

News Media in the Digital Age

Was dürfen wir glauben? Methoden und Maschinen für die
Bewertung des Wahrheitsgehalts von Behauptungen

F3–Fighting Fake Facts, 04/02/2019 , Basel

Karl Aberer,
Distributed Information Systems Laboratory, EPFL
karl.aberer@epfl.ch

Overview

- Main Trends
- Bias
- Fake News (in Science)



Main trends

News Media today

News media play an ever increasing important role in today's society

- Positive: critical information source for enterprises and administration
- Negative: Fake news, political influencing



PLACE FINANCIÈRE

La base de données préférée des banques est sous le feu des critiques

5 minutes de lecture

banques

Mathilde Farine

Publié dimanche 2 juillet 2017 à 11:17, modifié dimanche 2 juillet 2017 à 11:43

World-Check, compilée par Thomson Reuters, serait truffée d'erreurs, selon des enquêtes de plusieurs médias. En Suisse, les banquiers l'utilisent de façon systématique, tout en connaissant ses faiblesses

PUBLICITÉ

La banque privée à l'esprit d'entreprise.

En savoir plus >



NATO REVIEW magazine

NATO Newsletter

Stay informed! Join our free newsletter

Home Themes Videos Previously in NATO Review Subscribe free About NATO Review Contact us

NATO Review | The "Lisa case": Germany as a target of Russian disinformation

The "Lisa case": Germany as a target of Russian disinformation

Share this

Print Email

About the Author

Sabine Weller, German Council on Foreign Relations

RELATED ARTICLES

DEBATE: What are the real prospects for strengthened European defence? Retaining the will to do anti-operations

What can we learn today from the Trade War?



News Media in the Digital Age - Main Trends

The **consumption** of media is changing

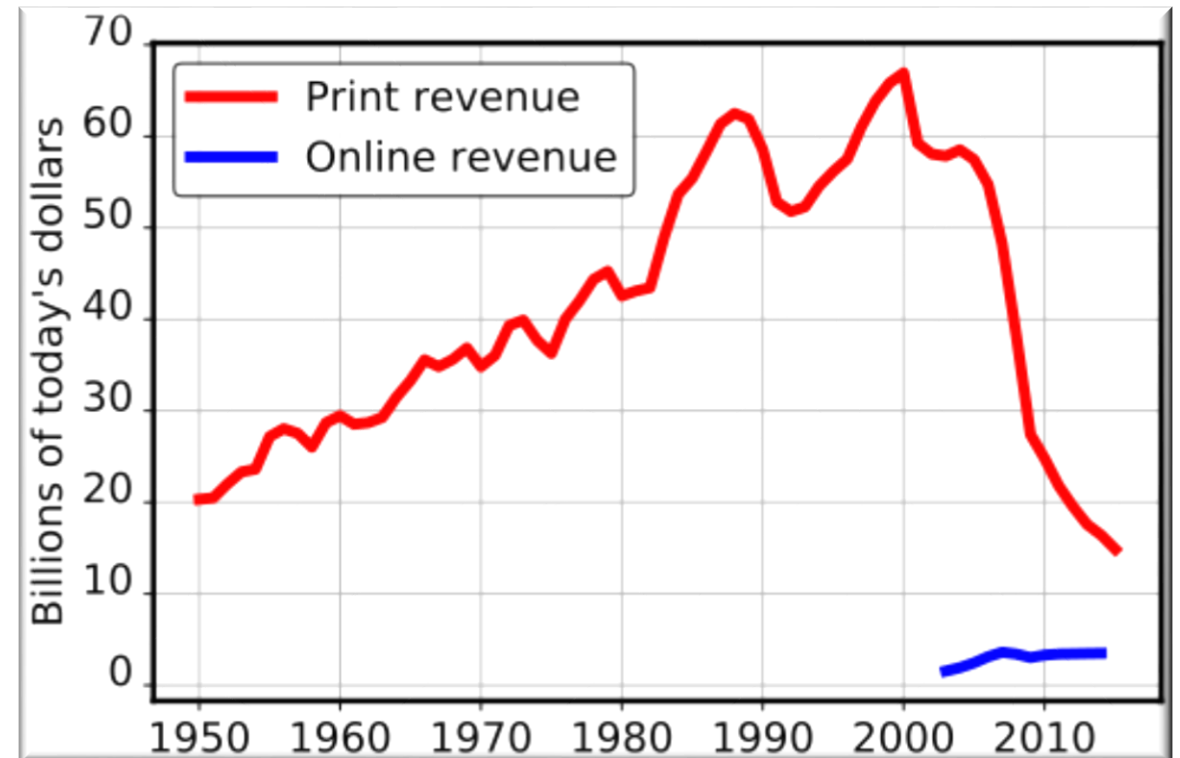
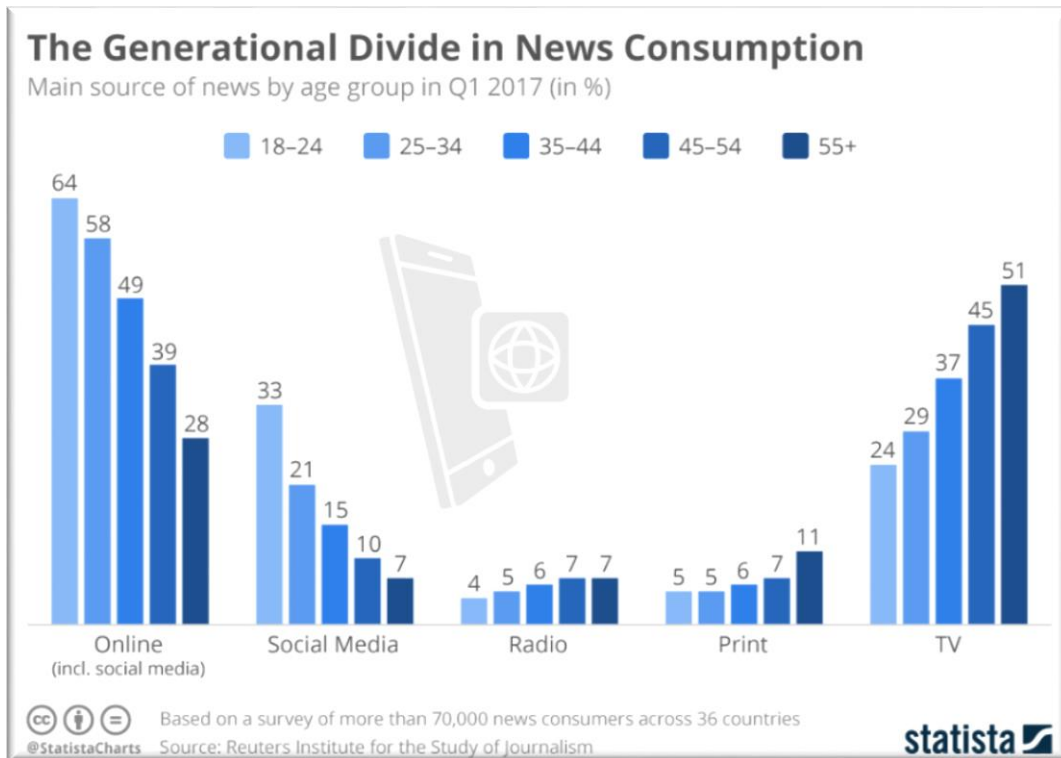
- Young people consume news from social media
- Changing business models due to digitalization

