Building Event Collections from Crawling Web Archives

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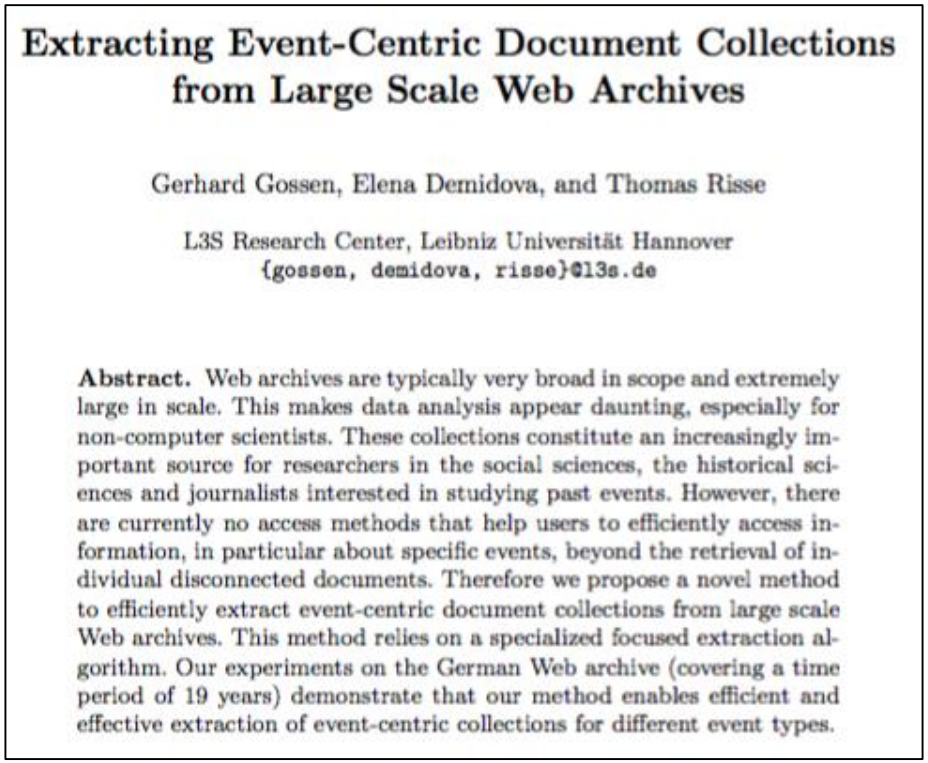
Inspiration from Previous Work



Extracting Event-Centric Document Collections from Large Scale Web Archives

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Abstract. Web archives are typically very broad in scope and extremely large in scale. This makes data analysis appear daunting, especially for non-computer scientists. These collections constitute an increasingly important source for researchers in the social sciences, the historical sciences and journalists interested in studying past events. However, there are currently no access methods that help users to efficiently access information, in particular about specific events, beyond the retrieval of individual disconnected documents. Therefore we propose a novel method to efficiently extract event-centric document collections from large scale Web archives. This method relies on a specialized focused extraction algorithm. Our experiments on the German Web archive (covering a time period of 19 years) demonstrate that our method enables efficient and effective extraction of event-centric collections for different event types.

https://doi.org/10.1007/978-3-319-67008-9_10

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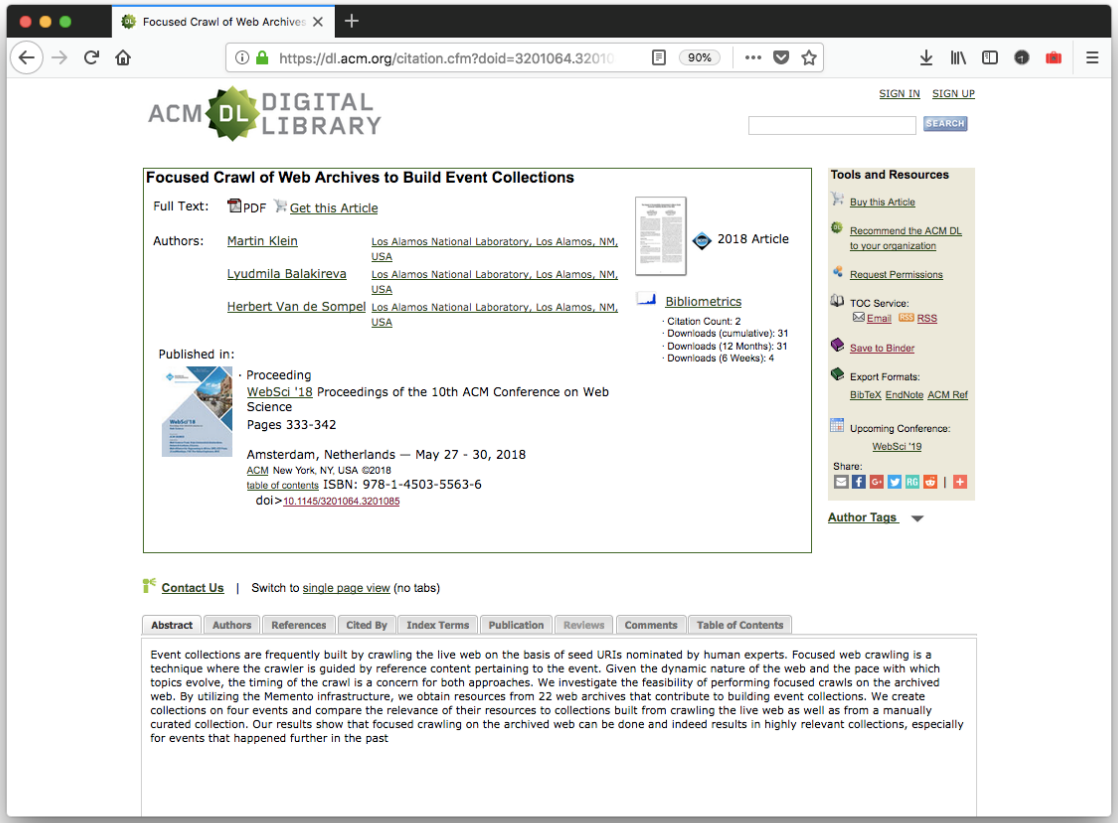
Published at WebSci 2018



https://doi.org/10.1145/3201064.3201085

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Questions

1. Can we create event collections by focused crawling online-available web archives?

2. How do event collections created from the archived web compare to those created from the live web?

3. How does the amount of time passed since the event affect the collections built from the live and the archived web?

4. How do event collections built from the archived web compare to manually curated collections?

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Background – Event Collection Building

- Often orchestrated by subject matter experts, archivists, special collection librarians, technicians
- Potentially with guidance from institutional collection policy
- Results in a list of seeds (URIs, social media accounts, etc)
- Utilization of crawling services such as Archive-It, Social Feed Manager

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Problems and our Approach

- Temporal: time passed since event is of concern
  → Use of web archives via Memento infrastructure
- Selection: seeds often picked manually
  → Use of references from Wikipedia pages
- Relevance: seed assessment often done by humans
  → Use of focused crawling with content and temporal relevance assessment

