 million Web search queries collected by AOL and recently released on the Internet is user No. 4417749. The number was assigned by the company to protect the searcher's anonymity, but it was not much of a shield.



Thelma Arnold's identity was betrayed by AOL records of her Web searches, like ones for her dog, Dudley, who clearly has a problem.

No. 4417749 conducted hundreds of searches over a three-month period on topics ranging from "numb fingers" to

"60 single men" to "dog that urinates on everything."

And search by search, click by click, the identity of AOL user No. 4417749 became easier to discern. There are queries for "landscapers in Lilburn, Ga," several people with the last name Arnold and "homes sold in shadow lake subdivision gwinnett county georgia."

It did not take much investigating to follow that data trail to Thelma Arnold, a 62-year-old widow who lives in Lilburn, Ga., frequently researches her friends' medical ailments and loves her three dogs. "Those are my searches,"

SIGN IN TO E-

SINGLE PAGE

FRINT

REPRINTS



- Anonieme IDs geen garantie voor anonimiteit
 - Logs bevatten direct identificerende informatie:
 - Namen, telefoonnummers, credit cards, BSNs
 - Tevens indirect identificerende informatie:
 - Thelma's vragen uit het NYT artikel
 - Geboortedatum, geslacht en postcode is voldoende om 87% van de Amerikanen uniek te identificeren!

Bias & Machine Learning



Computers Struggling with Text

- Microsoft Tay: <u>chatbotslife.com/the-accountability-of-ai-case-study-</u> microsofts-tay-experiment-ad577015181f
- Amazon's Al recruiting tool: <u>reuters.com/article/us-amazon-com-jobs-automation-insight/amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idUSKCN1MK08G</u>

- Any remedy for bias starts with awareness of its existence.
- Bias on the Web reflects biases within ourselves, manifested in subtler ways.
- We must consider and account for bias in the design of Web-based systems that truly address the needs of users.

OUR INHERENT HUMAN tendency of favoring one thing or opinion over another is reflected in every aspect of our lives, creating both latent and overt biases toward everything we see, hear, and do. Any remedy for bias must start with awareness that bias exists; for example, most mature societies raise awareness of social bias through affirmative-action programs, and, while awareness alone does not completely alleviate the problem, it helps guide us toward a solution. Bias on the Web reflects both societal and internal biases within ourselves, emerging in subtler ways. This article aims to increase awareness of the potential effects imposed on us all through bias present in Web use and content. We must thus consider and account for it in the design of Web systems that truly address people's needs.

Bias has been intrinsically embedded in culture and history since the beginning of time. However, due to and reach
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we might not have encountered previously. This makes understanding and recognizing bias on the Web more essential than ever. My main goal here is thus to raise the awareness level for all Web biases. Bias awareness would help us design better Web-based systems, as well as software systems in general.

Measuring Bias

The first challenge in addressing bias is how to define and measure it. From a statistical point of view, bias is a systemic deviation caused by an inaccurate estimation or sampling process. As a result, the distribution of a variable could be biased with respect to the original, possibly unknown, distribution. In addition, cultural biases can be found in our inclinations to our shared personal beliefs, while cognitive biases affect our behavior and the ways we make decisions.

Figure 1 shows how bias influences

» key insights

- Any remedy for bias starts with awareness of its existence.
- Bias on the Web reflects biases within ourselves, manifested in subtler ways.
- We must consider and account for bias in the design of Web-based systems that truly address the needs of users.

Bias on the Web – Highlights

- Activity Bias
 - In many collections, a few contributors create half the data:
 - Two Twitter datasets: 0.05% of the most popular people attracted almost 50% of the participants in the 1st and 2% of the users generated 50% of the tweets in the 2nd dataset
 - Facebook dataset:7% of active users produced 50% of the posts
 - Amazon reviews dataset:4% of active users produced 50% of reviews (fraud?)
 - Wikipedia: 2000 people (0.04% of registered editors) wrote half of the entries of English Wikipedia
 - A "Digital Desert" of Web content no-one ever sees

Bias on the Web – Highlights

- Data Bias
 - 50% of popular web sites are in English...
 - ... but percentage of native English speakers is only 5%, all English speakers 13% (Disclaimer: stated source is Wikipedia.)
 - Own example:
 POI recommendation using geo-tagged Flickr photos:
 everyone visiting Paris visits the Eiffel Tower...
 - Consequence: optimizing for a data driven performance measure like accuracy forces the approach to recommend the Eiffel Tower even if this is a useless recommendation!