The **production** of media is changing

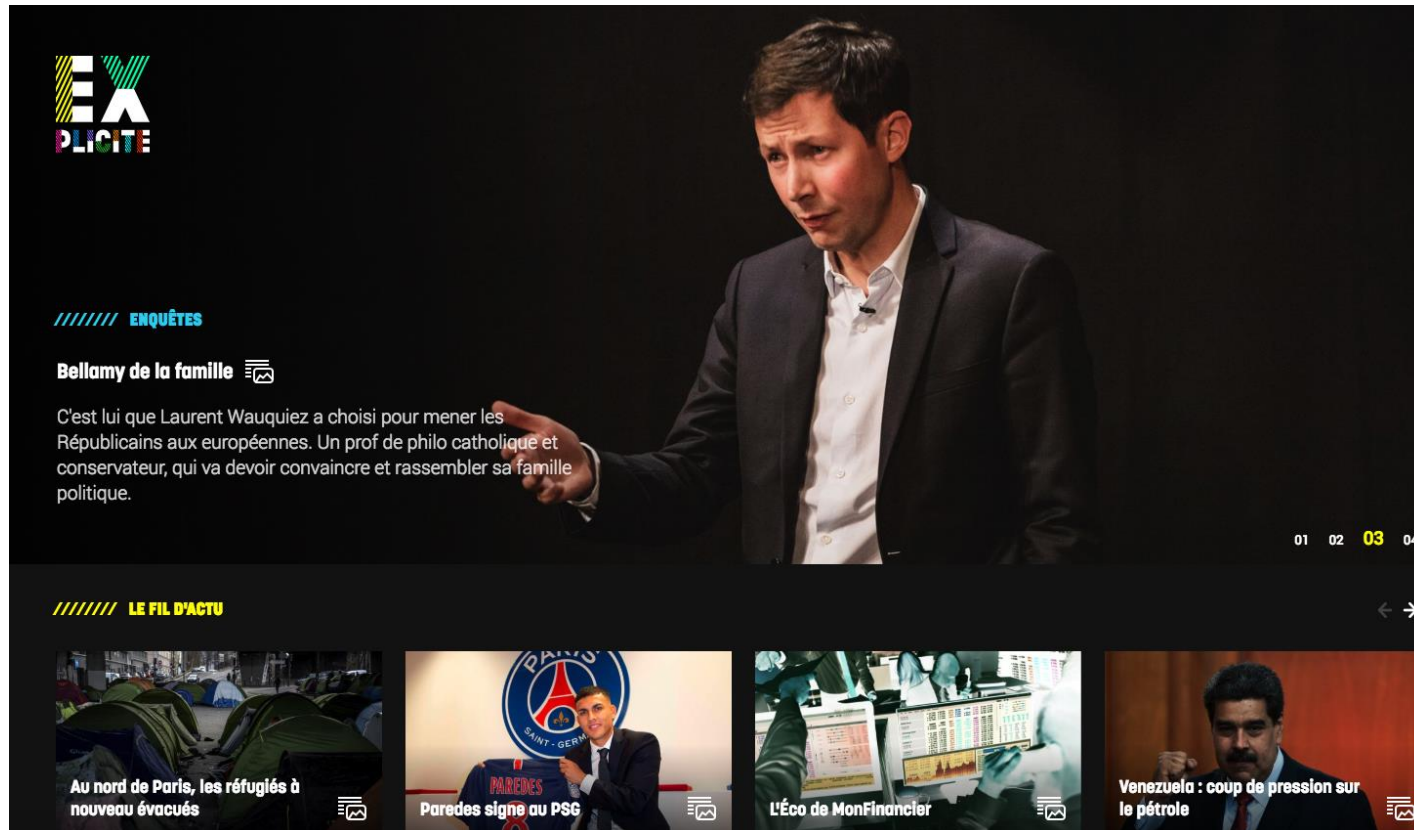
- Social media (Twitter) and open data become essential sources for journalists
- Use of artificial intelligence tools in media production

Changing News Media Consumption

Young Generation consumes news from Social Media



Alternative Media Channels



EXPLICITÉ

////// ENQUÊTES

Bellamy de la famille

C'est lui que Laurent Wauquiez a choisi pour mener les Républicains aux européennes. Un prof de philo catholique et conservateur, qui va devoir convaincre et rassembler sa famille politique.

01 02 **03** 04

////// LE FIL D'ACTU

- Au nord de Paris, les réfugiés à nouveau évacués
- Paredes signe au PSG
- L'Éco de MonFinancier
- Venezuela : coup de pression sur le pétrole

Renegade journalists

150k crowd-funding

Diffusion on social media

Independence

<https://www.explicite.info/>

Alternative Media Channels

Brut.

Tweets **4,568** Following **694** Followers **387K** Likes **341** Lists **2** Moments **3** [Follow](#)

Brut FR @brutofficiel

Nouveau média d'information 100% vidéo, 100% digital. FB : bit.ly/2iXxe1Z Insta : bit.ly/2iz17X7 YouTube : bit.ly/2fi6UXL

France
brut.live
Joined August 2016

[Tweet to](#) [Message](#)

Photos and videos

Brut. @brutofficiel · 4h
Apprendre en pleine forêt plutôt que dans une classe. C'est ce que proposent de nombreuses écoles maternelles au Danemark. Une façon de développer l'autonomie des élèves.

Plutôt que d'être dans une classe,

Who to follow · Refresh · View all

- [Edouard Philippe](#) @EP...
[Follow](#)
- [Christophe Castaner](#) ...
[Follow](#)
- [Emmanuel Macron](#) @...
[Follow](#)

[Find people you know](#)

Trends for you · Change

- [#AML2019](#)
- [#MachineLearning](#)
16K Tweets
- [#ArtificialIntelligence](#)
12.2K Tweets
- [#geneva](#)
- [#Brexite](#)
77.6K Tweets
- [#EB144](#)
1,246 Tweets
- [Switzerland](#)

