CWI

Centrum Wiskunde & Informatica

Understanding user behavior from search logs: a metadata-level approach

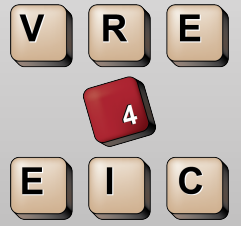
Tessel Bogaard, Information Access

Laura Hollink, Jan Wielemaker,

Jacco van Ossenbruggen, Lynda Hardman

Acknowledgments:
Under a strict confidentiality agreement the National Library of the Netherlands has provided us with around 200M log records collected from October 2015 until March 2016. We thank the National Library for their support.

This research was partially supported by the VRE4EIC project, a project that has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 676247.



Motivation

Better **understand user search behavior** in a digital library, so to evaluate and improve:

- Search algorithms
- Search interfaces
- Identify gaps in the collection

Problem

How to understand user search behavior from **low-level HTTP server logs**?

- Analysis of search logs in combination with the collection
- Explicit and transparent exploration, processing, and analysis of data needed

Research based on use case in collaboration with the **National Library of the Netherlands**

Koninklijke Bibliotheek
National Library of the Netherlands

How to understand user behavior from search logs?

Query-level analysis:

- Uncontrolled vocabulary
- Patterns hard to find in unique queries
- Users enter privacy-sensitive information

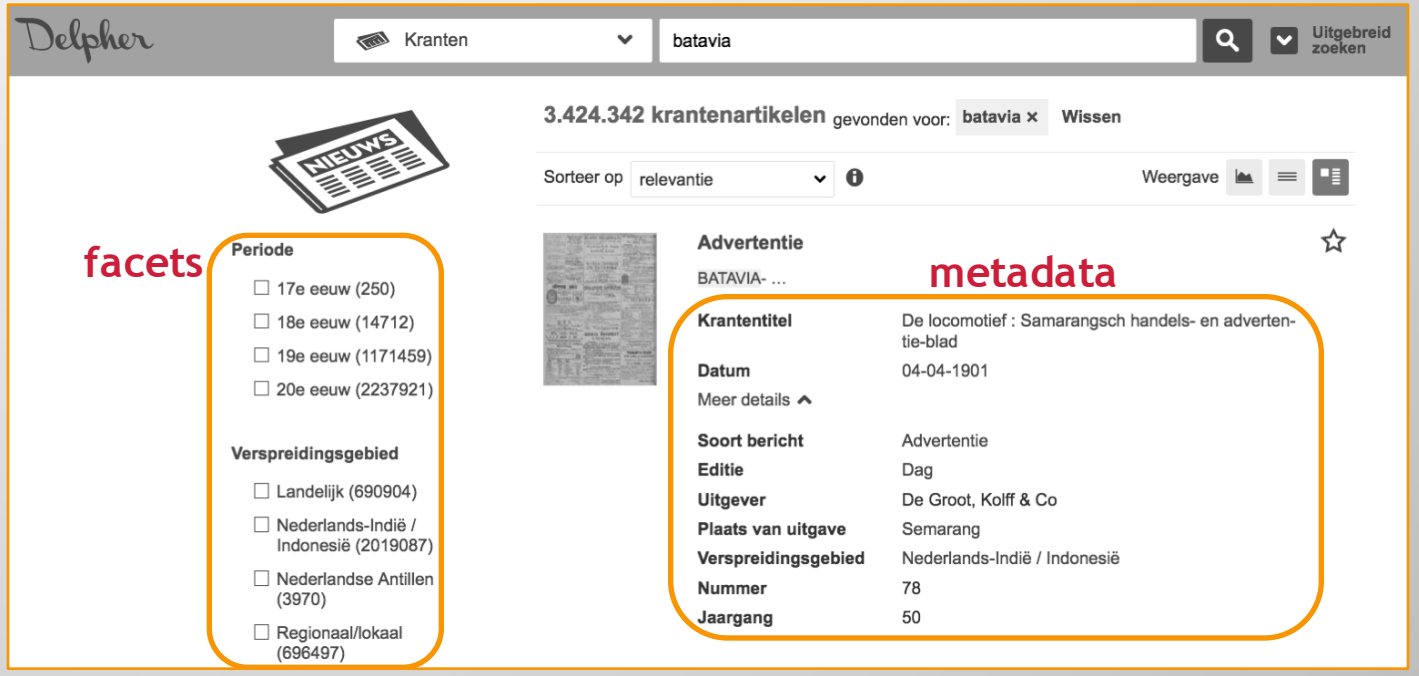
Query: “Oudkerk”

- politician?
- family name?
- village?

