Librarians and APIs 101: overview and use cases

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Library APIs 101 – Basics

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Using an API

- Local computer (Windows, Linux, etc.) with network connectivity
- You can use a web browser to exercise an API manually
- Python, Ruby, PHP, C# and many other languages also work.
- Destination host of the API provides a Link/URL for an API
- Local computer visits a link (sends a request) to destination API
- Destination API responds with result data (or browser web page)
- Local computer can read, copy, parse, store the API results
API Documentation

- API provider usually provides online documentation
- Acceptable URL formats for requests/links
- Parameters search terms and other parameters
- Parameters for results formats (XML, JSON, others)
- Use of cursor parameters for long results
Example Library APIs

- Elsevier/ScienceDirect Article metadata search
- Elsevier Full-Text search
- Elsevier Entitlement API – User Permissions
- Crossref Article Searches, Works meta data
- OAI-PMH servers – Dublin Core Item Metadata
- Open Access information by DOI
- ORCID data – Author Education, Employments, Works
Entitlement API XML Sample

Request:

http://api.elsevier.com/content/article/entitlement/pii/S0049384814002849?apiKey=d91051fb976425e3b5f00750cbd33d8b

Results: (vary depending on IP of the requestor)

<entitlement-response>
  <document-entitlement status="found">
  
  <dc:identifier>http://dx.doi.org/10.1016/j.thromres.2014.05.018</dc:identifier>
  <prism:url>http://api.elsevier.com/content/article/pii/S0049384814002849</prism:url>
  <prism:doi>10.1016/j.thromres.2014.05.018</prism:doi>
  <pii>S0049-3848(14)00284-9</pii>
  <pii-norm>S0049384814002849</pii-norm>
  <scopus_id>84905087060</scopus_id>
  <eid>1-s2.0-S0049384814002849</eid>
  <entitled>false</entitled>
  <message>Requestor is NOT entitled to the requested resource</message>

  </document-entitlement>

</entitlement-response>
Example Request and Response for oaidoi.org ":doi"

Docs: https://oadoi.org/api
Request: https://api.oadoi.org/10.1038/nature12373
Response:
{
  "algorithm_version": 2,
  "doi": "10.1038/nature12373",
  "doi_resolver": "crossref",
  "evidence": "oa repository (via OAI-PMH doi match)",
  "free_fulltext_url": "https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4221854/pdf",
  "is_boai_license": false,
  "is_free_to_read": true,
  "is_subscription_journal": true,
  "license": null,
  "oa_color": "green",
  "reported_noncompliant_copies": [],
  "url": "https://doi.org/10.1038/nature12373"
}
Some Library API Links - 2017

- Elsevier Developers (Several useful APIs): [https://dev.elsevier.com/index.html](https://dev.elsevier.com/index.html)
- Open Access Information: [https://oadoi.org/](https://oadoi.org/)
- Crossref (multiple publishers): [https://www.crossref.org/](https://www.crossref.org/)
- ORCID: [https://members.orcid.org/api/tutorial/search-orcid-registry](https://members.orcid.org/api/tutorial/search-orcid-registry)
- OAI-PMH: [https://www.openarchives.org/pmh/](https://www.openarchives.org/pmh/)
- Links for 2,038 OAI-PMH Servers: [http://opendoar.org/OAIbaseURLs.php](http://opendoar.org/OAIbaseURLs.php)
- DataCite OAI-PMH, search, and citation builder: [https://oai.datacite.org/](https://oai.datacite.org/)
OPEN ARCHIVES INITIATIVE (OAI)

- Main Page: http://www.openarchives.org/

- OAI-PMH is one part, but a big part, of OAI

- See the main page for more OAI-PMH links
OAI-PMH Quick Steps for Beginner

- Survey Some OAI-PMH Servers

- Identify an OAI-PMH server

- List “sets” of items that the server serves

- Pick a setSpec of interest and List some records
OAI-PMH Step 1: Survey Some OAI-PMH Servers

- A list of 2,038: http://opendoar.org/OAIbaseURLs.php
- Bepress Legal: http://law.bepress.com/do/oai/?verb=Identify
- BORIS: http://boris.unibe.ch/cgi/oai2?verb=Identify
- Zenodo: http://zenodo.org/oai2d?verb=Identify
- Miami-Merrick: http://merrick.library.miami.edu/oai/oai.php
OAI-PMH Step 2: Select your OAI-PMH Server

- Be sure the main link ends with ?verb=Identify
- Paste and visit the link in your browser: http://zenodo.org/oai2d?verb=Identify
- You will see details about the Zenodo server
- Type Ctrl-U to see the XML (Firefox works well)
OAI-PMH Step 3: List OAI-PMH “sets” available

- Browse to this URL: https://zenodo.org/oai2d?verb=ListSets
- You will see one or more "sets" that the server touts to support.
- See a setSpec there is called 'user-zenodo'
- At the very bottom is cursor control: resumptionToken
OAI-PMH Step 4: Pick a setSpec and List Records


2. Zenodo result page provides links to the data

3. Copy the http:// link value of a resourceIdentifier starting with ‘http’

4. Eg, [https://zenodo.org/record/167280](https://zenodo.org/record/167280)

5. Paste it to the browser to see a link to its data

6. That page will have a download link of a Zenodo dataset at the bottom ([ovensuukyselyt.csv](ovensuukyselyt.csv)).
OAI-PMH Cursor Notes

- Review OAI-PMH Step 4 above and scroll to the bottom. The appearance of a 'resumptionToken' means this page has only one of many batches of results.