News channel

100% Video

100% Twitter

<https://twitter.com/brutofficiel>

Changing Business Models

7 business models that could save the future of journalism

by MANDLA CHINULA · Jun 19 in MEDIA ENTREPRENEURSHIP

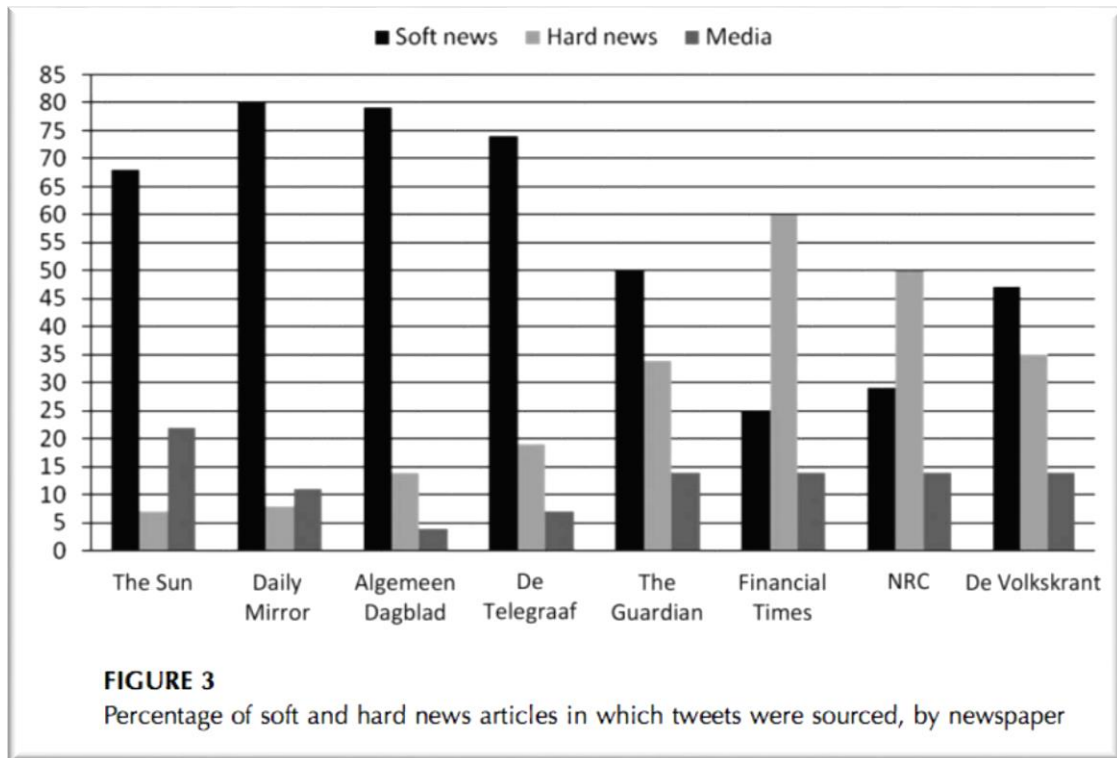


- Sponsored Content
- Crowd-Funding
- Subscriptions
- Micro payments
- Donor funding
- Live Journalism
- Quality journalism

“Investigative journalism also drives advertising. It’s what elevates our brand,” said Jed Hartman, The Washington Post’s chief revenue officer

Changing Information Sourcing by Journalists

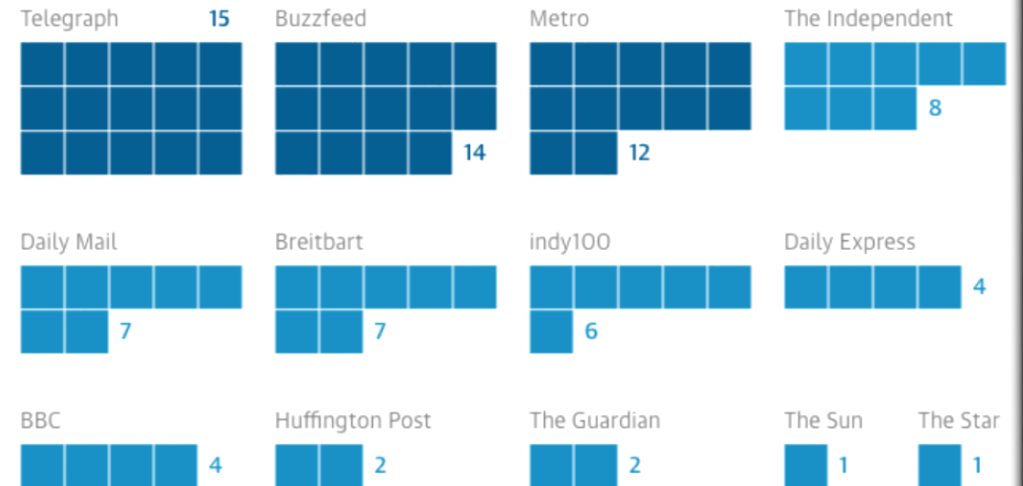
Data from 2011



... and possible consequences

Russian accounts were embedded or quoted 15 times by the Telegraph and 14 times by BuzzFeed

The number of times each site embedded or quoted a Russian account



Guardian graphic | Source: Guardian analysis of 14 UK news organisations plus three US-based new media sites with substantial British readership

Use of AI in Journalism

Liberate journalists from performing routine tasks (sifting through digital information) to free time for quality journalism

The screenshot shows a dashboard for 'Swiss Twittersphere'. It features a sidebar with navigation options like 'Home', 'Dynamic Topics', 'Timeline', 'Map', 'Relations', 'Topics', 'Events', 'Communities', 'Influencers', and 'Search'. The main content area is titled 'Top stories' and includes a 'Filter by' section with options for 'Start date', 'End date', 'Quick ranges', 'Languages' (German, English, French), 'Sentiments' (Very negative, Negative, Neutral, Positive, Very positive), and 'Countries'. The top stories section displays several articles, including one about 'Ice Hockey' and another about 'In-Game Tournaments Announcement (popularity: 8438)'. A 'Twitter Stream' section is also visible on the right side of the dashboard.

Information Sourcing

The screenshot shows a news article from 'tagesanzeiger' with the headline 'Haben Sie wie Ihre Gemeinde abgestimmt?'. The article discusses a robot named 'Tobi' that can generate text based on voting data. The text reads: 'Unser Roboter *Tobi* wandelt Abstimmungsdaten in Texte um. Sehen Sie, wie Ihr Dorf oder Ihre Stadt sich an der Urne verhalten hat. Wie *Tobi* 4500 Texte innert Sekunden schreiben kann, [lesen Sie hier](#).' Below the article, there is a section titled 'Schritt 1 Gemeinde auswählen' with a search bar and a note: 'Zur Zeit stehen nur Gemeinden der Kantone **Bern** und **Zürich** zur Verfügung.'

Text Generation

The screenshot shows an image search interface. It has a 'News Article' section on the left with a search bar and a 'Retrieved Images' section on the right displaying a grid of images. The search bar contains the text 'Suchen Sie nach einer Postleitzahl oder dem Gemeinamen'. Below the search bar, there are options for 'OR' and 'AND', and a 'SUBMIT' button. The 'Retrieved Images' section shows a grid of images related to the search query, including images of alcohol bottles and a bar.

Image Search

Examples: Tamedia



Bias and diversity



Bias

Bias is the result of an information selection mechanism that makes the information “non-representative” of the “reality”

Different mechanisms

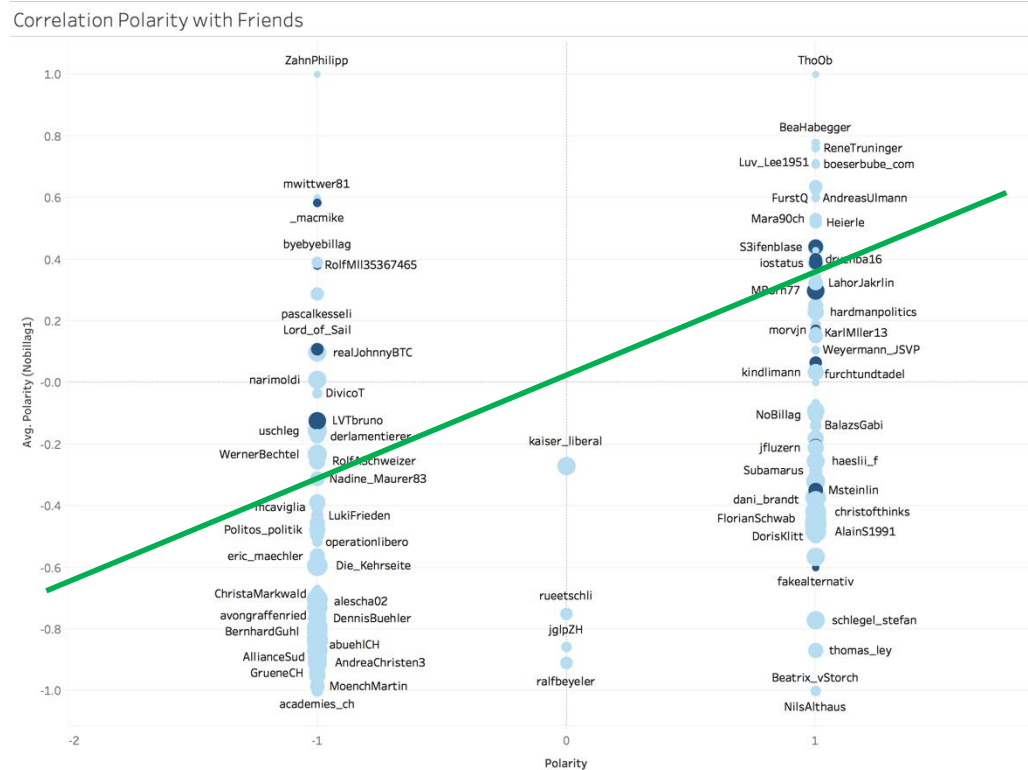
- Selection by authors
- Selection by readers
- Selection by intermediaries (algorithms!)