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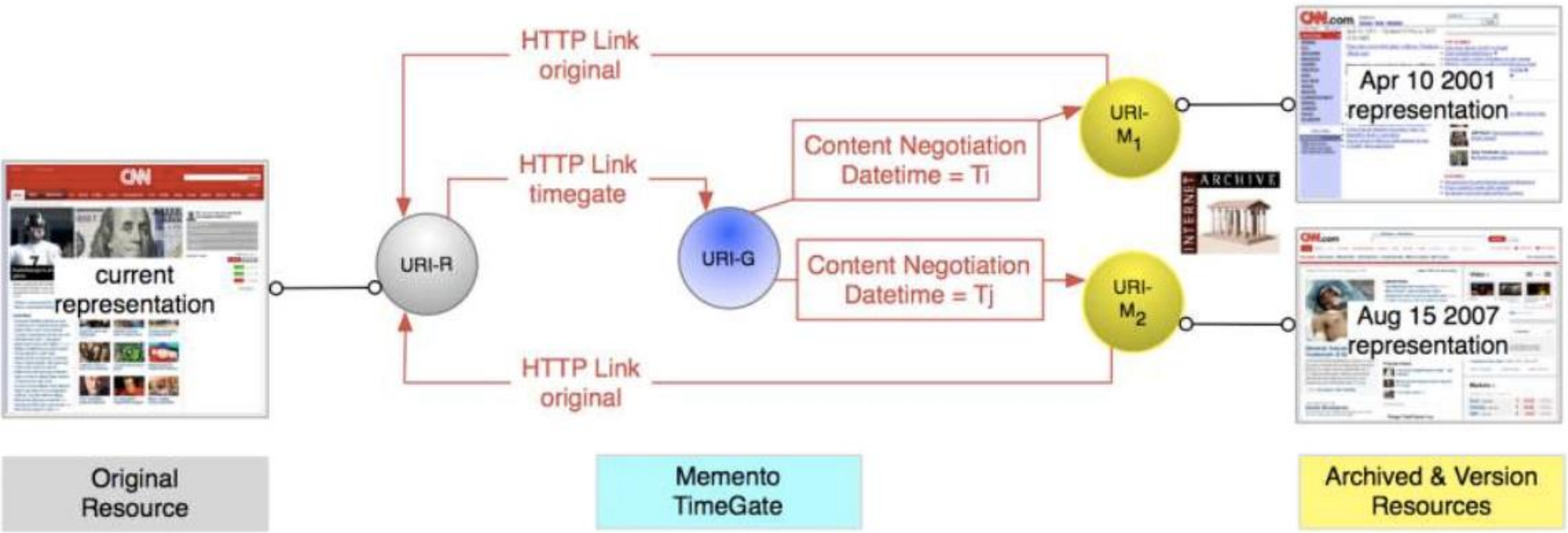
Memento Framework



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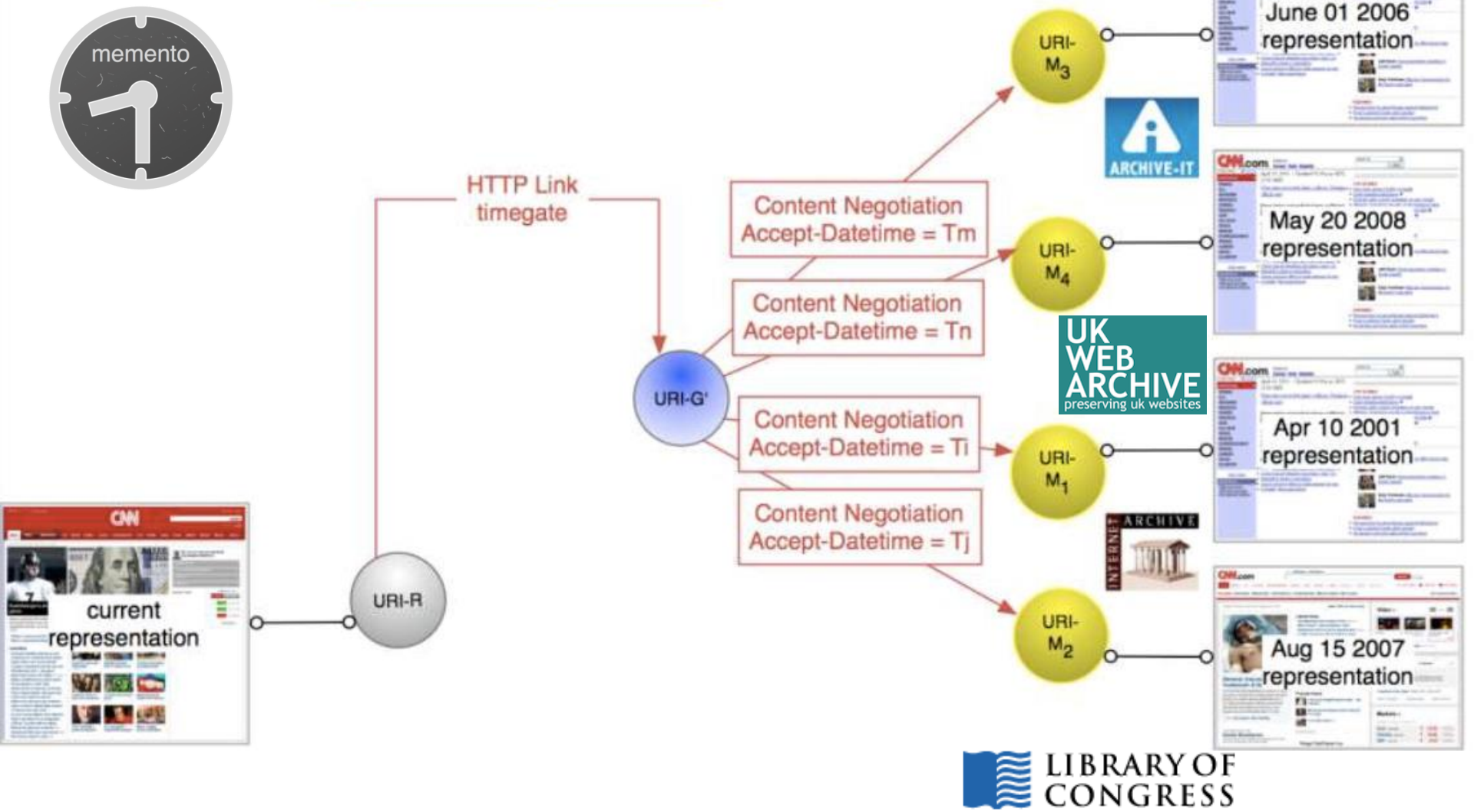
Integrating Multiple Archives

more info: http://mementoweb.org/
https://tools.ietf.org/html/rfc7089

archive.is
webpage capture



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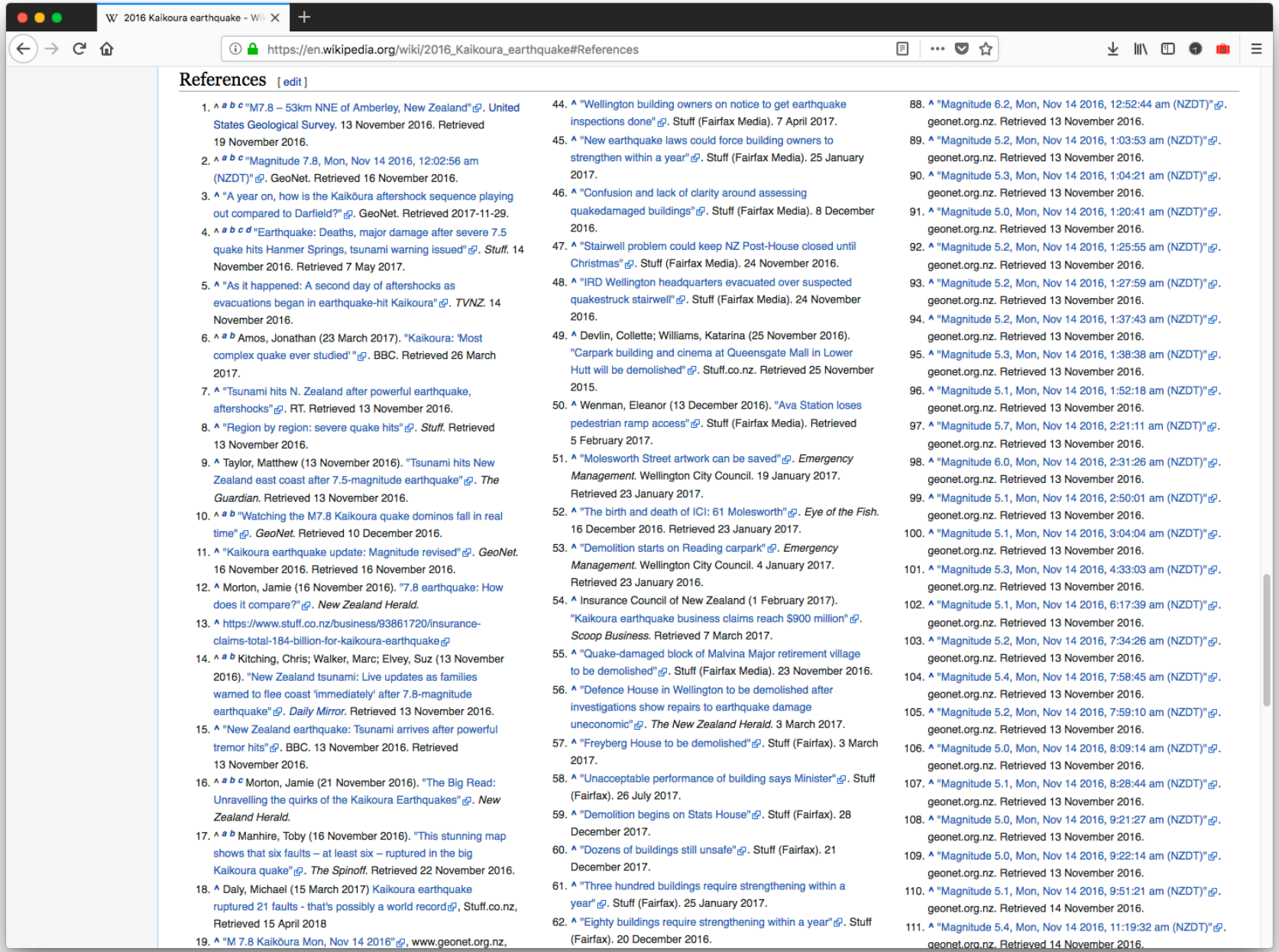

