Cobaltmetrics

Web-Scale Citation Tracking

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http://gph.is/XI8Wen

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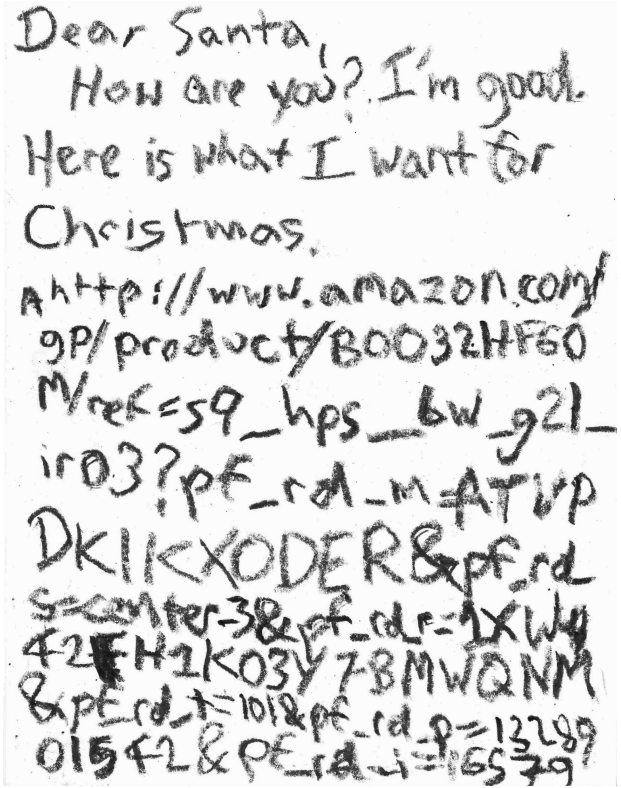
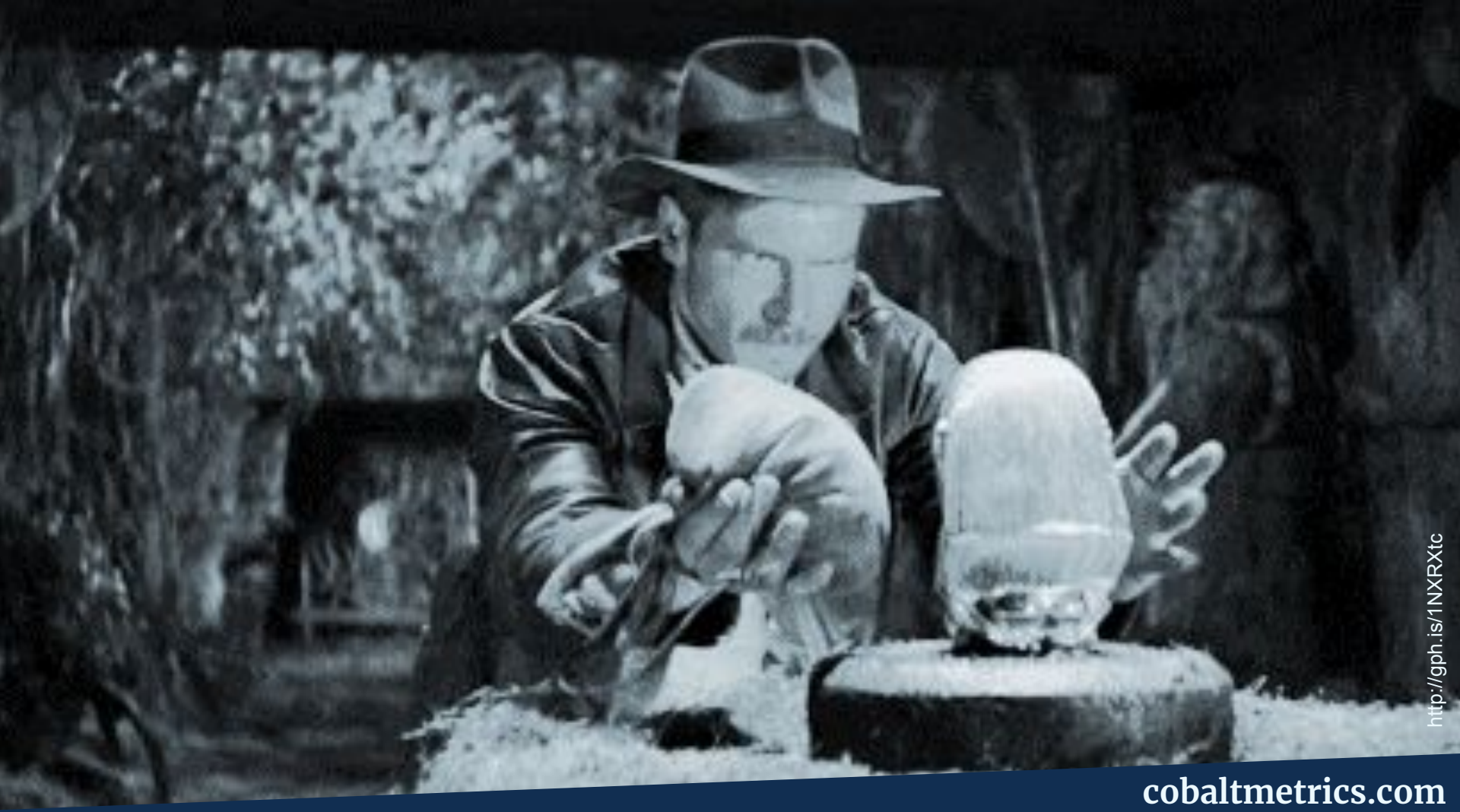
cobaltmetrics.com

Dear Santa





http://gph.is/1NXRXtc

Attention vs. Impact

Citations and altmetrics are proxies for impact.