Considered as “bad”

- Echo chambers, Filter bubbles
- Contributes to polarization in the population
- Subtle form of misrepresenting reality

Echo Chambers

Popular accounts from the NoBillag vote



Friends are from the NoBillag camp



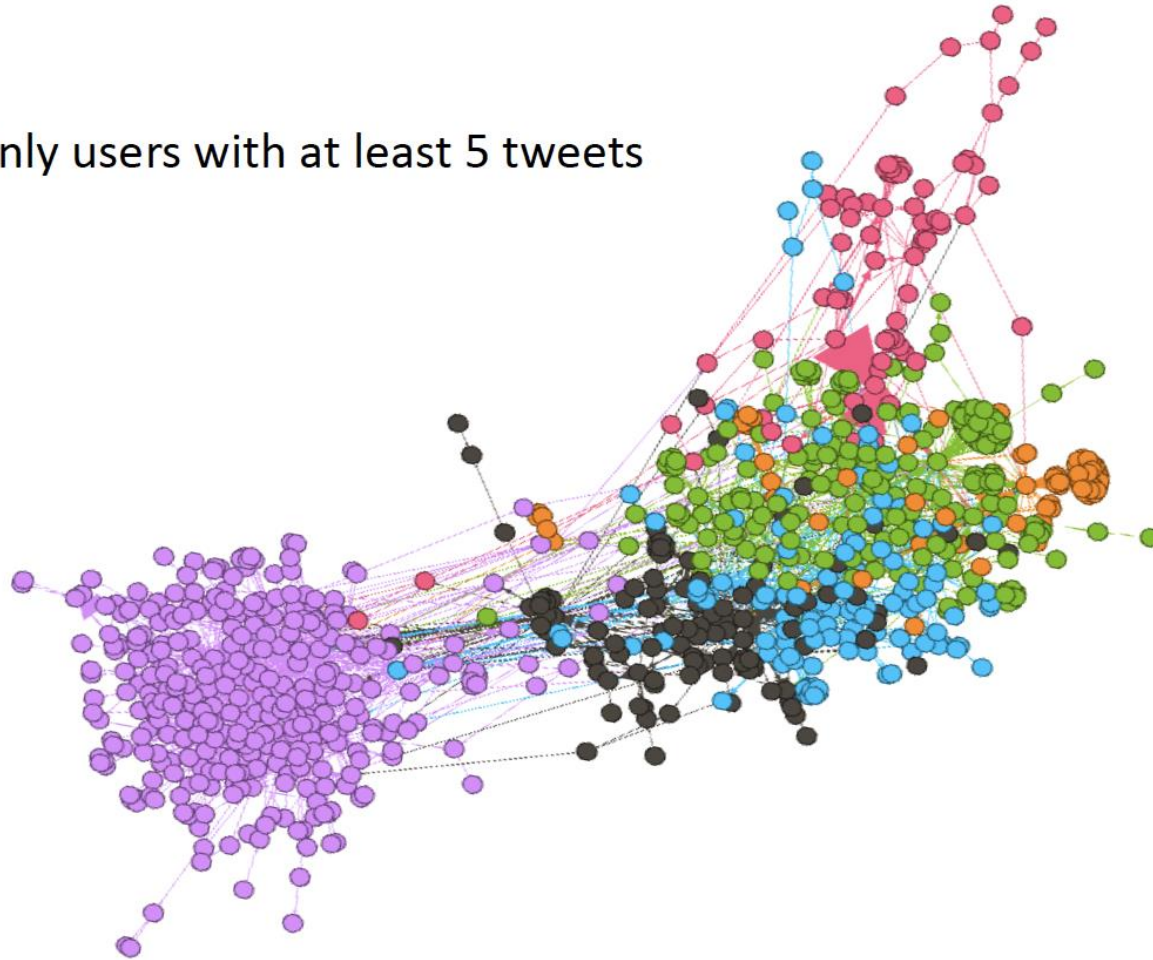
Friends are from the NoBillag opposition

