To Request Is Human, To Retrieve Divine

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Drexel CCI Doctoral Student Association (DSA)
Research Showcase
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What?

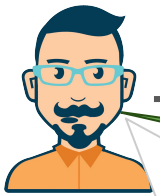
IETF RFC7089

- Web researcher, focusing on computational web archiving
  - Digital histories, encoded as bits
- Replicating an experience is complex!
  - Assembling bits does not a complete sufficient replication make
- Information Retrieval (IR) to web archives is rudimentary
  - **Time** + **location (URI)** as query parameters
- Want to ***empower*** end-user with rich, but intuitive tooling

H. Van de Sompel et al., "***HTTP Framework for Time-Based Access to Resource States -- Memento***", IETF RFC 7089, Dec. 2013, https://datatracker.ietf.org/doc/html/rfc7089

Time-Based Content Negotiation: Requesting

Time-Based Content Negotiation: Responding



HTTP Request

- Accept-Datetime: Wed, 02 Aug 2017 23:15:00 GMT
- GET: http://web.archive.org/web/http://www.drexel.edu

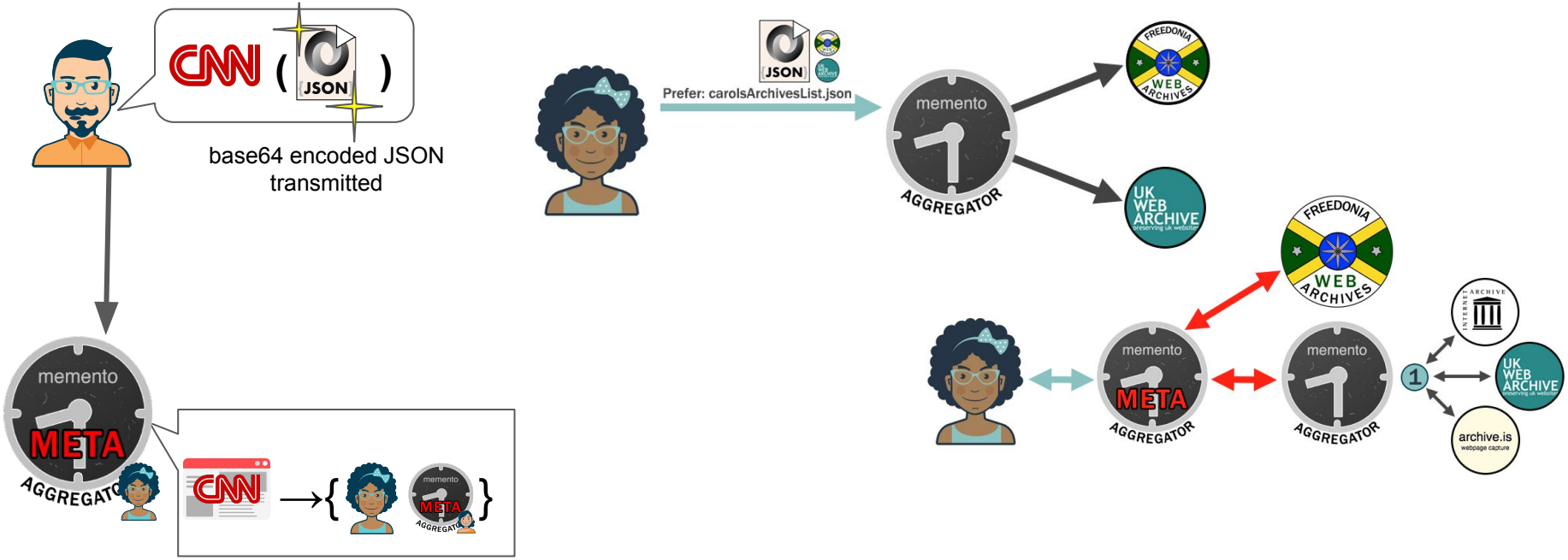
"Close enough"

Request `drexel.edu` at Aug 2, 2017 at 6:15pm EST

HTTP Response (302)