Bias on the Web – Highlights

- UI/UX influence on collected data:
 - Presentation Bias
 - You can only click on what you see!
 - Position Bias
 - You only see where you look!
- Click distributions only useful when de-biased!
- Second-order bias originating in personalization: biasing content to our own pre-existing selection biases?



Question:

How to quantify the ranking bias in search engines?

Retrievability

Measures bias in the access of documents in a collection

L. Azzopardi and V. Vinay. Retrievability: An evaluation measure for higher order information access tasks. In Proceedings of the 17th ACM Conference on Information and Knowledge Management, CIKM '08, pages 561–570, New York, NY, USA, 2008. ACM.

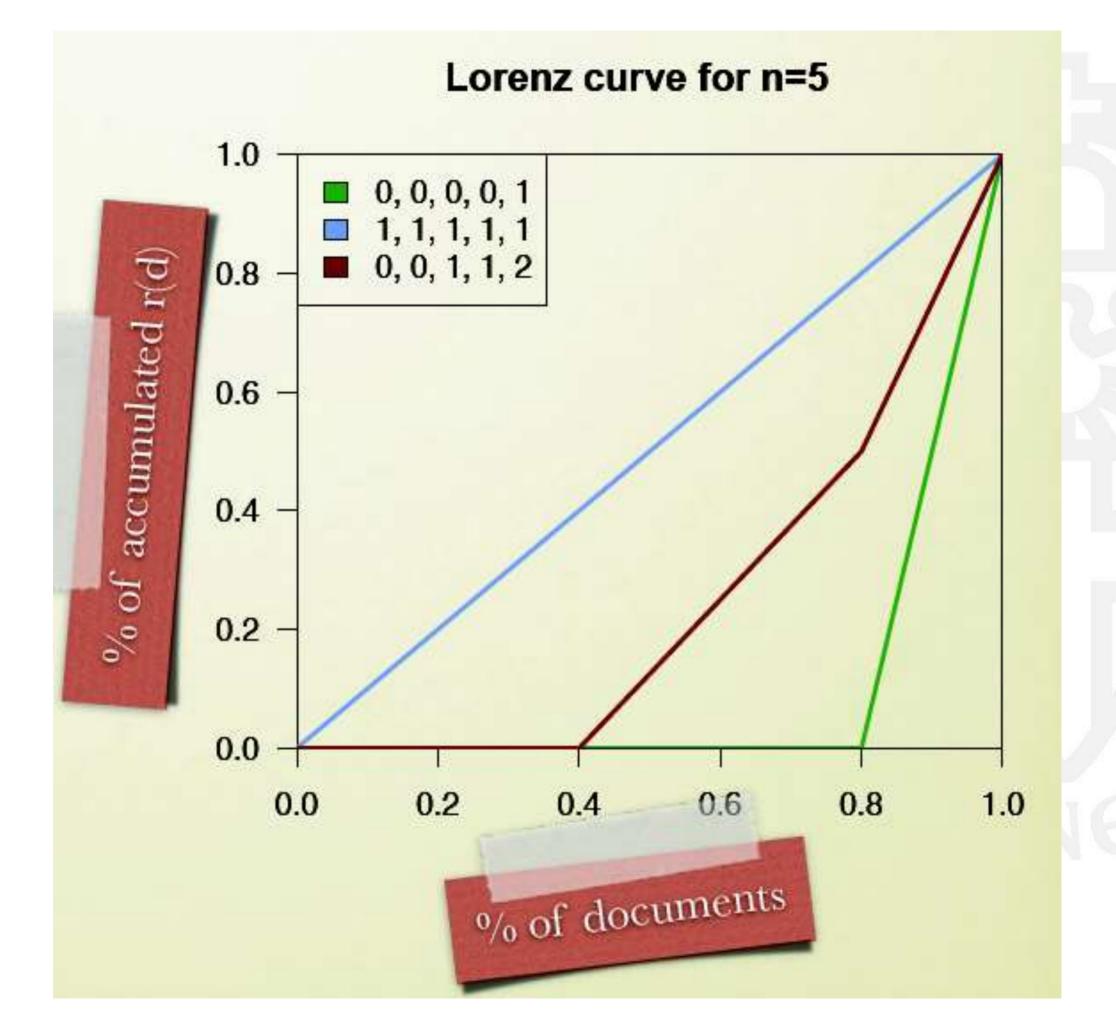


Retrievability

- Measure the accessibility of all documents in a collection given a set of queries
 - Retrievability score *r*(*d*) measures how often document *d* is retrieved by a given set of queries

Retrievability

- Measure the accessibility of all documents in a collection given a set of queries
 - Retrievability score *r*(*d*) measures how often document *d* is retrieved by a given set of queries
- "Evaluate" a retrieval method by the distribution of retrievability scores generated:
 - Lorenz curve visualizes the inequality
 - Gini coefficient quantifies the inequality



Relationship bias and effectiveness?