Authors that are rather **against** NoBillag

Authors that are rather **for** NoBillag

Echo Chambers: Influencers

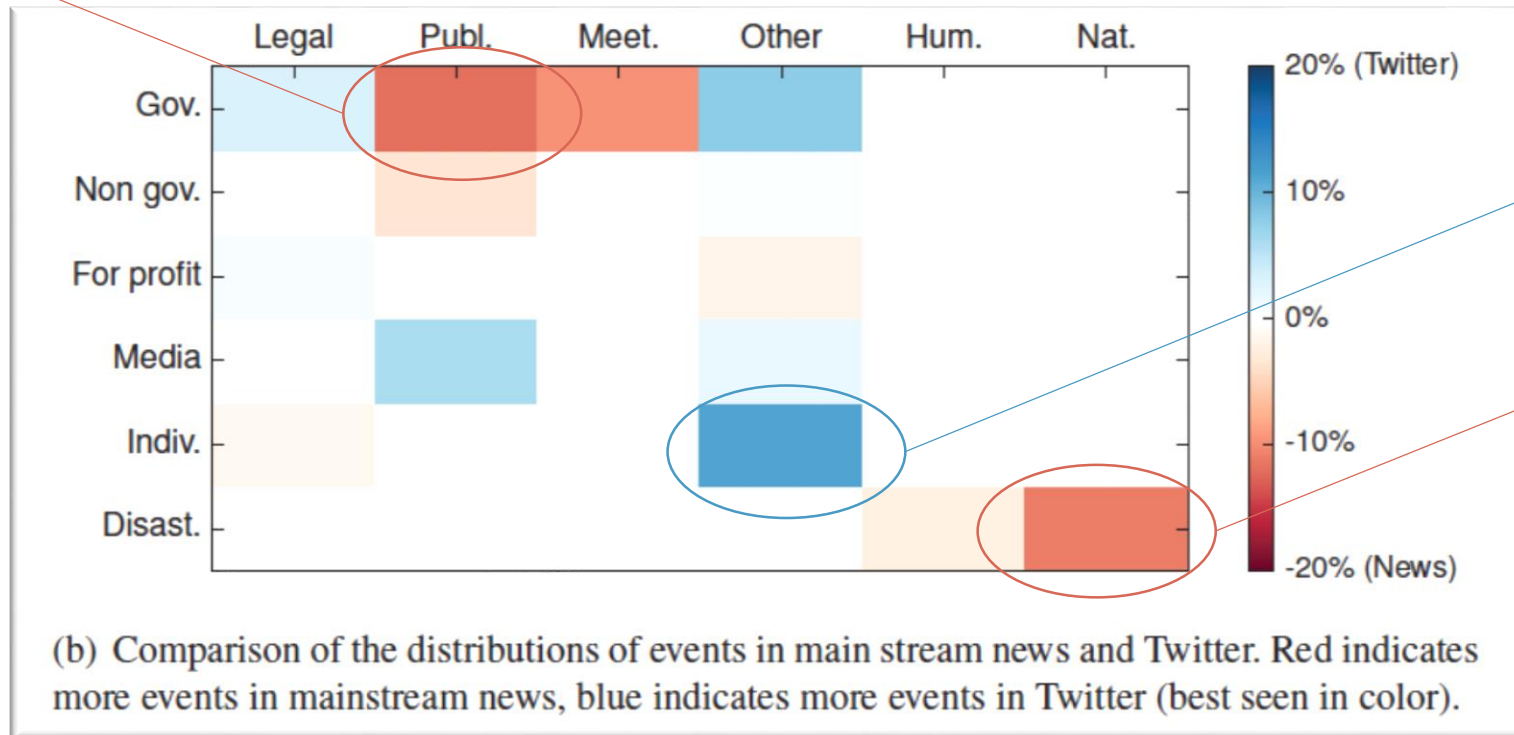
Only users with at least 5 tweets



Channel Bias

Events related to Climate Change in News and Twitter

Publications, meetings and legal documents from governments, more on News

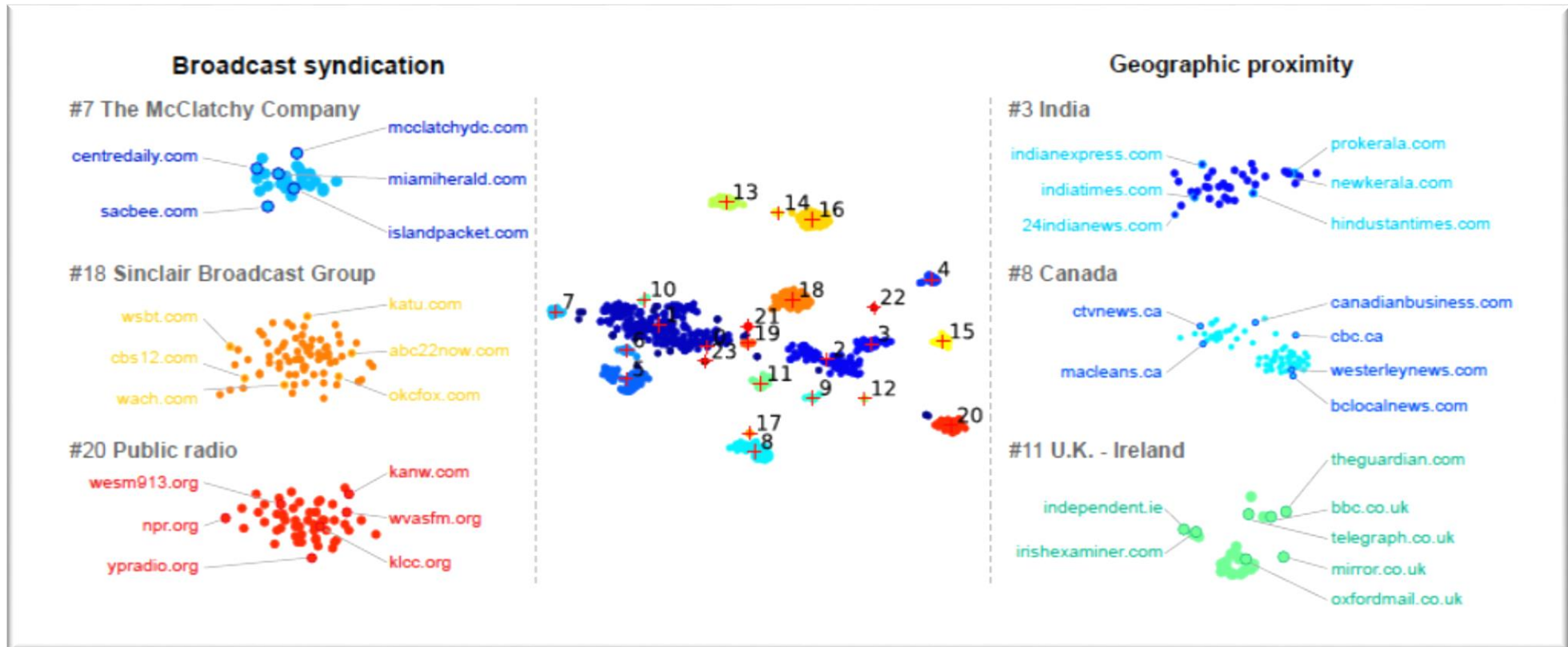


Individual Actions from individuals more on Twitter

Natural Disasters more in News

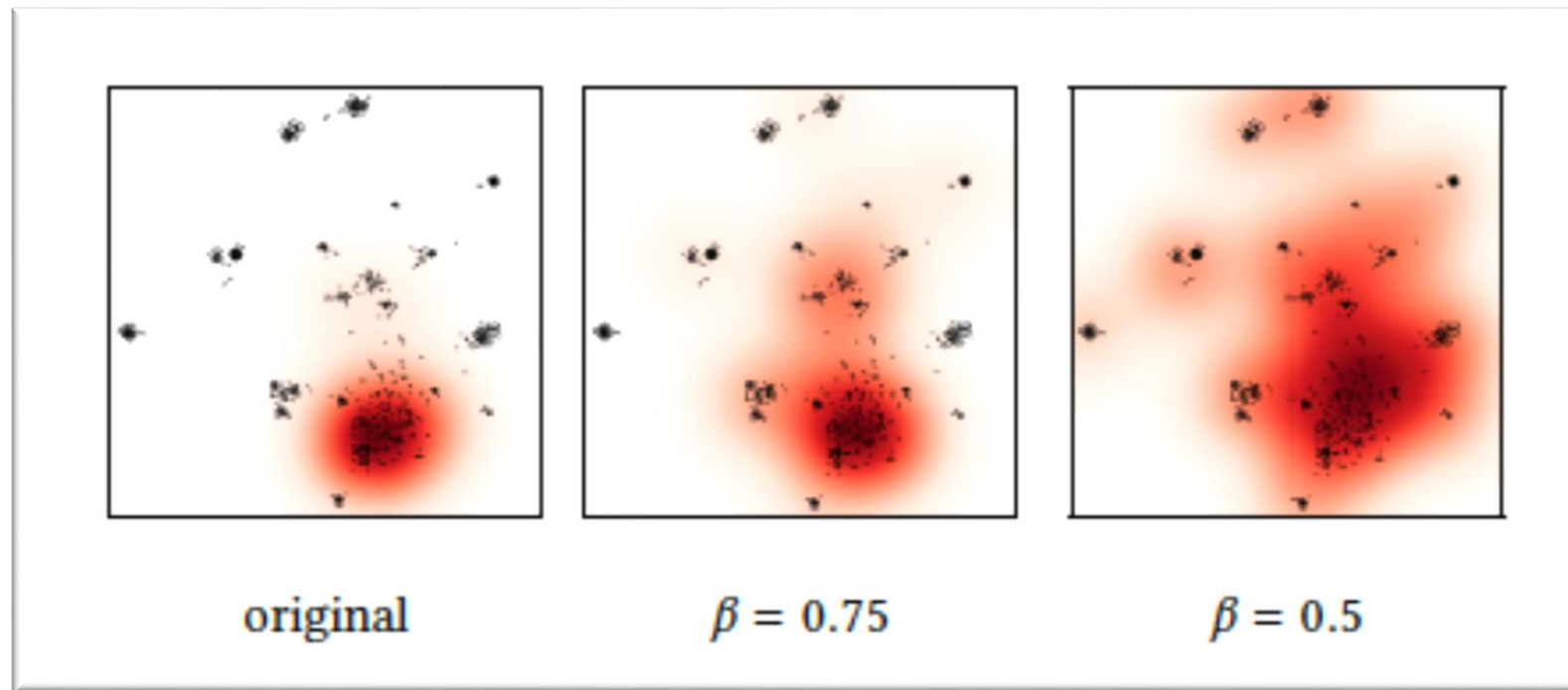
Syndication Bias

Media channels characterized (and clustered) by the events they cover
▮ reveals the structure of the large media conglomerates



Fighting Syndication Bias

Select sources by popularity or by maximizing diversity (conflicting criteria!)