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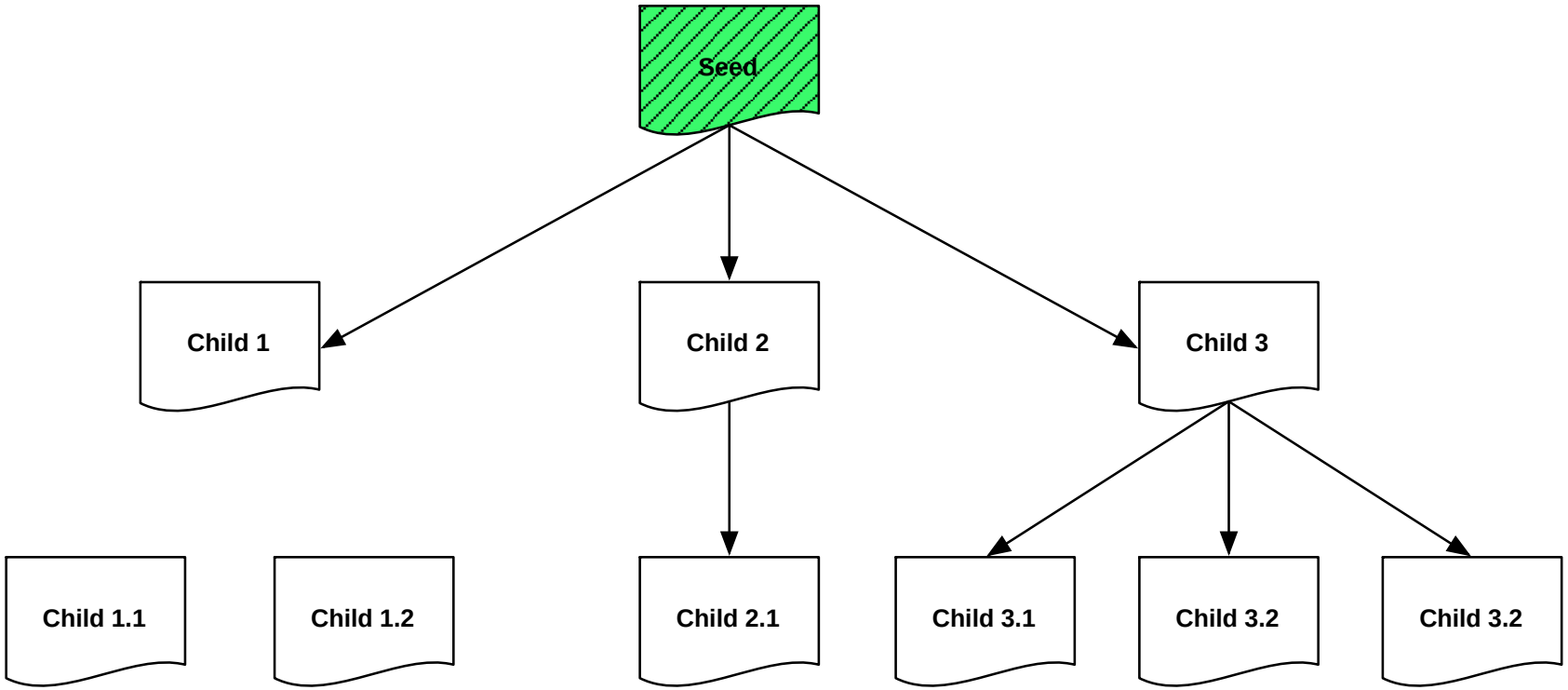
Focused Crawling



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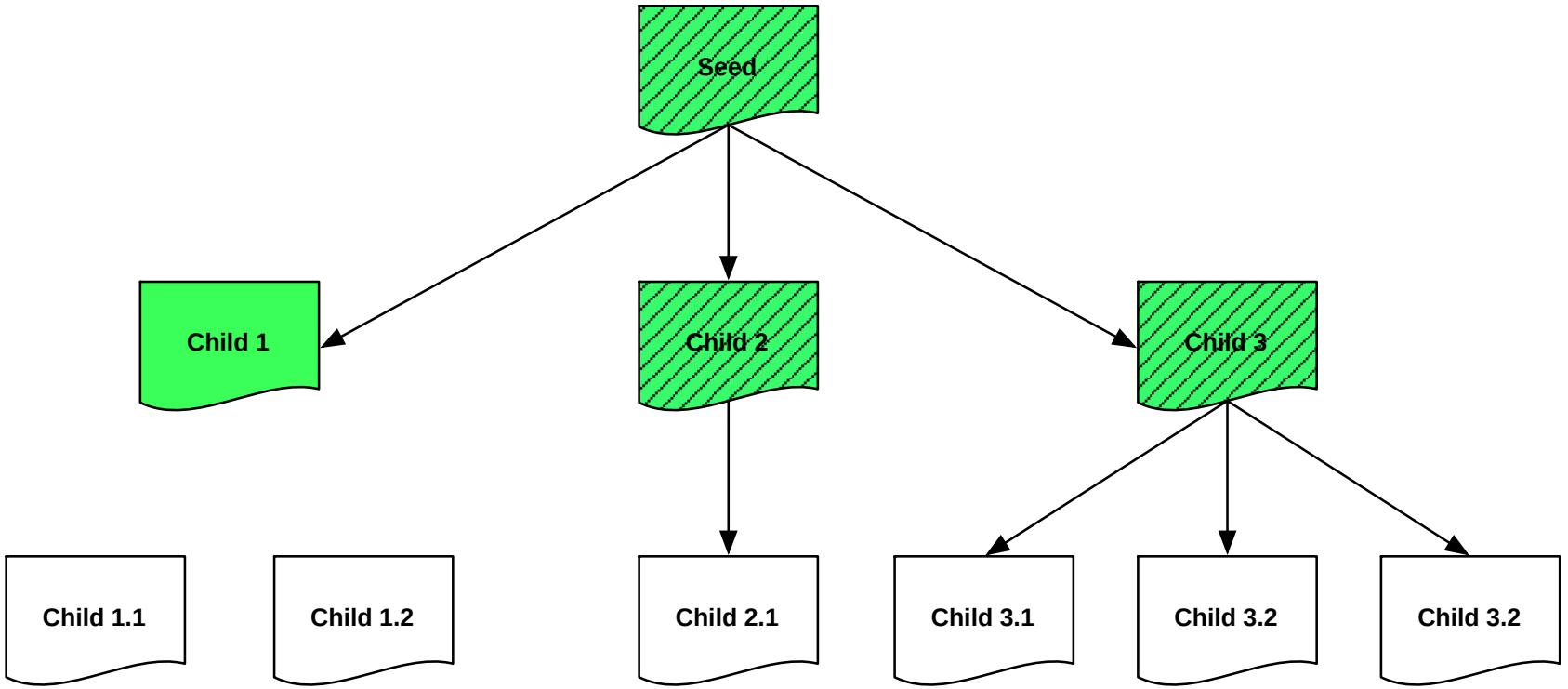
Focused Crawling