Citations and altmetrics measure attention.

Attention correlates w/ impact. So do influence and privilege.

Mentions and events are merely newish types of citations.

A partial landscape of citation aggregators

- Journal to journal: Web of Science, Scopus
- DOI to DOI: OpenCitations
- URL to DOI: ALM/Lagotto, Crossref Event data
- URL to URL: Altmetric, Plum, **Cobaltmetrics**

Common issues with citation aggregators

- Imbalanced datasets
  - Predefined lists of supported research outputs
  - Predefined lists of supported languages
- Irreproducible indicators
  - Dependency on 3rd party servers (short URLs, APIs)

Why should we care?

Metrics are a sampling game.

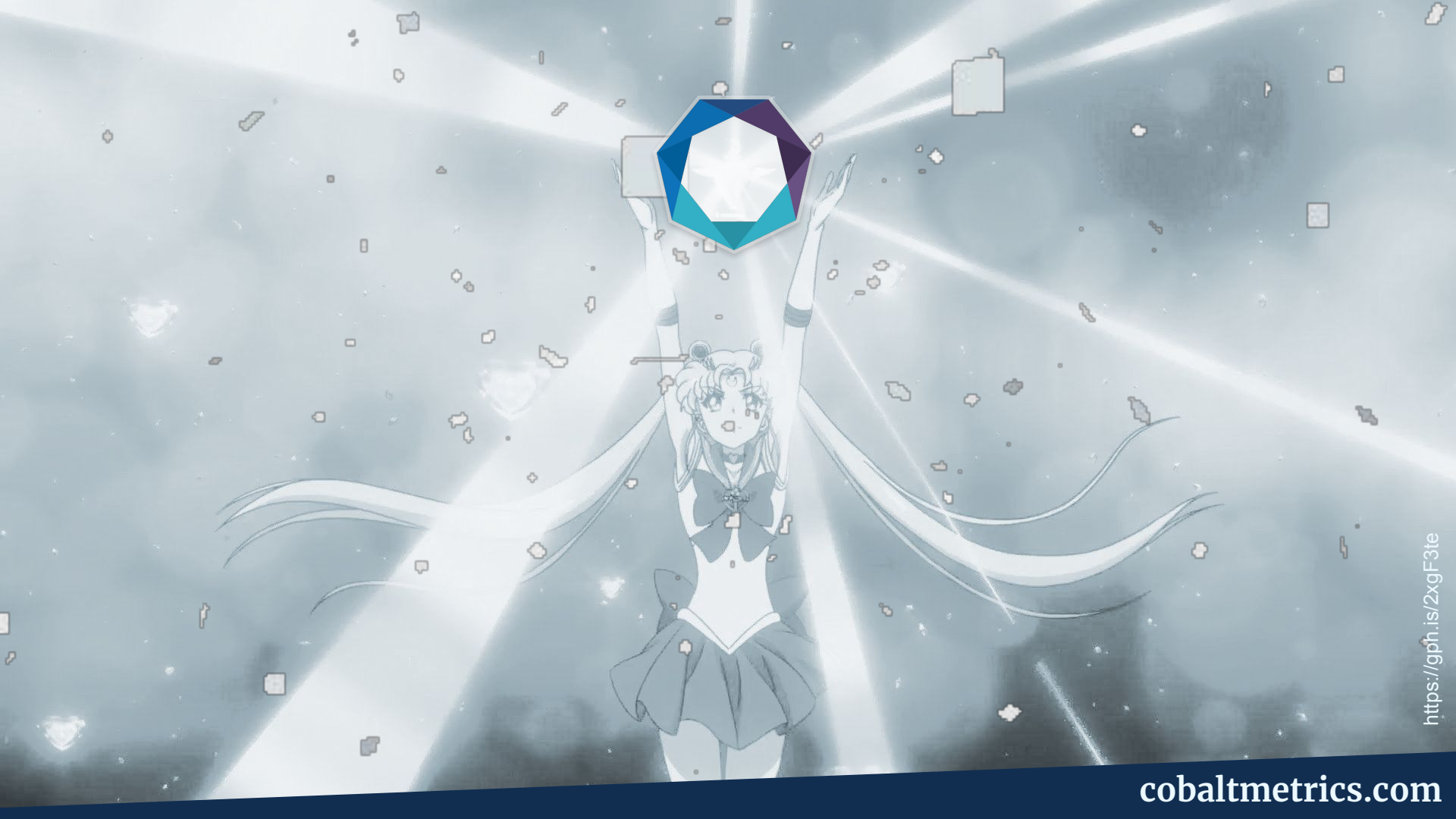
Imbalanced datasets reinforce discrimination.

