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

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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**
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?
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

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Try metadata-level analysis:

• Vocabulary controlled

• Group search interactions by shared facet-use

• Focus shifted from privacy-sensitive query

Query: “Oudkerk”
  • politician?
  • family name?
  • village?

Facets: • announcement
  • local newspaper
Click: • announcement
  • Rotterdamse courant
Linking search logs and collection

- Enriched dataset
- 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

- >100M documents 1618-1995
- /kranten/results
- /kranten/view facet= 18th century facet= article
- /kranten/view facet= suriname facet= kranten
- Linking search logs and collection

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