Prior work indicates that high effectiveness (measured using P@10 and MAP) correlates with low "retrievability bias"

Azzopardi, L.,Bache, R.:On the relationship between effectiveness and accessibility. In: Proceedings of the 33rd International ACM SIGIR Conference on Research and Development in Information Retrieval, pp. 889–890. ACM (2010)

Retrievability & Ranked Retrieval

Every document is always retrieved!



Retrievability & Ranked Retrieval

- Every document is always retrieved!
- Consider a cut-off, that corresponds intuitively to the amount of effort we expect a user to be willing to invest in learning the answer to their query
 - E.g., cut-off of 10: retrievability score equals the number of times this document is retrieved in the top 10 of the results for each of the queries in the (given) query set

"... by a given set of queries"

Q: How do we get the set of queries for which to measure retrievability?

Note:

Choice of query set matters, see: Bashir, S., Rauber, A.: Analyzing document retrievability in patent retrieval settings. In: International Conference on Database and Expert Systems Applications, pp.753–760. Springer (2009)



Simulation

- Original study:
 - Draw at random a large set of single terms and bigrams (from the documents in the collection)
 - Inspired by "Query Based Sampling" for resource description in non-cooperative federated search
- Applied in our study on the Dutch Web Archive:
 - 2M most frequent terms (frequencies ranging from 5 to 200M)
 - 2M most frequent bigrams (frequencies ranging from 20 to 35M)

Alternative "Query" Set

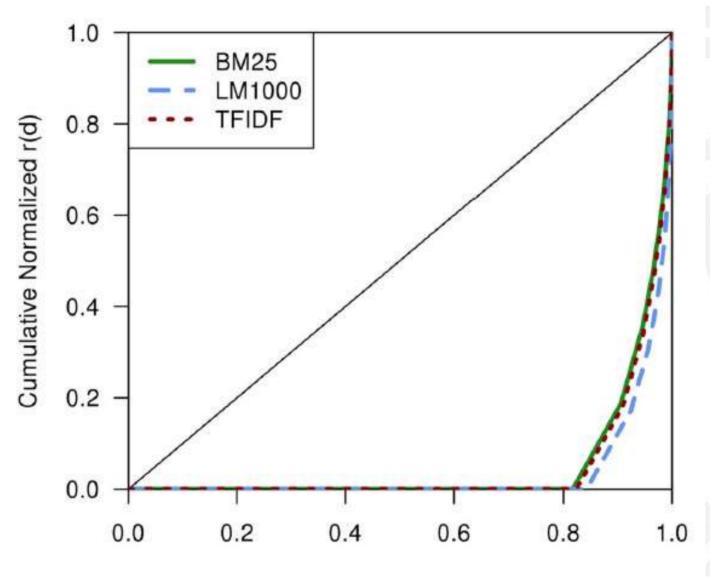
- Our study, on the Dutch Web Archive:
 - Anchor Text from external links
 - De-duplicated for year of crawl
 (Most sites crawled once a year, but a subset more frequently.)
- Side note:

searsia.org/blog/2017-03-18-query-suggestions-without-tracking-users/



Retrievability Score Inequality ("All")

Lorenz curve



Documents Ordered by r(d)

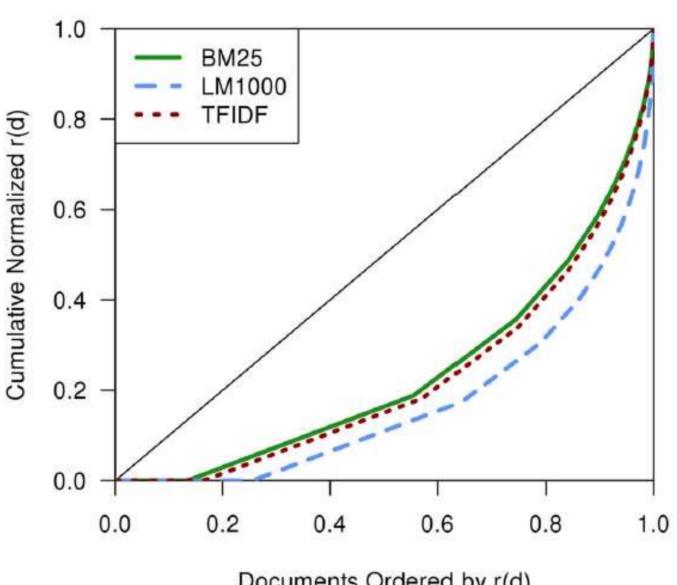
$$Q_s, c = 10$$

Zero Retrievability

- Original approach:
 - If a document is never retrieved by any query, r(d) = 0
- Alternative ("union"):
 - Consider only the documents that are retrieved by at least one of the methods under consideration
 - Fair comparison across retrieval methods for a given cut-off
 - Reduces the impact of the high number of documents that has a retrievability score of 0

Retrievability Score Inequality ("Union")

Lorenz curve



Documents Ordered by r(d)

$$Q_s, c = 10$$

Retrievability = Findability?