Only popularity



Growing importance to diversity

**CAN YOU BELIEVE
WHAT YOU READ**



Fake

Propaganda

Also in Europe



The screenshot shows the NATO REVIEW magazine website. The header features the NATO logo and the text 'NATO REVIEW magazine'. Below the header is a navigation menu with links for Home, Themes, Videos, Previously in NATO REVIEW, Subscribe free, About NATO REVIEW, and Contact us. The main article is titled 'The "Lisa case": Germany as a target of Russian disinformation'. The article text discusses a media storm surrounding a fake story about a Russian-German girl, a wake up call for German political elites, and the German government's response. It also mentions Germany's leading role in the Ukraine crisis and Angela Merkel's position on sanctions against Russia. The article concludes by stating that the "Lisa case" shows the failure of Germany's partnership for modernisation with Russia and the dysfunctionality of Russia's attempts to use personal ties and informal networks to influence German decision-making and policy.



The screenshot shows an article titled 'Baltics battle Russia in online disinformation war'. The article text states: 'From the hacking attack on Estonia in 2007 to the fake news targeting the NATO battalions on the alliance's eastern border in 2017 – the Baltic states have been the bull's-eye of Russian-backed digital warfare.' Below the text is a dark image with a grid pattern and some faint, illegible text, possibly representing digital warfare or data.

Selective Perception of Science Studies

Science: different views on the same abortion study

- Shocking Figures Show New York City's Abortion Rate is 60% of Its Birth Rate (lifeneews.com)
- CDC Report: 35% of Aborted Babies are Black American Babies (blacklivesmatterexposed.com)
- How These Groups Plan to Combat the High Rate of Abortion Among Blacks (blackcommunitynews.com)
- CDC reports decline in number, rate of abortion (womenshealthpolicyreport.org)
- CDC Releases Mind Blowing NYC Abortion Numbers (truthkings.com)
- Obamacare and prochoice policies help reduce abortion rate to pre-Roe levels; lowest in 45 years (dailykos.com)
- Whittling Away Abortion Access (NY Times - opinion)

Boosting Bad Science

By PAULA COHEN / CBS NEWS / May 29, 2015, 5:00 AM

How the "chocolate diet" hoax fooled millions

f Share /  Tweet /  Reddit /  Flipboard / @ Email

Last Updated May 29, 2015 5:23 PM EDT

Eating chocolate every day can help you lose weight? If it sounds too good to be true -- that's because the chocolate diet study that made headlines around the world last year was all an elaborate hoax.


Now those responsible are going public with the story behind the bogus diet study and the media frenzy that followed. It was a carefully planned effort to expose the prevalence of junk science and unchecked, hype-driven press coverage.


Credibility Evaluation Today


Manual fact checking by experts


Fact Check
The latest rumors, memes, and junk news debunked by Snopes.

Latest Fact Check

 **Did the Whole Migrant Caravan Turn Down Mexico's Offer of Jobs, Medical Care and Education?**
7 November 2018 - Some members of the caravan accepted the offer, some spurned it, and some returned home.

 **Was Cesar Sayoc a Lifelong Democrat Who "Recently" Covered His Van in Trump Stickers?**
6 November 2018 - The mail bombing suspect had never been a registered Democrat, and his van had been home to pro-Trump material for years.

 **Did a Man Photobomb Mitch McConnell With a Thumbs-Down Gesture While They Voted?**
7 November 2018 - This isn't exactly what we mean when we refer to a "photo booth."

 **Did the Carnival Cruise Ship 'Triumph' Overturn and Sink?**
7 November 2018 - "Jokes are created by users." But not necessarily good jokes.

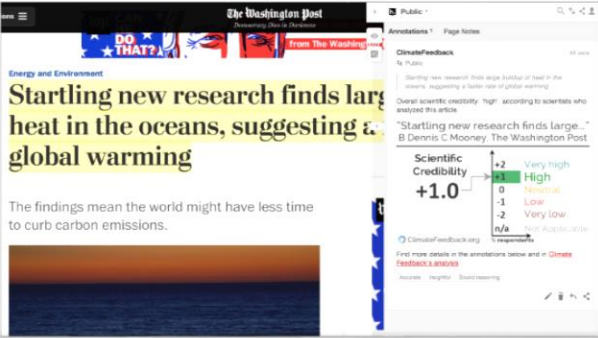
**General Fact Checking Sites
(mostly journalists)**

Climate Feedback About Scientific Feedbacks Community News & Events

Accurate information is the foundation of a functioning democracy

WHAT WE DO Climate Feedback is a worldwide network of scientists sorting fact from fiction in climate change media coverage. Our goal is to help readers know which news to trust.

Latest Article Reviews

 **Startling new research finds large heat in the oceans, suggesting a global warming**

Washington Post accurately describes ocean warming study with potential implications for future carbon budget

The Washington Post
"The Washington Post article accurately reports the results and links to other topics using reliable sources. Quotations from Pieter Tans and Paul Durack add important caveats show."