How to understand user behavior from search logs?

Digital libraries and archives differ from open web search:

- Collection known and available
- High quality professionally-curated metadata
- Facets based on metadata help navigate through query results



How to understand user behavior from search logs?

Query-level analysis:

- Uncontrolled vocabulary
- Patterns hard to find in unique queries
- Users enter privacy-sensitive information

Query: “Oudkerk”

- politician?
- family name?
- village?

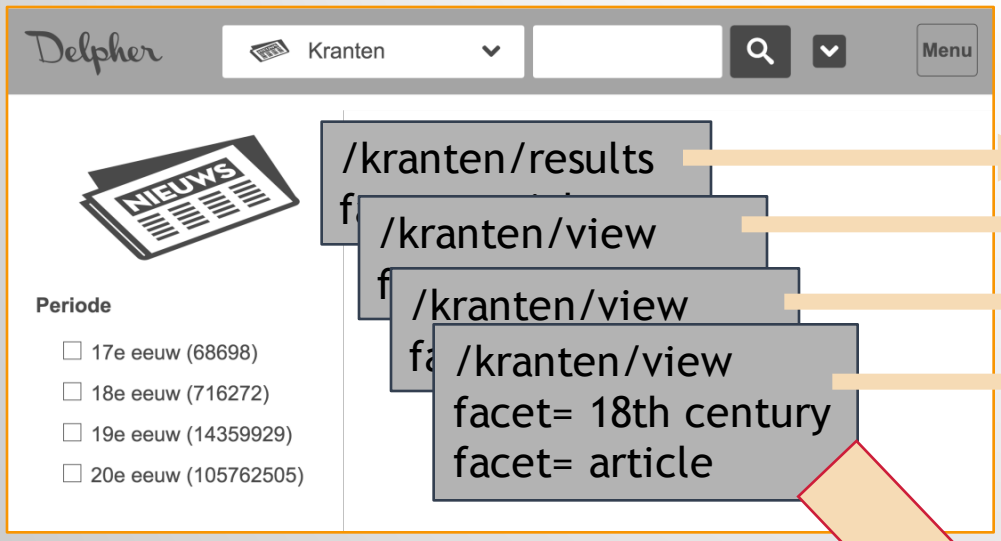
Try metadata-level analysis:

- Vocabulary controlled
- Group search interactions by shared facet-use
- Focus shifted from privacy-sensitive query

Facets:
- announcement
- local newspaper

Click:
- announcement
- Rotterdamse courant

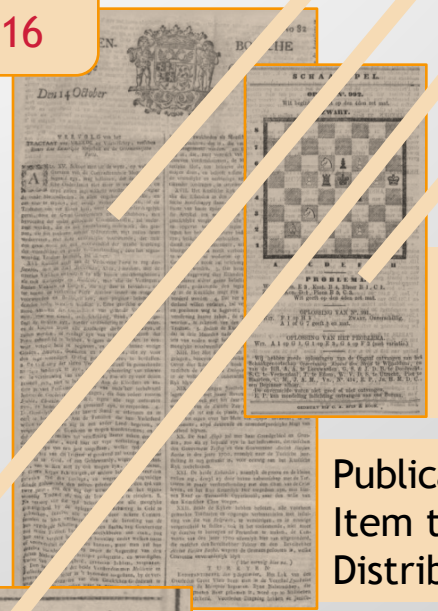
Linking search logs and collection

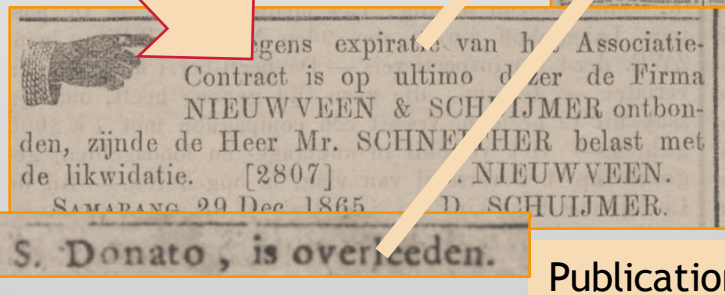


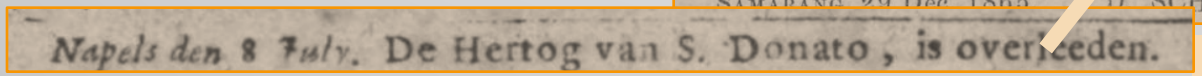
clicks

~200M log records
Oct.2015-Mar.2016

>100M documents
1618-1995







Metadata:

Publication date: 24-09-1866
Item type: caption
Distribution zone: national

Publication date: 14-10-1774
Item type: article
Distribution zone: local

Publication date: 02-01-1866
Item type: advert
Distribution zone: Indonesia

Publication date: 31-07-1727
Item type: announcement
Distribution zone: local

Enriched dataset

Understanding usage patterns from enriched dataset

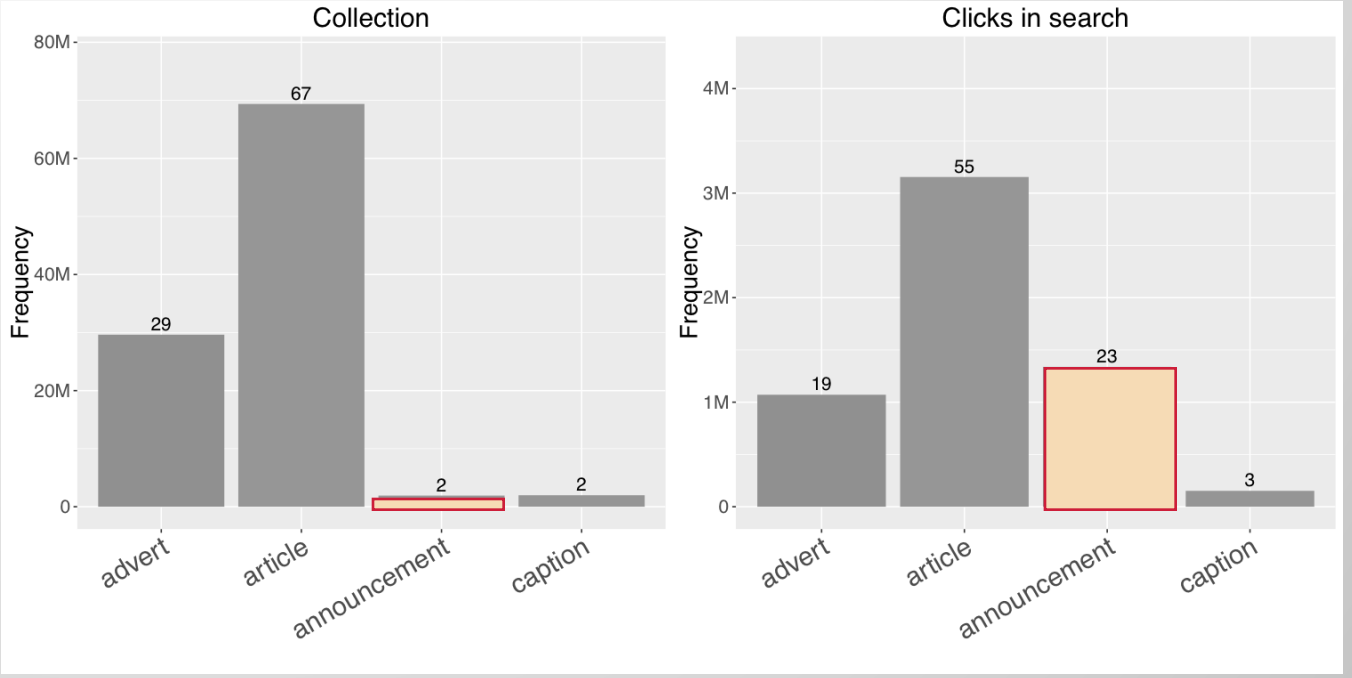
Is search for family announcements different from search for articles?

Announcements are popular:

- Announcements are **2%** of the collection but receive **23%** of all clicks

Search is efficient:

- Same number of search interactions in shorter time, fewer clicks and hardly any downloads



Preliminary results

Metadata-level analysis:

- Insights into user behavior and information needs
- Starting point for inter-collection comparison of user behavior
- First step towards more privacy-preserving method of analysis
- Data, code and results shared through **SWISH DataLab** github.com/SWI-Prolog/swish

Future work and open questions

- How to evaluate this method of analysis?
- Next step: predictive analytics based on metadata instead of query
- Continued collaboration with National Library: development usage data analytics dashboard