- Divide collection in 4 equi-sized bins
 - Using wealth distribution (area under the curve)
- Can a document be found if the user queries the collection using a query sampled from that document?
 - Need to take care to create a reasonable artificial known-item query...
- Documents that are "highly retrievable" are significantly easier to find (using MRR to evaluate effectiveness)



Conclusions

- Analysis of retrievability helps understand the behaviour of retrieval systems, and makes explicit the inherent biases that affect the retrieved results
- Knowing which documents are particularly hard to find allows the institutions to improve their retrieval systems and the users to adapt their search strategies and be aware of the retrieval bias and the source of that bias

Quantifying retrieval bias in Web archive search



Thaer Samar, Myriam C. Traub, Jacco van Ossenbruggen, Lynda Hardman & Arjen P. de Vries

Quantifying Bias is not Enough!

- Retrievability compares ranking algorithms, so it can quantify bias – we can choose the least biased algorithm, but cannot reduce the bias observed
- Recent work by Singh and Joachims corrects bias in the exposure of items (due to presentation bias) associated to user groups; to ensure a fair exposure of those groups
 - https://arxiv.org/abs/1802.07281

Juridische Context

Data Protection by Design (art. 25) eist dat het risico op inbreuken op fundamentele rechten en vrijheden zoveel mogelijk wordt gemitigeerd (bv., onrechtmatige discriminatie op grond van etniciteit of gender)

Case:

informagus.nl/edu/cpo/



Juridische Context

Data Protection Impact Assessment (art. 35) eist dat bij een hoog risico op inbreuken op fundamentele rechten en vrijheden een uitgebreid impact assessment wordt gemaakt, waarbij mitigerende maatregelen zoals DPbD worden genomen zodat het risico afdoende wordt ingeperkt

Open Problems



Question (without an Answer)

How to determine the impact of the bias inherent in any sample of the Web that you are exposed to ("you" being a person or an algorithm)?

Legal Context

GDPR recital 71: the data controller **should take measures** to "[prevent] discriminatory effects on natural persons on the basis of racial or ethnic origin, political opinion, religion or beliefs, trade union membership, genetic or health status or sexual orientation ..."

Discussion I: Awareness

- Bias on the Dutch Web / Social Media
 - Case studies on CommonCrawl and/or KB Web Archive
- Methods and techniques
 - Explore and extend current / develop new techniques
 - Tools for the average Web user
- My research:

Personal Web Archives, to help you understand and reflect on biases you are exposed to

WASP: Web Archiving and Search Personalized

Web Archive Search Personalized 2018-04-17 15:04 From: week ago beginning month ago day ago Until: month ago week ago day ago now now (4) Gol wasp Page 1 for 'wasp' from 2018-04-17 15:04 until now 6 How to Draw a Wasp [archive] [live] (7) http://how2drawanimals.com/8-animals/183-draw-wasp.html 8 2018-04-18 10:38 Page 1 of 5 [How to Draw a Wasp] Please PAUSE the "How to Draw a Wasp" video after each ... [Draw Wasp 1] Step 1: Draw a circle as a guide for the front part of the wasp's body. ... [9][Draw Wasp 2] Step 2: Draw a couple of arcs on the sides of the circle to complete the guide for the ... [Draw Wasp 3] Step 3: Draw another circle on the left side as a guide for the top part of the head ... [Draw Wasp 4] Step 4: Draw another arc below the circle as a guide for the bottom part of the head Wasp - Wikipedia [archive] [live] https://en.wikipedia.org/wiki/Wasp @2018-04-18 09:59 The term wasp is sometimes used more narrowly for the Vespidae, which includes the common wasp or yellow ... wasp [12] The largest social wasp is the Asian giant homet, at up to 5

wasp - Wiktionary [archive] [live]

https://en.wiktionary.org/wiki/wasp

Turner Publishing, pp. 8-11.