We are interested in **low-frequency phenomena**,
and in distinguishing **structural zeros** from **sampling zeros**.

Weapons of math destruction

“There is a moral obligation to **challenge machine biases**.”
— Heather Staines, PIDapalooza’19

Algorithmic bias reflects the values of the humans involved in designing the algorithm and/or collecting the data.



https://gph.is/2xgF3te

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Cobaltmetrics

It is not up to citation aggregators to decide what is citable, our role is to **observe all citation patterns on the web**.

The web is not FAIR (and will most likely never be) and **that is just fine**.

Cobaltmetrics

Cobaltmetrics crawls the web to index **hyperlinks and PIDs as first-class citations**.

The web is our corpus, and our URI transmutation API collates citations to all known versions of a document.

Design rationale

Cobaltmetrics tracks all URIs, URLs, and typed PIDs.

Cobaltmetrics can only be queried by URIs.

Cobaltmetrics will never create new identifiers.

Cobaltmetrics will never create new metrics.

Design rationale

- ✅ Lawrence et al., 2001, https://doi.org/10.1109/2.901164
- ✅ http://dx.doi.org/10.1109/2.901164
- ✅ doi:10.1109/2.901164
- ✅ https://ieeexplore.ieee.org/document/901164/
- ✅ https://bit.ly/2kEavO1
- ✘ Lawrence et al., 2001

Better a URL today than a PID tomorrow

The ideal identifier should be **persistent**,
findable, accessible, interoperable, and reusable...

...we all **copy-paste from the address bar** of our browser.

PIDs are not silver bullets

There are **billions of documents**
that will never get DOIs or any other fancy PID:
old documents, grey literature, and **the rest of the web**.

There are tons of documents with PIDs that are cited
with no mention of their PIDs.

Compact IDs vs. good old URLs

Cobaltmetrics' citation index (February 2019):

- HTTP+HTTPS+FTP: 256 million URLs (98%)
- Every other scheme: 4 million IDs

http://gph.is/2OXLMRE

Are your metrics alt- enough?

NO.

Are your metrics alt- enough?

- Bias in favor of **English**
- Bias in favor of **traditional publication venues**
- Bias in favor of **traditional publication formats**
- Bias in favor of **short-term rewards** (vs. long-term goals)
- …?

Selection biases: Wikipedia languages

Altmetric: 3 languages (en, fi, sv)

PlumX Metrics: 3 languages (en, es, pt)

ALM: 25 most popular languages

Cobaltmetrics: 180+ languages!

Selection biases: document types

Strong focus on traditional peer-reviewed publications.
Preprints are still treated as **second-class documents**.

What about patents, clinical trials, law articles, etc.?
What about **non-textual objects**, e.g. datasets or software?

In Cobaltmetrics **a URL is a URL**, we do not discriminate.

Selection biases: PIDs vs. URLs

Nothing lasts forever on the web:

- Link rot!
- Content drift!
- Outages!

https://gph.is/2NehBG5

Non-canonical URIs

Non-canonical URI ≈ any ID that is not 100% FAIR, including but not limited to:

- **Short URLs**
- **Proxy URLs**
- **Sci-Hub URLs**

URI transmutation

Transmutation = normalization + conversion

- Equivalencies we can compute (e.g. ORCID⇄ISNI)
- Equivalencies we must learn (e.g. short URL⇄URL)

Our transmutation API is open and free, try it out!

URI transmutation example

We remix 4M cliques of IDs from ORCID's Public Data File.

Example:

- orcid:0000-0003-0557-1155 → {scopus:55148973700}
- scopus:55148973700 → {orcid:0000-0003-0557-1155}
- mailto:luc@thunken.com → {orcid:0000-0003-0557-1155, scopus:55148973700}

A note on reproducibility

Because we aggregate data from different sources, there are **many moving parts**.

Our default strategy is to **ingest the entire datasets**, so that we control when and how data gets updated.

Our API can return a **fingerprint** of the whole database, as well as the **log of all the web resources** we remix.

http://gph.is/2JCxAbw

Web-scale citation tracking

- Wikimedia (all projects, all languages)
- StackExchange/StackOverflow (all projects, all languages)
- US legal opinions (via CourtListener)
- Hypothes.is annotations
- Usenet posts (via the Internet Archive)
- **CommonCrawl (3.1 billion webpages)**

https://cobaltmetrics.com/docs/page/data-sources

Web-scale citation tracking: transmutation

- **Crossref**
- ORCID
- PMC
- **Terror of Tiny Town**
- Unpaywall
- Wikidata
- ...

https://cobaltmetrics.com/docs/page/data-sources

Cobaltmetrics in the context of open science

- Currently mostly closed-source, but...
- Everything on the website (data/docs) is now **CC BY 4.0**
- Coming soon:
  - No more third party trackers
  - Pricing transparency

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