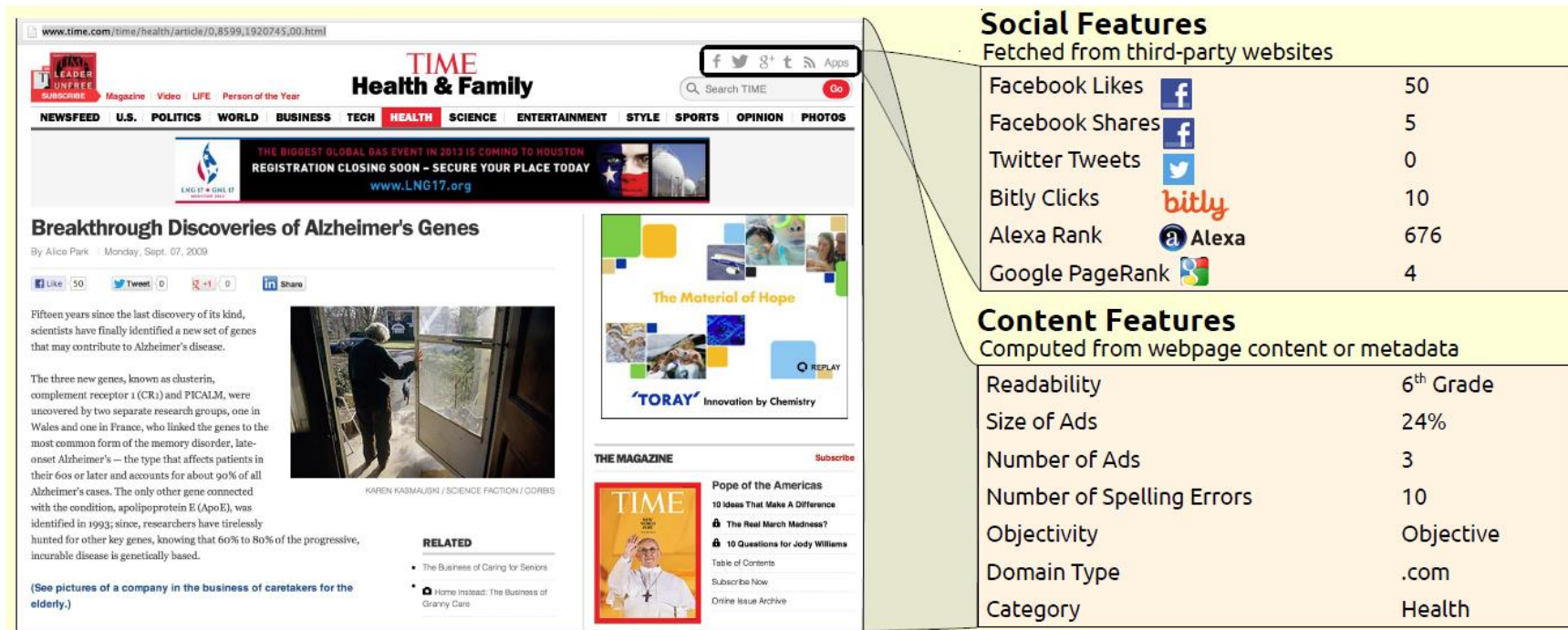
- 31 Oct. 2018

**Specialized Science Fact Checking Sites
(mostly scientists)**

Automated Web Credibility Evaluation?

Insights

- There exist features that correlate with credibility
- Combination of content and social features works best
- **Quality of classification depends on quality of training data = ground truth**



The image shows a screenshot of a TIME Health & Family article titled "Breakthrough Discoveries of Alzheimer's Genes" by Alice Park, dated Monday, Sept. 07, 2009. The article text discusses the identification of new genes (clusterin, complement receptor 1 (CR1), and PICALM) linked to Alzheimer's disease. The page includes social media sharing buttons for Facebook, Twitter, and LinkedIn, and a list of related features. A callout box on the right side of the page lists various features categorized into Social and Content features.

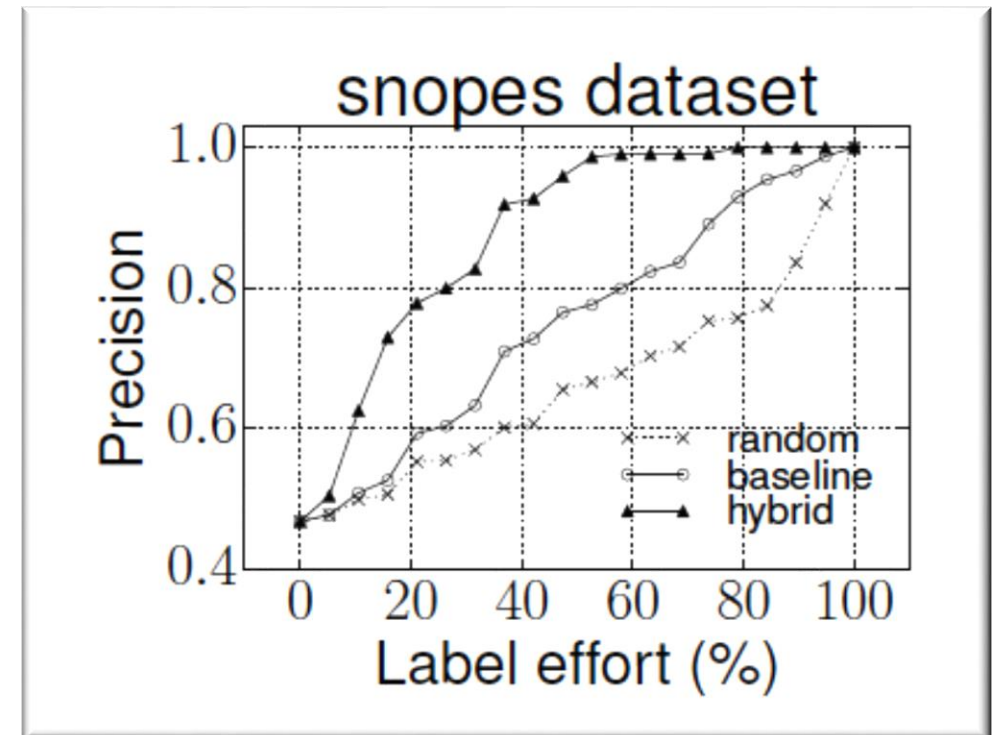
Social Features	
Fetched from third-party websites	
Facebook Likes	50
Facebook Shares	5
Twitter Tweets	0
Bitly Clicks	10
Alexa Rank	676
Google PageRank	4

Content Features	
Computed from webpage content or metadata	
Readability	6 th Grade
Size of Ads	24%
Number of Ads	3
Number of Spelling Errors	10
Objectivity	Objective
Domain Type	.com
Category	Health

Amplifying Expert Feedback

Minimizing labelling effort by presenting good examples to experts

- 20% of manual labels (ground truth) allow to predict 80% of unknown labels correctly





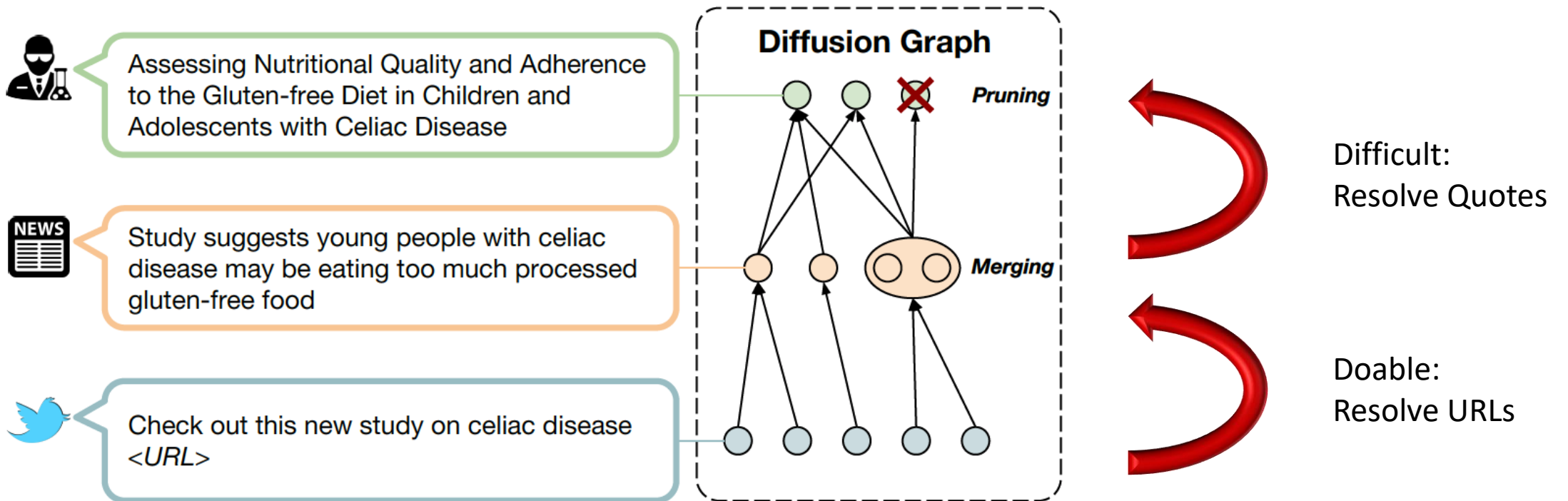
SciLens: Evaluating Quality of Scientific News

Investigate whether scientific findings are adequately presented in science news.