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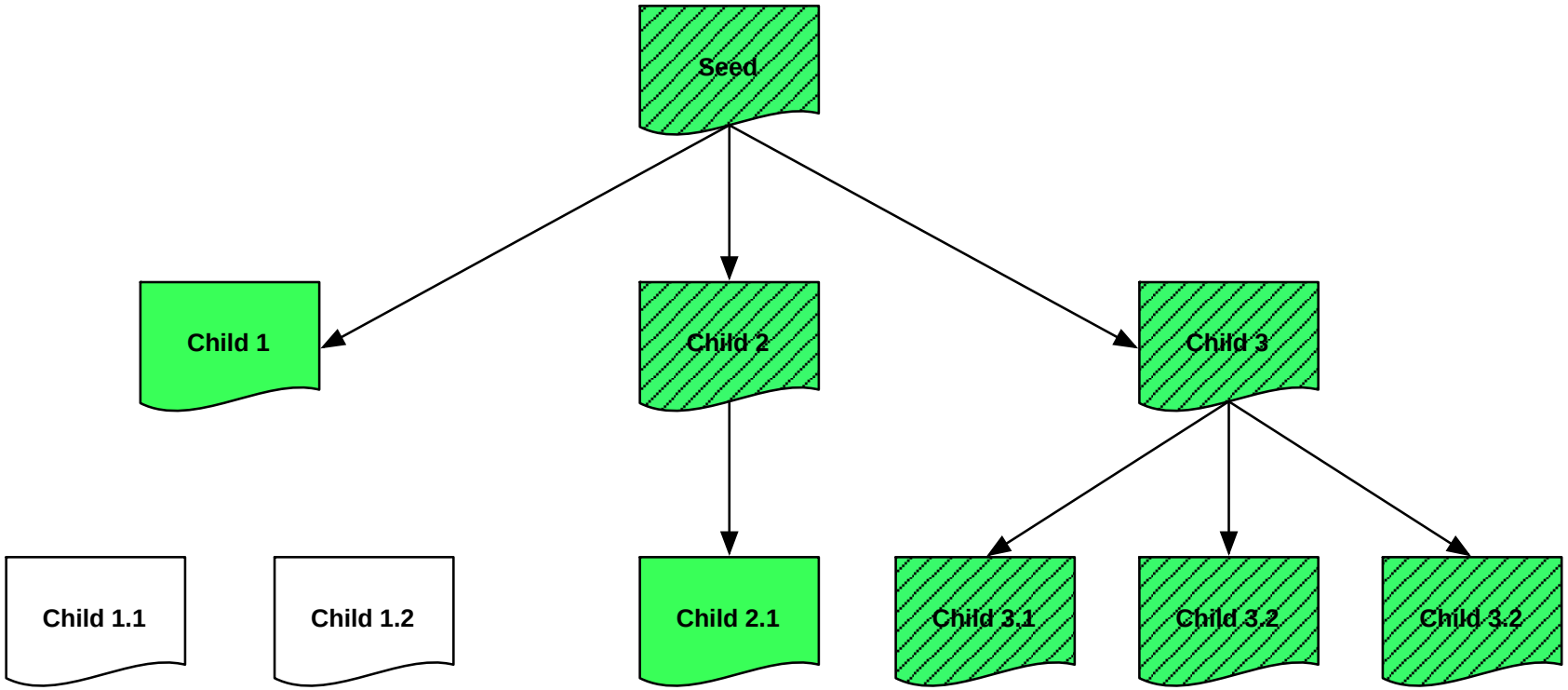
Focused Crawling



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Content Relevance

1. Content of Wikipedia page + random 60% of page's references
   - Generate topic vector (TF-IDF of 1grams + 2grams)

2. Content of remaining 40% of Wikipedia page's references
   - Generate topic vector (TF-IDF of 1grams + 2grams)

- Compute cosine similarity value between vectors 1 and 2
- Run 10 times
- Take average cosine similarity value as content threshold

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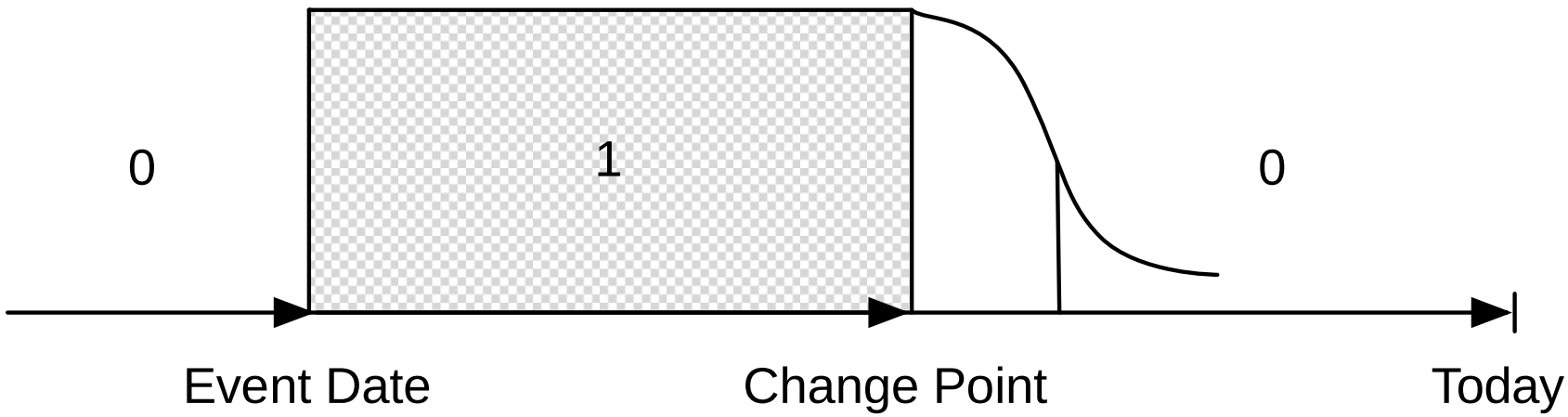
Temporal Relevance

- Define temporal interval for which crawled pages are considered relevant
- Event date extracted from Wikipedia event page



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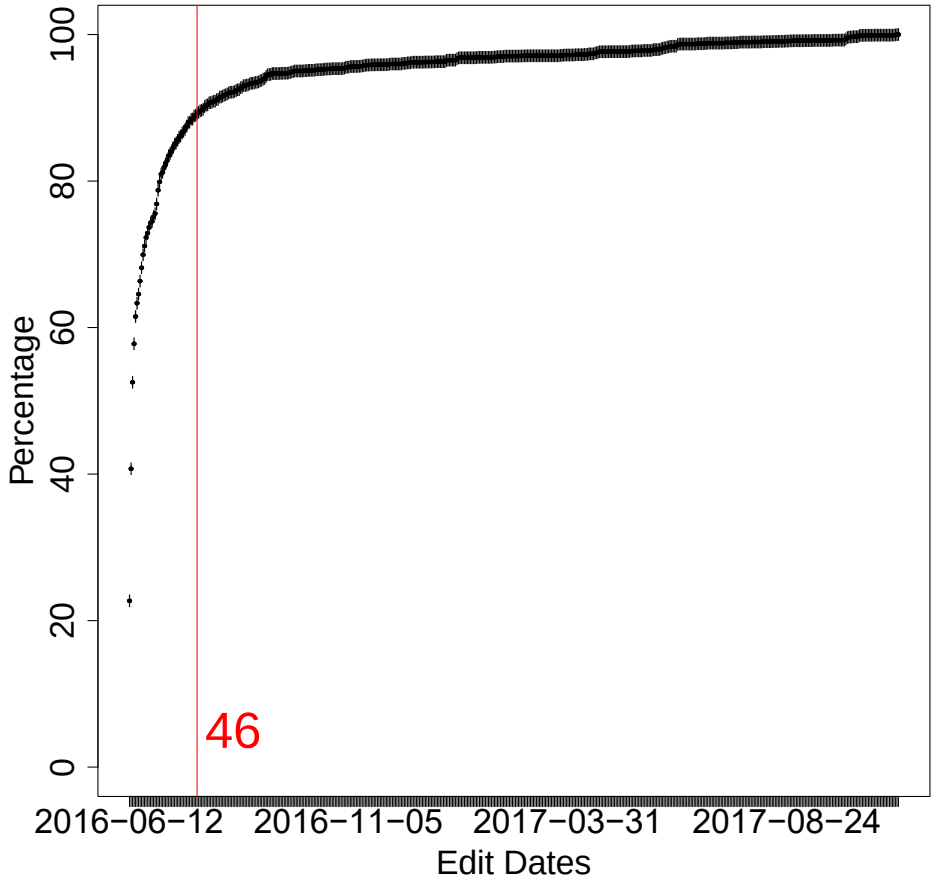
Change Point Detection



