Chapter 17: Putting Everything Together

This is the end, my only friend, the end.

-- Jim Morrison
(of The Doors)

Every new beginning comes from some other beginning's end.

-- Seneca

When shall we three meet again?
In thunder, lightning, or in rain?

-- Three Witches
(Shakespeare‘s Macbeth)
Information Retrieval and Data Mining

- Indexing
- Query Processing
- Ranking
- Link Analysis
- Info Extraction
- Semantic Search
- Data Preprocessing
- Association Patterns
- Clustering
- Classification
- Sequences
- Graphs

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Information Retrieval and Data Mining
Evolution (and Future) of Search Engines


- Library catalogs
- tf * idf
- SMART
- Probabilistic IR
- Language Models
- PageRank
- Learning to Rank
- Click graphs
- Knowledge graphs
- > 1 Bio pages
- Deep QA
- Conversational QA
- Multimodal search
- Things not strings
- Privacy and trust
Take-Home Message

Search engines are one of the most impressive results of CS!

Information retrieval is the science of search engines. It comprises and integrates many concepts and methods from algorithms, statistics, graphs, text analysis – and data mining!

Thank you very much for your participation!