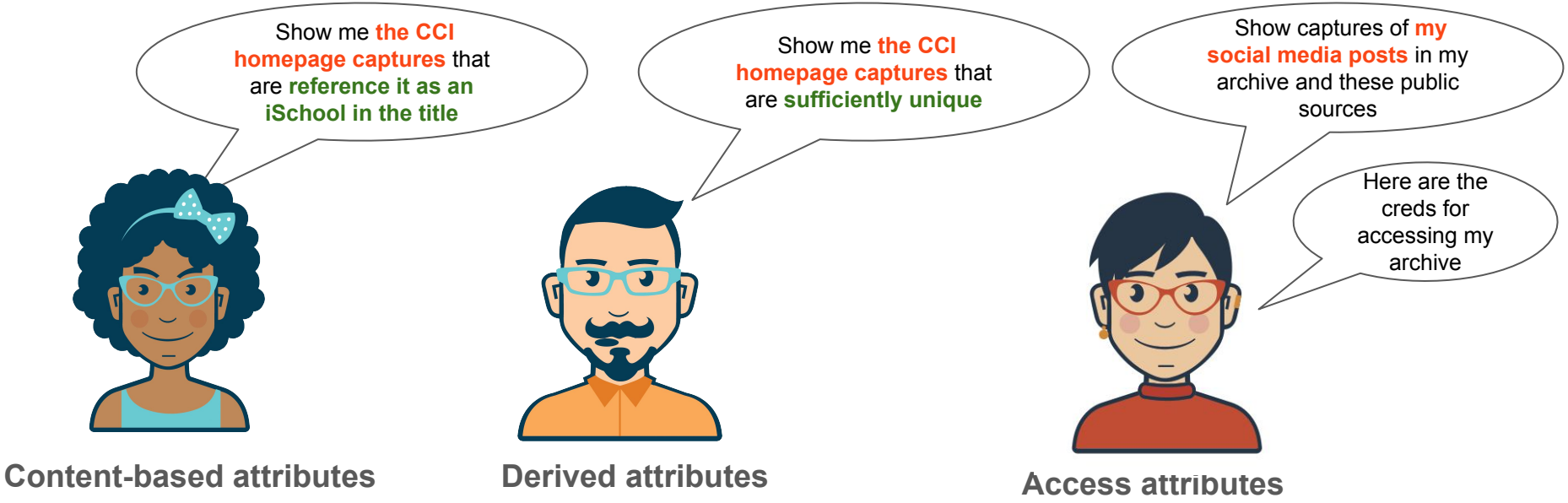
- Memento-Datetime: Wed, 02 Aug 2017 23:18:04 GMT
- Location: http://web.archive.org/web/20170802231804/http://www.drexel.edu/
- Link:

How About Just From These Repos?



Mat Kelly, Sawood Alam, Michael L. Nelson, and Michele C. Weigle, "***Client-Assisted Memento Aggregation Using the Prefer Header***," Presented at the Web Archiving and Digital Libraries Workshop (WADL 2018), Fort Worth, Texas, June 2018.

Attributes to Surface for Querying

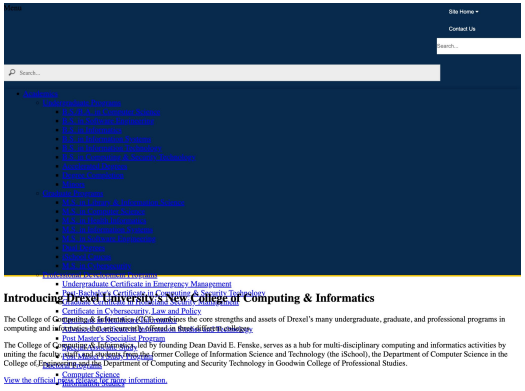


Threshold-based Retrieval

- Ability to request preference that meets some quantitative/qualitative criteria
- e.g., Memento Damage < 0.6

Captured May 28, 2024

Captured Aug. 2017
(missing image)



Captured Aug. 2015
(missing JS, CSS)

Justin F. Brunelle, **Mat Kelly**, Hany SalahEldeen, Michele C. Weigle, and Michael L. Nelson, "***Not All Mementos Are Created Equal: Measuring the Impact of Missing Resources***," International Journal on Digital Libraries (IJDL), 16(3), pp. 283–301. May 2015.