- Plot number of Wikipedia page edits per day
- Run R's changepoint algorithm
- Detect significant change in curve

https://cran.r-project.org/web/packages/changepoint/index.html

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Datetime Extraction

- Extract datetime from pages via:
  - URI
    http://www.cnn.com/2017/12/09/us/wildfire-fighting-tactics/
  - Meta tags
    <meta property="article:published" itemprop="datePublished" content="2017-12-09T10:14:50-05:00" />
  - ODU's Carbondate tool
    http://carbondate.cs.odu.edu/
  - Memento datetime
  - X-Header

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Experiment Details

- Topics limited to terror attacks and mass shootings in the U.S.
  - From different times in the past
- Take content and temporal relevance into account
  - Equally weighted
- Use events' Wikipedia page as input for focused crawler
  - Version that was live at change point

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Crawl Details

- Focused crawl of:
  - 22 archives, simultaneously, via Memento infrastructure
  - The live web
- Seeds
  - Memento of Wikipedia page references closest to and after event time
  - Subject to temporal and contextual relevance assessment
- Crawled outlinks
  - Memento of outlinks closest to and after event time
  - Subject to temporal and contextual relevance assessment

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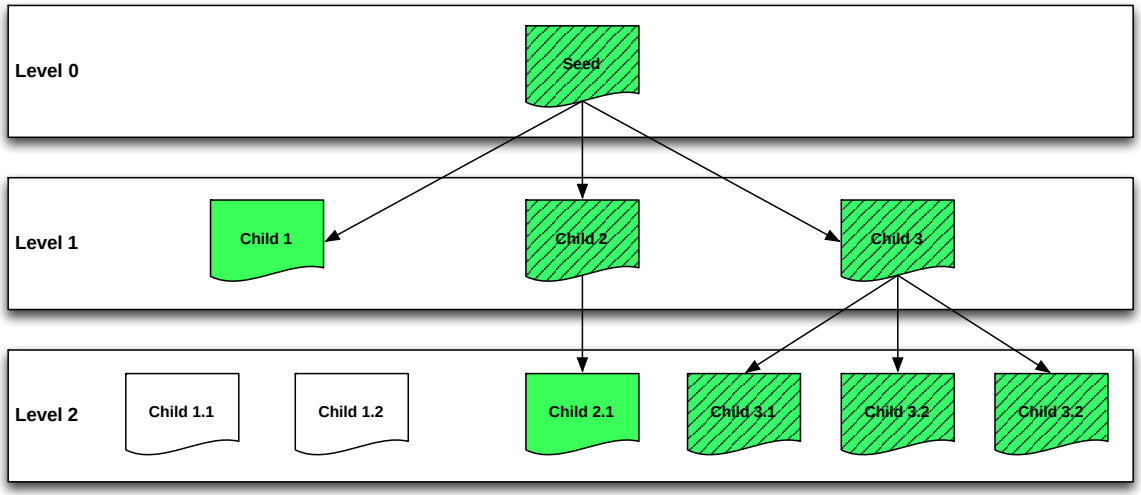
Crawl Details

- Crawl stop conditions:
  - No more relevant documents left
  - 5 levels deep
- Utilized crawl priority queue



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Collections Crawled (in November 2017)

- **New York City, October 31st 2017**
- Las Vegas, October 1st 2017
- Orlando, June 12th 2016
- San Bernadino, December 2nd 2015
- **Tucson, January 8th 2011**
- Binghampton, April 3rd 2009

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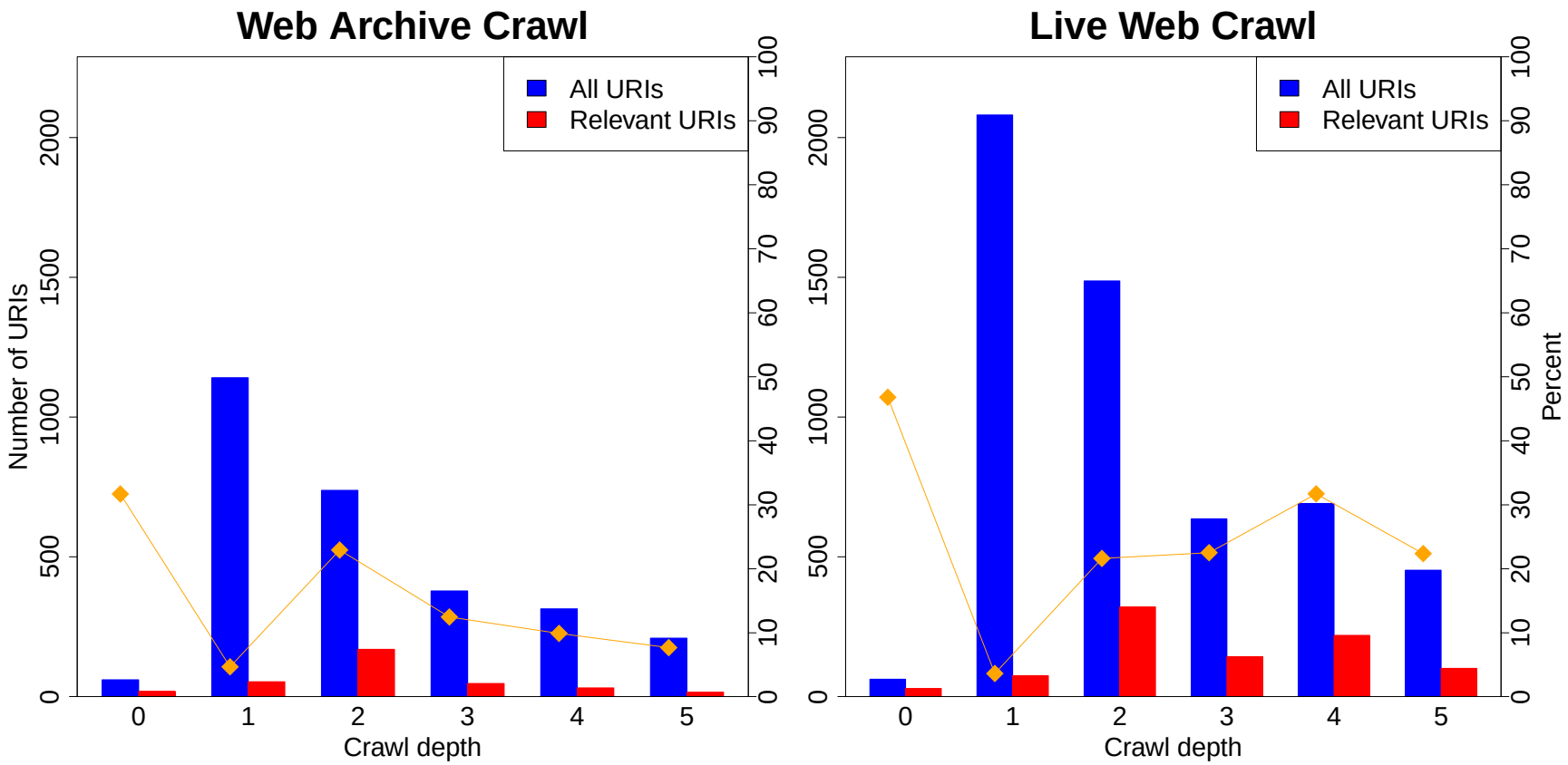
NYC, 10/31/2017 – URIs per Level