@2018-04-18 09:18

) * common wasp (Vespula vulgaris) * cuckoo wasp (Chrysididae) * digger wasp (Sphecidae ... wasp (Vespula germanica) * gold wasp (Chrysididae) * ichneumon wasp (Ichneumonidae) * ...

centimetres (2.0 in) in length ... Retrieved 18 June 2015. 2. * a b "Wasp". ... Wasp. Gollancz Science Fiction. ... OCLC 67375475, 89. * USS Wasp Veterans (15 June 1999). USS Wasp.

Figure 2: Search interface for WASP: ① shortcuts for usual time settings; ② selected query time interval; ③ date and time picker; ④ query box; ⑤ description of current result page; ⑥ title of result with links to archived and live version; ① URL of the result; ⑧ archive time of the result; ⑨ snippet for the result.

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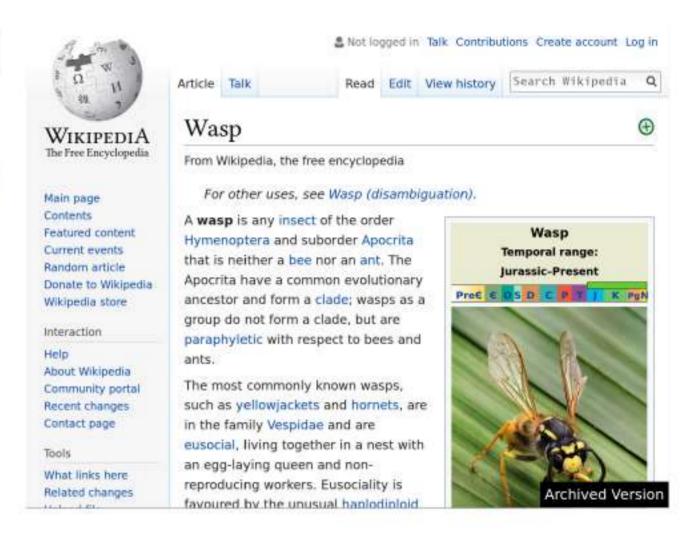


Figure 3: Screenshot of a web page reproduced from the archive. A small black banner is inserted at the bottom right of the browser viewport to remind users that they are viewing an archived page.

Discussion II: Exploitation vs. Exploration

- Measures that do not discourage exploration
 - Countering the Popularity Bias
- Can we somehow quantify future rewards, not just current rewards (?)
- Best Paper SIGIR 2018:
 - Should I Follow the Crowd? A Probabilistic Analysis of the Effectiveness of Popularity in Recommender Systems ir.ii.uam.es/pubs/sigir2018.pdf
 - Properties of measures informing better experimental designs

- Insight in how classifiers etc. decide not trivial for tools like deep networks over, say, character sequences
- That should have been a flag for me for when I came in . Service was excellent and food very good . This was a disaster , and Penn Avenue Fish Company was responsible . Very clean . Did n't see that coming . Always a pleasure . I really felt like I had wasted \$ 25 . Will always go back Check them out on Beer Advocate . Friendly staff .
- That should have been a flag for me for when I came in . Service was excellent and food very good . This was a disaster , and Penn Avenue Fish Company was responsible . Very clean . Did n't see that coming . Always a pleasure . I really felt like I had wasted \$ 25 . Will always go back Check them out on Beer Advocate . Friendly staff .
- Challenge:
 - How to create a Ground Truth?

When is an explanation of an algorithmic decision a good explanation?

Discussion III: Explanations

Example from https://arxiv.org/abs/1801.06422

lrp From: kolstad @ cae.wisc.edu (Joel Kolstad) Subject: Re: Can Radio Freq. Be Used To Measure Distance? [...] What is the difference between vertical and horizontal? Gravity? Does n't gravity pull down the photons and cause a doppler shift or something? (Just kidding!)

belongs to the newsgroup sci.electronic

"More importantly, a good explanation method should not reflect what humans attend to, but what task methods attend to. For instance, the family name "Kolstad" has 11 out of its 13 appearances in the 20 newsgroups corpus in sci.electronic posts. Thus, task methods probably learn it as a sci.electronics indicator. Indeed, the explanation method in Fig 1 (top) marks "Kolstad" as relevant, but the human annotator does not."



Discussion IV: De-biasing data?

- Compare measures on social media or web data to those from more traditional data (e.g., demo-graphics, CBS)
- Integrate observations from different sources; e.g., use population density as well as geo-located Tweet frequency to counter geographical bias
- De-bias representations derived from biased data (?)
 - E.g., word embeddings (e.g. Bolukbasi et al. "Man is to computer as woman is to homemaker?")



Other research themes to explore:

- Transparency and accountability of algorithms:
 - Awareness
 - Access and redress
 - Accountability
 - Explanation
 - Data provenance
 - Auditability
 - Validation and testing
- fairness-measures.org/