Data collection: start from social media posts, identify news, find quotations of science articles in the nutrition domain

- 11'000 social media posts
- 7'500 news articles
- 1'300 papers

SciLens Approach



Resolving Quotes

Linking news to science articles: bootstrapping approach

- Create a set of reporting verbs (“say”, “claim”, “prove”,...), studies (“survey”, “analysis”) and scientists (“researcher”, “analyst”)
- Extend this set with semantic similar words using word embeddings
- Identify indirect speech using NLP processing
- Build regular expression patterns over word classes

<FirstName LastName>, registered dietitian and associate professor at the Department of Agricultural Food and Nutritional Science in University of Alberta

...

Processed, gluten-free foods are very high in fats and carbohydrates because that's what gives them the flavouring and improved texture, said <LastName>.

quote
quotee
quotee affiliation

90% precision at 50% recall

Identifying Quality Features

Context	Type	Indicator
Article	Baseline	Title [Clickbait, Subjectivity, Polarity], Article Readability, Article Word Count, Article Bylined
	Quote-Based	#Total Quotes, #Person Quotes, #Scientific Mentions, #Weasel Quotes
Sci. literature	Source Adherence	Semantic Textual Similarity
	Diffusion Graph	Personalized PageRank, Betweenness, [In, Out] Degree, Alexa Rank
Social media	Reach	#Likes, #Retweets, #Replies, #Followers, #Followees, [International News, Temporal] Coverage
	Stance	Tweets/Replies [Stance, Subjectivity, Polarity]

Should You Be Taking a Curcumin or Turmeric Supplement?

A PLOS ONE study did find, however, that a combination of curcumin and tomatine, an antifungal and anticancer compound in tomatoes, inhibited cell growth of prostate cancer.

Fitness Magazine

Combination of α -Tomatine and Curcumin Inhibits Growth and Induces Apoptosis in Human Prostate Cancer Cells

Curcumin and α -tomatine alone or in combination had a small inhibitory effect on the growth of non-tumorigenic prostate epithelial RWPE-1 cells.

PLOS ONE

Source adherence: Semantic textual similarity feature for News article

Non-Expert Evaluation

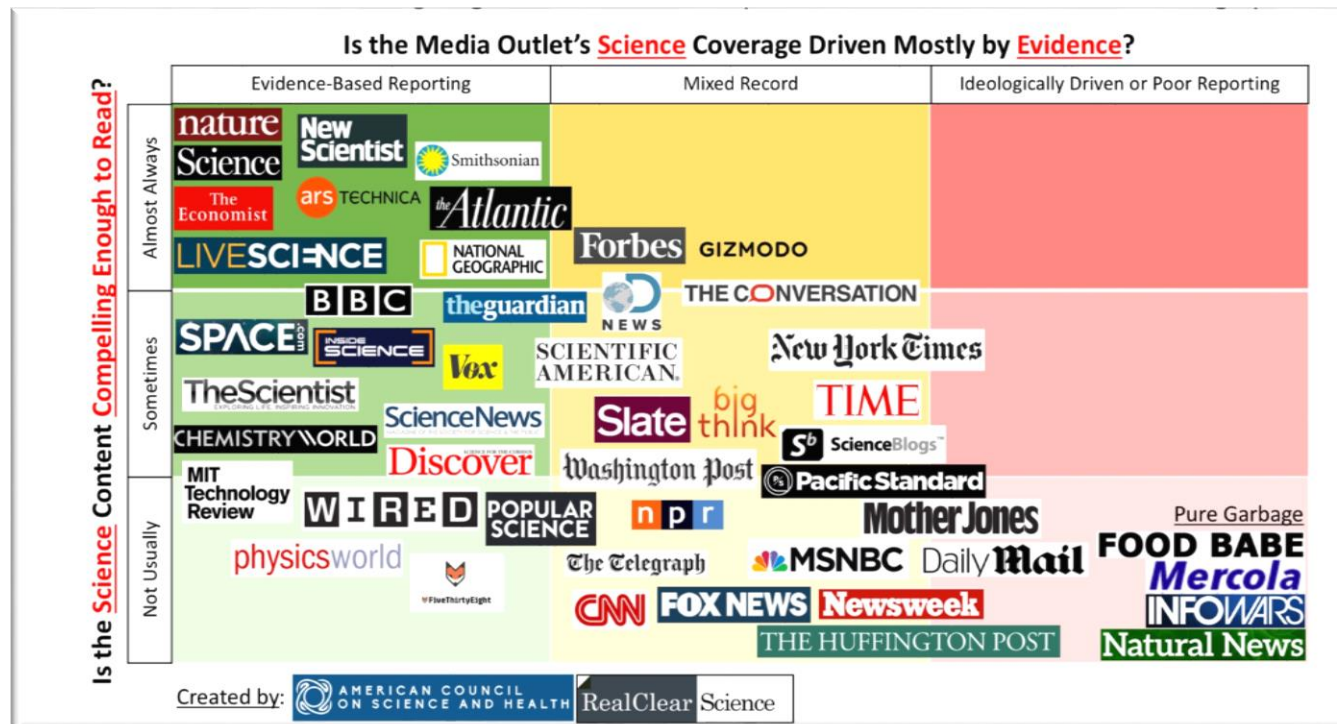
Hypothesis: when non-experts see the quality features they can do a better assessment

Visitors per day of this news website (more visitors = more stars)
Mentions of universities and scientific portals (more mentions = more stars)
Length of the article (longer article = more stars)
Number of quotes in the article (more quotes = more stars)
Number of replies to tweets about this article (more replies = more stars)
Article signed by its author (✓ = signed, ✗ = not signed)
Sentiment of the article's title (☺☺ = most positive, ☹☹ = most negative)

Supervision

Building a machine learning classifier using the quality features

- In absence of ground truth we use weak supervision
- Instead of judging the quality of articles we judge quality of outlet



Expert assessment
of quality of journals

Results

		Experts		Non-Experts		Fully
		by agreement	#	No ind.	Ind.	automated
ATC	Strong agreement	7	0.80	0.45	1.41	
	Weak agreement	12	1.28	1.18	0.76	
	Disagreement	1	0.40	1.30	0.00	
	All articles	20	1.10	1.00	1.00	
CRISPR	Strong agreement	6	1.40	1.17	1.00	
	Weak agreement	10	0.86	0.76	0.67	
	Disagreement	4	0.96	1.22	1.03	
	All articles	20	1.96	0.96	0.85	

- When displaying features to non-experts, the quality of their evaluation increases significantly
- A weakly-supervised classifier performs better than non-experts!

[Our Vision](#)

[In Practice](#)

[EPFL Open Science Champions](#)

[Events](#)

[News](#)

[About the Initiative](#)

EPFL Open Science Champions

In September 2018, EPFL President Martin Vetterli announced the creation of the [Open Science Fund](#) to support the best ideas from everyone on campus with a total of CHF 3 Mio over the period 2019-2021.

Evaluating the Quality of Science News Articles

In an age of fake news and mistrust towards experts, weeding out misreporting of scientific studies is important. The [Distributed Information Systems Laboratory](#) will develop SciLens, a platform that automatically generates indicators using weakly supervised learning, effectively helping non-experts to evaluate more accurately the quality of a science news article.

Conclusions

- In view of the “credibility crisis” in media we need quality journalism more than ever
- Traditional news media are no longer protected by information monopolies
 - Privileged access to news agencies
 - Information networks
 - Privileged access the readers
- Technology is a means to aid journalists that
 - Relieve them from mundane and trivial information processing tasks
 - Increase their capacity to analyze large bodies of information
 - To focus on their true added value – verification and intellectual analysis

Questions