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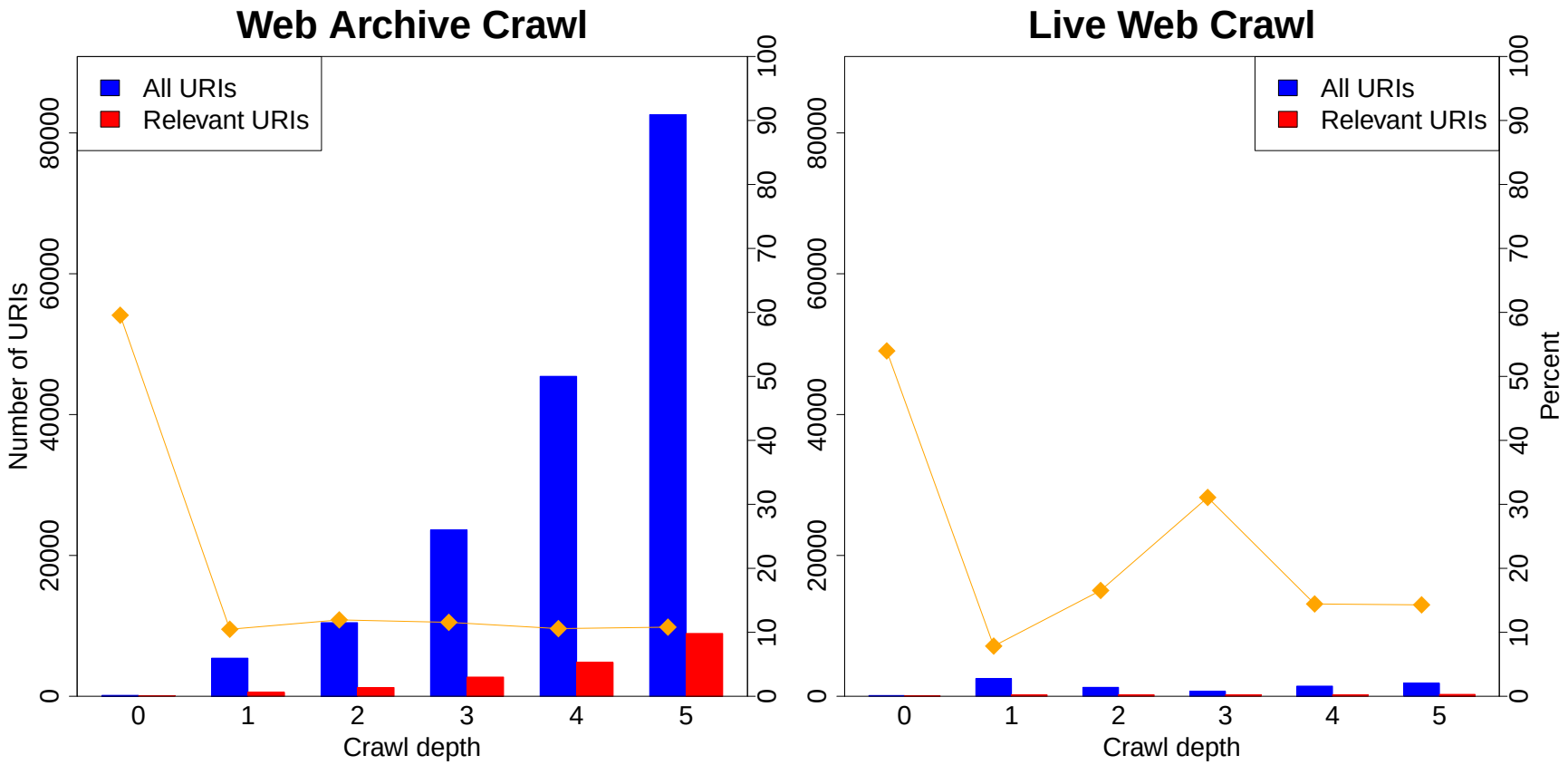
TUC, 01/08/2011 – URIs per Level



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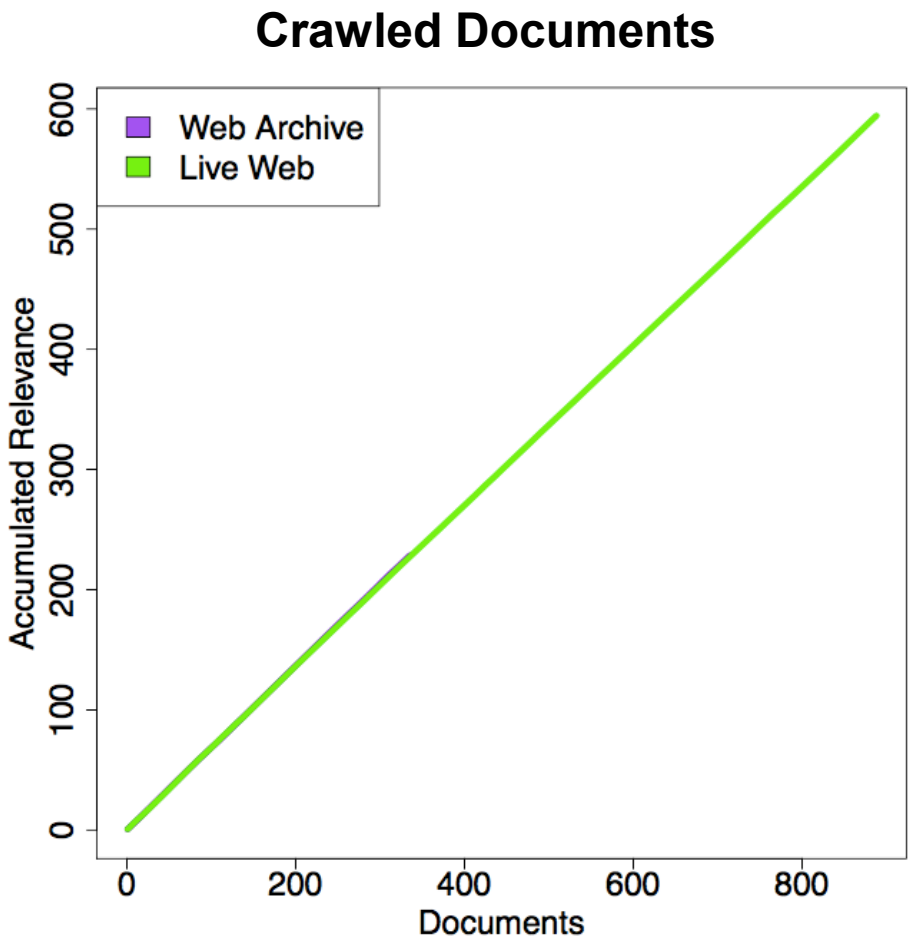
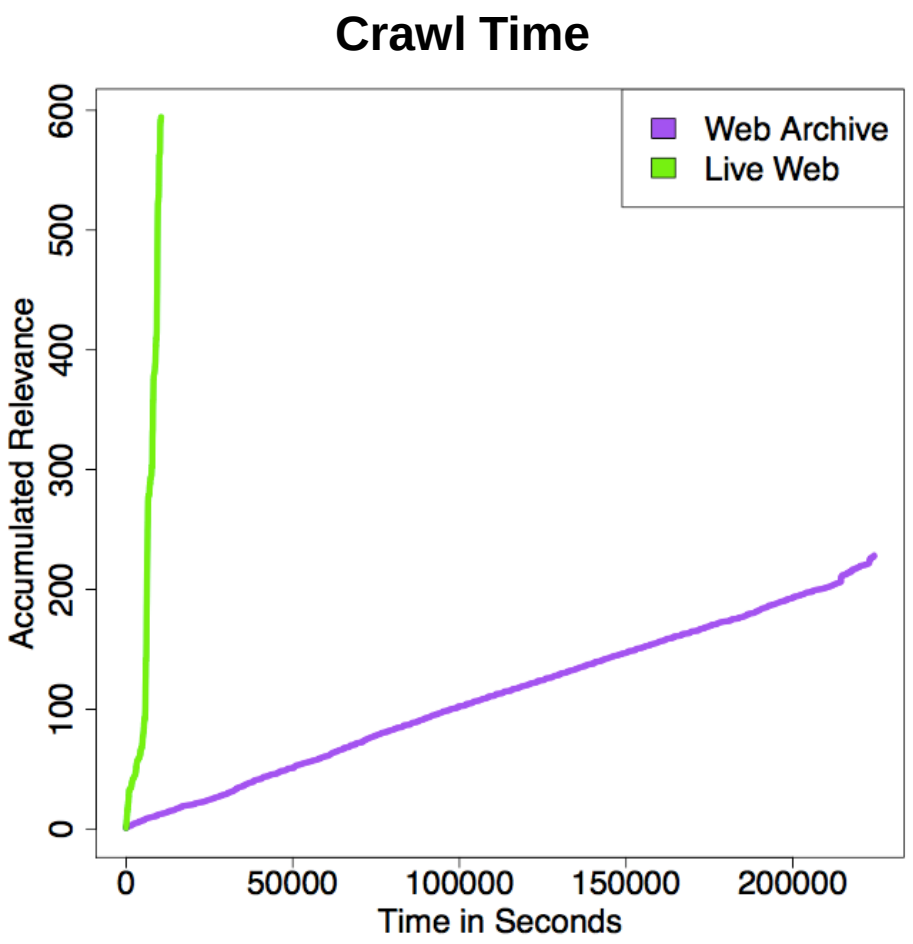
NYC, 10/31/2017 – Relevance over…