Preference from Client's Perspective

HTTP Request

```
GET /tm/cdxj/https://drexel.edu HTTP/1.1
Host: somewebarchive.net
Prefer: damage="<0.4"
Prefer:archives="data:application/json;charset=utf-8;
                 base64,Ww0KICB7...NCn0="
Prefer: publicOnly
```

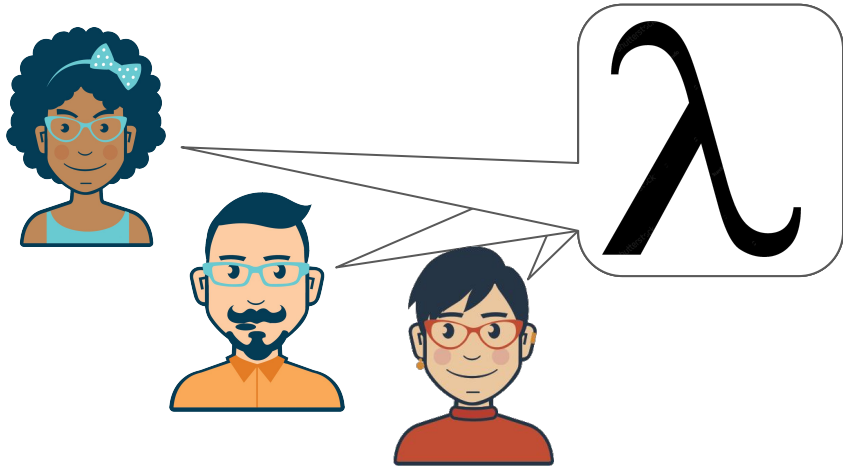
HTTP Response

```
HTTP/1.1 200 OK
Content-Length: 1207
Content-Type: application/cdxj+ors
Preference-Applied: damage="<0.4"
```

CDXJ
TM

Mat Kelly, Michael L. Nelson, and Michele C. Weigle, "A Framework for Aggregating Private and Public Web Archives," In Proceedings of the ACM/IEEE JCDL, 2018, pp. 273–282.

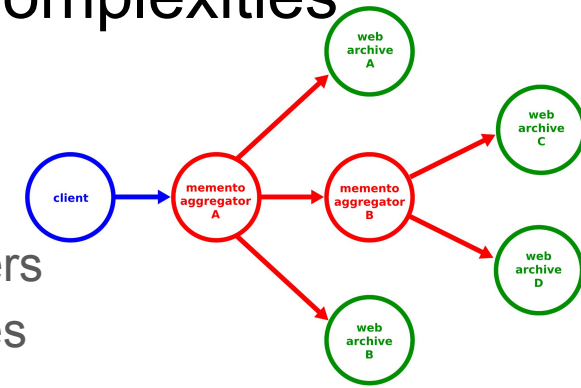
Lambda-based Functions



- User-supplied functions
  - Customizable criteria for retrieval
  - Analysis and filtering performed server-side
- Use Case (e.g.):
  - User requests all captures that are about topic healthcare reform that do not contain the mention of any of the current members of congress
  - Can AI/ChatGPT be used as the basis for parameterization? (obligatory)

Chaining Sources, Scoped IR, Querying Complexities

- Scoped sources
- Efficient querying
- Empowering user/client beyond fundamental parameters
- Integration of public, private, and personal web archives
  - With an eye toward access regulation
- Expressive thresholds
  - Currently solely based on count, but also could be sources of Damage < 0.4
  - Requires consideration of deferral, optimization, async communication, etc.



Mat Kelly, "***Exploiting the Untapped Functional Potential of Memento Aggregators Beyond Aggregation***," International Journal on Digital Libraries (IJDL), 25(1), pp. 93–104, March 2024.

Upcoming Work

- Criteria/classification of attributes for querying
- Efficient querying/resolution approaches for clients and servers
- Deploying a test bed of Memento aggregators for experimentation
  - prev. just w/ mocking
- Advance indexing approaches for web archives to facilitate richers information retrieval
- e.g., Which attributes do you surface if the function is lambda?