- The resumptionToken expires after a short time, so a document like this cannot convey a meaningful example, as it will expire shortly.

- You can start to see how a computer program to retrieve this data (a harvester program) will be preferable to manual methods to process many API results.

- Each OAI Set is meant to be delivered, in its entirety to the user/harvester. Therefore there is no filter or search of items within a 'set'.

OAI-PMH Formats and Tips

- Some servers supply metadata formats other than oai_dc (Dublin Core). Read about the ListMetadataFormats verb in the documentation.

- Some servers tout the existence of many sets, but if you try to retrieve some, you may get 0 records or an error message.

- Some servers may not tolerate 'extra parameters', for example the re-statement of a 'set=myset' value when a link includes a resumption token.

- OAI-PMH Step 2 is not necessary to execute often. It will provide the current API version, which might imply new verbs that are honored or old ones that no longer are, if the server changes the rules.
Thank You!

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Text Mining ScienceDirect to Improve Patient Care

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GUMC is an internationally recognized academic medical center

Dahlgren Memorial Library (DML) is part of the GU medical school and serves GUMC

Jonathan Hartmann is Senior Clinical Informationist at DML and provides services to MedStar Georgetown University Hospital (MGUH)
Rounding services at GUMC

- Informationists accompany MGUH clinical teams on daily patient rounds
  - Internal Medicine
  - Pediatrics
  - Pediatric Intensive Care and Neonatal Intensive Care
- Clinicians request information to help support their patient care decisions
- Informationists use iPads to access DML resources quickly at the point of care
Began working with Linguamatics in 2013

- Linguamatics’ i2e text mining software uses natural language processing (NLP) to retrieve and display relevant information from text

- Text mining can identify facts, relationships and assertions that would otherwise remain buried in the text

- Developed GUI to enable use of i2e on iPads

- Text mined MEDLINE abstracts on patient rounds
Linguamatics GUI for iPad
Became aware Elsevier would allow text mining of content in 2015

Identified medical journals in ScienceDirect

Georgetown University Information Services team used API to download 1.5 million articles!
Full text housed on GUMC server
Gout: An Independent Risk Factor for Heart Failure


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Background: Prior epidemiologic studies have confirmed an association between gout and cardiovascular disease (CVD). However, due to the frequent co-occurrence of gout and traditional cardiovascular risk factors, it remains uncertain whether gout is an independent risk factor for CVD, including heart failure (HF). In this study, we sought to investigate the incidence of and risk of HF in patients with gout, and determine their cardiovascular risk profiles. Methods: Using a large, multi-institutional database (Expressity Inc, Cleveland, OH), we performed a retrospective cohort analysis on patients with gout, HF, and cardiovascular risk factors. Demographic analysis and multiple logistic regression were performed to assess the impact of gout and other cardiovascular risk factors on HF incidence. Results: Among 46,765,760 patients, we identified 506,675 (1.0%) patients with gout and 264,210 (0.57%) patients who had HF within the previous year. HF incidence was markedly increased in patients with gout compared to controls (7.3% vs. 0.5%, relative risk (RR): 14.6 [95% CI: 14.414.8]). Overall, female patients with gout had a higher risk for HF (Male RR: 11.9 [95% CI: 11.5-12.3], Female RR: 19.7 [95% CI: 19.4-20.0]), though the highest RR was seen in young males (age 20-34) with gout RR: 125.1 [95% CI: 60.7324.5]). In multivariate analysis controlling for traditional cardiovascular risk factors, gout was an independent risk factor for HF (OR: 1 95% CI: 1.861.94), with an effect size less than that of hypertension (OR: 5.68 [95% CI: 3.530.83]) and CAD (OR: 4.55 [95% CI: 4.514.59]), however similar to that of obesity (OR: 2.11 [95% CI: 2.013.2]), advanced age (OR: 1.90 [95% CI: 1.884.14]), and dyslipidemia (OR: 1.73 [95% CI: 1.714.72]), and greater than that of diabetes (OR: 1.60 [95% CI: 1.581.63]) or smoking (OR: 1.44 [95% CI: 1.431.46]), all at P<0.001. No significant multicollinearity was observed. Conclusion: HF is a markedly increased in patients with gout where gout is an independent risk factor for HF in addition to traditional cardiovascular risk factors. Relative risk of HF is greater in females with gout compared to males. These finding suggest the need for aggressive cardiovascular risk screening in patients with gout.

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Search strategy

- Start with MEDLINE or other database search
- If needed information is not found, informationists text mine full text articles
Example case

- Pediatrics resident needed information on fulminant Kawasaki disease and its early cardiac manifestations
- Used Linguamatics GUI on iPad to search ScienceDirect full text
- Retrieved two relevant articles that were immediately provided to physician who used them to determine appropriate care
Questions?
Thank You & Questions

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