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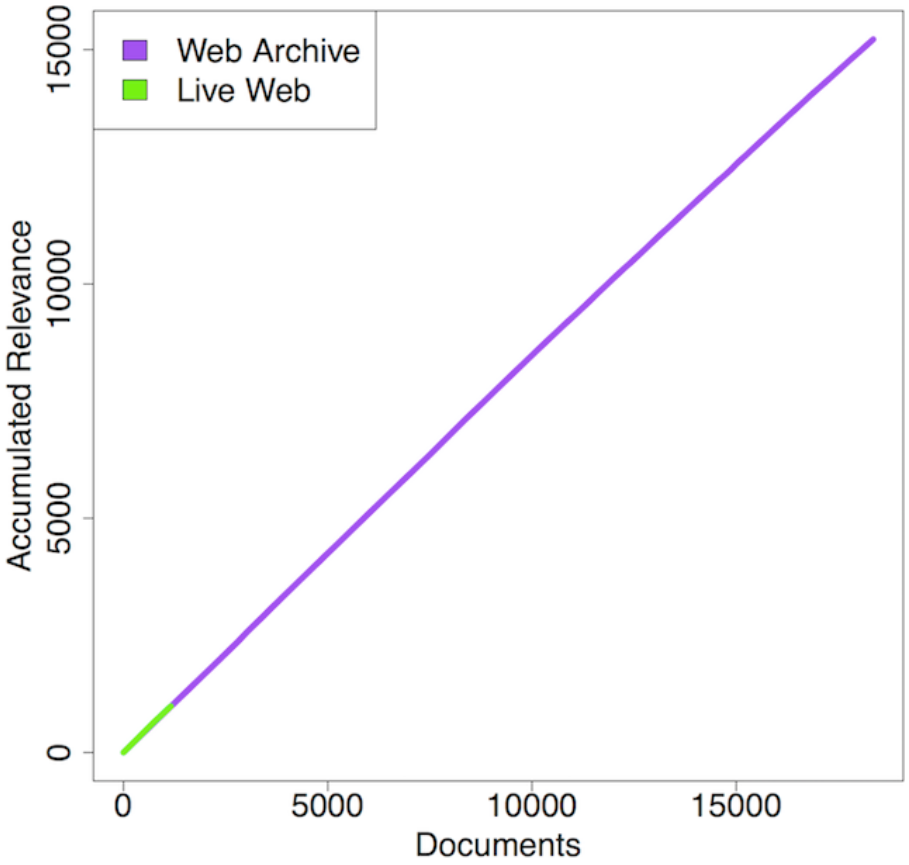
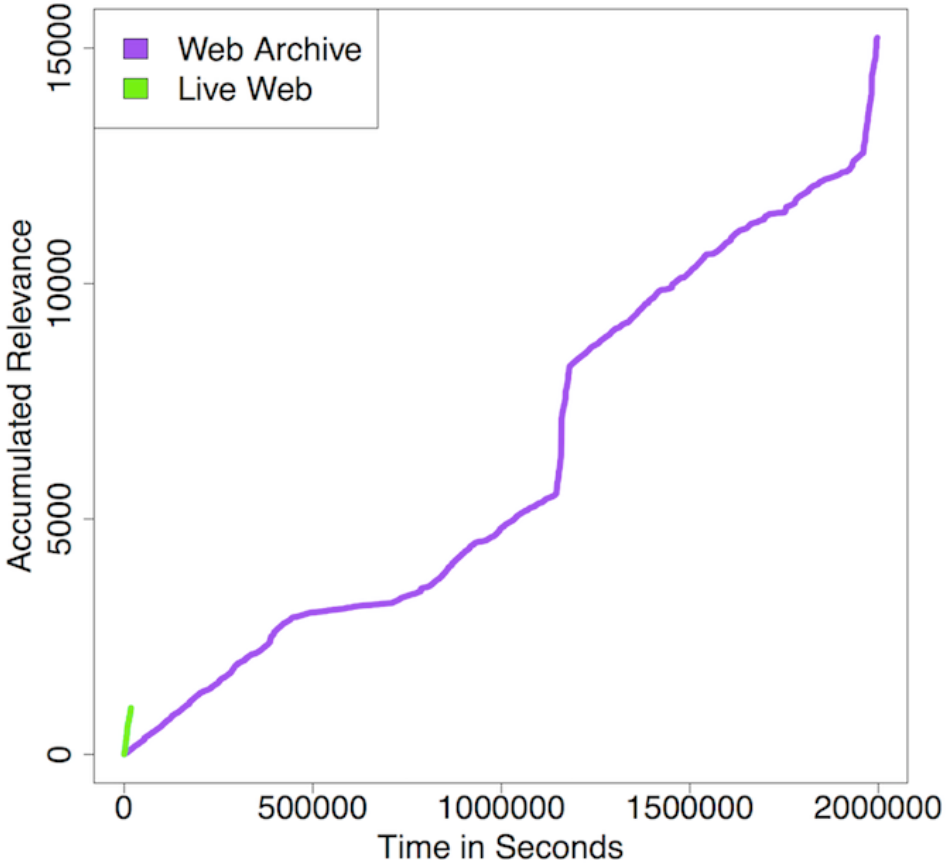
TUC, 01/08/2011 – Relevance over…

Crawled Documents



Crawl Time



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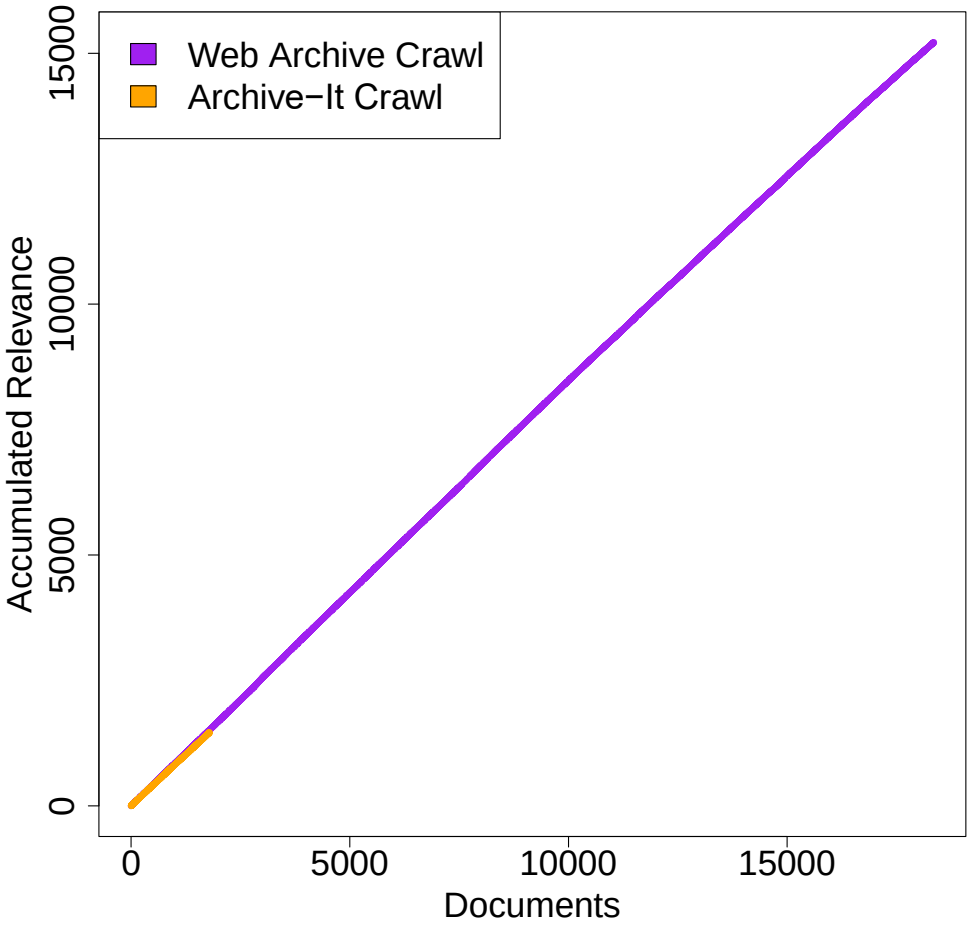
TUC, 01/08/2011 – Comparison to Archive-IT



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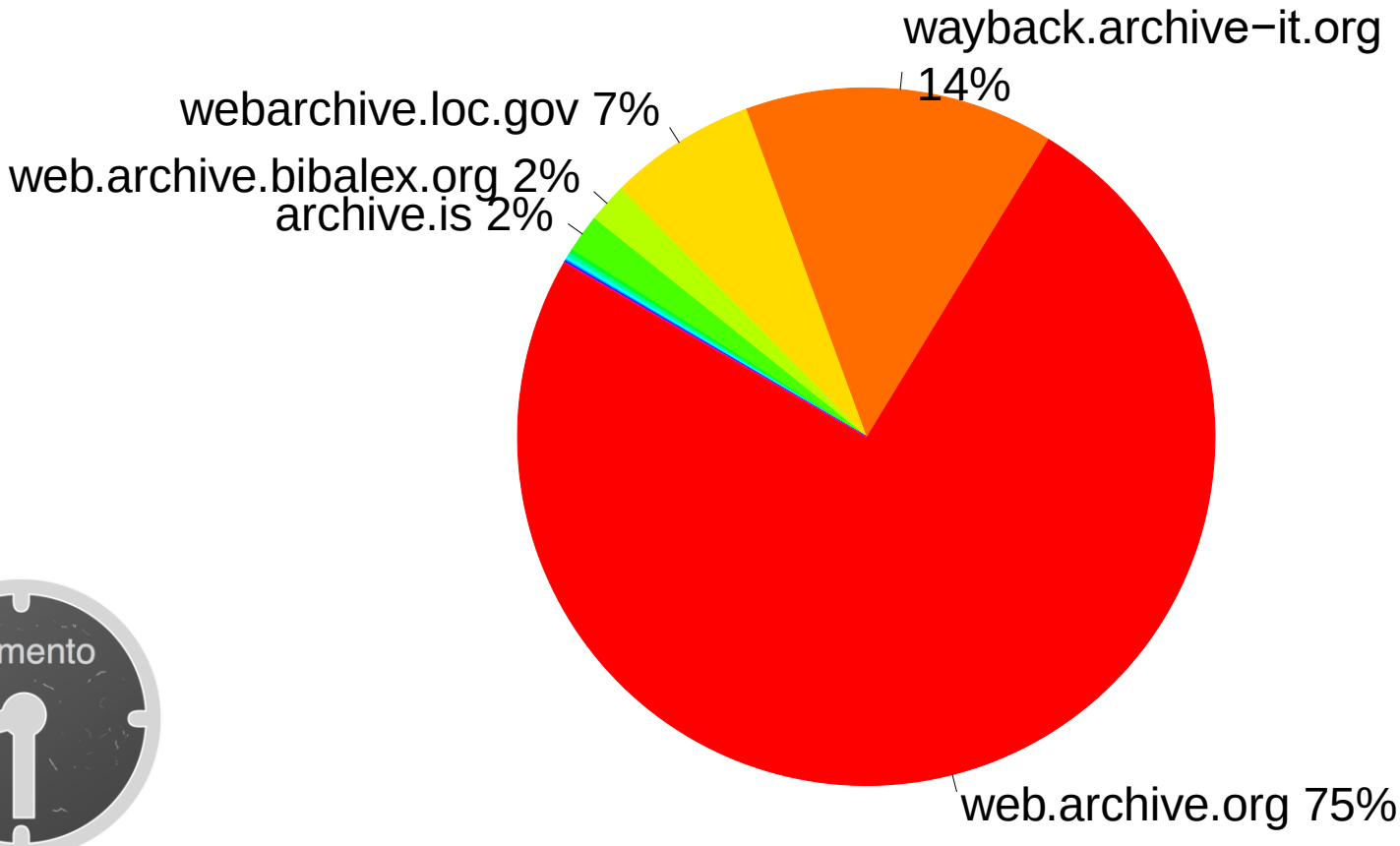
TUC, 01/08/2011 – Web Archive Contributions



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Takeaways

- Web archives are great resources to build event collections of web resources
- Crawling web archives is much slower than the live web
- Collections about very recent events benefit more from the live web than the archived web
  but
- Collections about events from the distant past benefit more from the archived web than the live web
- Utilizing multiple web archives is beneficial for the collection
- Focused crawls have the potential to outperform manual collection building

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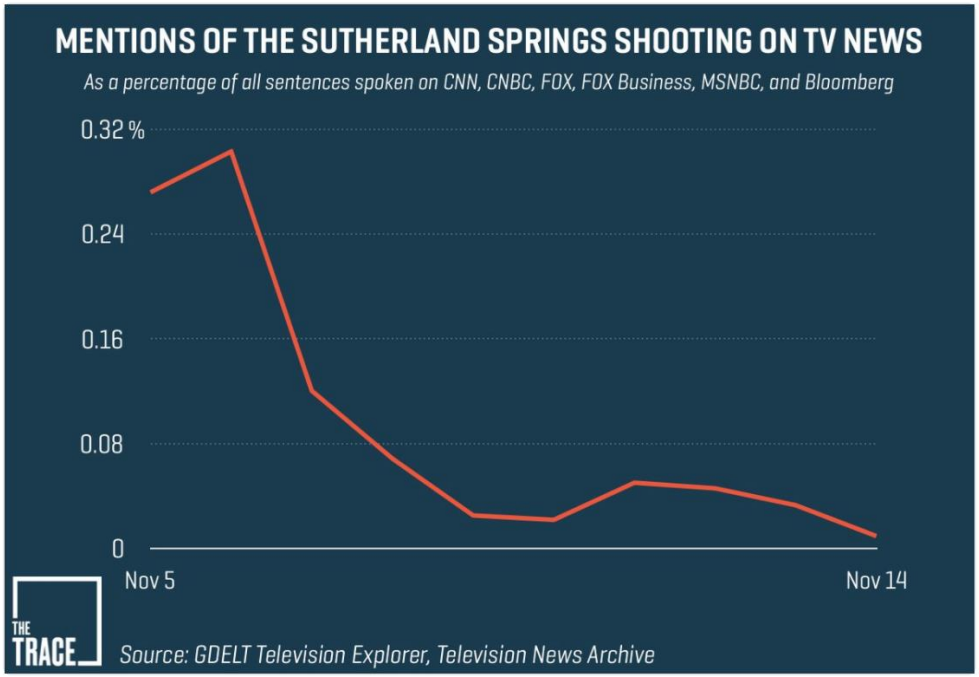
TV News Archive
@TVNewsArchive

Follow

"Two days after 26 people were massacred in a Texas church, the incident — one of the worst mass shootings in American history — had nearly vanished from the major cable news networks." @teamtrace thetrace.org/rounds/texas-c …



10:54 AM - 6 Dec 2017

https://web.archive.org/web/20171206181955/https:/twitter.com/TVNewsArchive/status/938466726190096384

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