

Information Retrieval: Course Introduction

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CSE, IITKGP

January 4th, 2016

Course Website:

<http://cse.iitkgp.ac.in/~pawang/courses/IR16.html>

Shared with Prof. Animesh Mukherjee

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Meeting Times

- Regular Hours:

- ▶ Monday - 17:00 - 18:00 (NR - 221)
- ▶ Thursday - 17:00 - 18:00 (NR - 221)
- ▶ Friday - 17:00 - 18:00 (NR - 221)

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- Office Hour:
 - ▶ Friday - 18:00 - 19:00 (CSE - 308)

My Contact

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Teaching Assistants

- Amrith Krishna
- Koustav Rudra
- Suman Kalyan Maity
- Abhishek Sikchi

Reference Books

- Christopher D. Manning, Prabhakar Raghavan, and Hinrich Schütze. 2008. *Introduction to Information Retrieval*, Cambridge university press.

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Lecture Material

- Additional Readings
- Lecture Slides

Course Evaluation Plan: Tentative

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- Mid-Sem : 25%

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- End-Sem : 45%

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- End-Sem : 45%
- Term Project: 30%

What is Information Retrieval?

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What is a document?

web pages, email, books, news stories, scholarly papers, text messages, Powerpoint, PDF, forum postings, patents, IM sessions, Tweets, question answer postings etc.

Document vs. Database Records

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 - ▶ e.g., bank records with account numbers, balances, names, addresses, social security numbers, dates of birth, etc.
- Easy to compare fields with well-defined semantics to queries in order to find matches

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Example bank database query

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- This text must be compared to the text of entire news stories

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Searching for the pages on WWW

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Find:

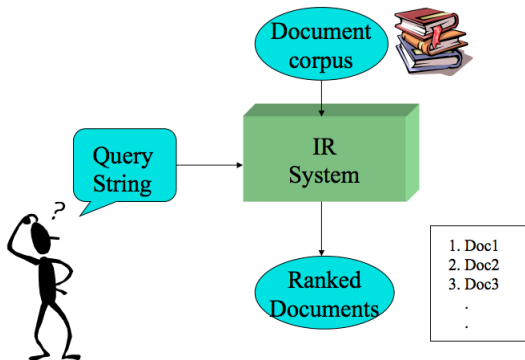
Typical IR tasks

Given:

- A corpus of textual natural-language documents.
- A user query in the form of a textual string.

Find:

- A ranked set of documents that are relevant to the query.



The system should be able to retrieve the relevant docs efficiently

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- Being on the proper subject.
- Being timely (recent information).
- Being authoritative (from a trusted source).
- Satisfying the goals of the user and his/her intended use of the information (information need).

Simplest notion of Relevance from Retrieval Models' Perspective

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- Simplest notion of relevance is that the query string appears verbatim in the document.
- Slightly less strict notion is that (most of) the words in the query appear frequently in the document, in any order (*bag of words*).

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- 'Apple' (company vs. fruit)
- 'Java' (programming language vs. Island)

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- ...

Active Areas of Research

Compiled based on the most recent papers at SIGIR, just indicative, not exhaustive

What to retrieve

- *Leveraging User Reviews to Improve Accuracy for Mobile App Retrieval.*
Dae Hoon Park, Mengwen Liu, ChengXiang Zhai, Haohong Wang

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- *Retrieval of Relevant Opinion Sentences for New Products.* Dae Hoon Park, Hyun Duk Kim, ChengXiang Zhai, Lifan Guo

- *Leveraging User Reviews to Improve Accuracy for Mobile App Retrieval.* Dae Hoon Park, Mengwen Liu, ChengXiang Zhai, Haohong Wang
- *Retrieval of Relevant Opinion Sentences for New Products.* Dae Hoon Park, Hyun Duk Kim, ChengXiang Zhai, Lifan Guo
- *Temporal Feedback for Tweet Search with Non-Parametric Density Estimation.* Miles Efron, Jimmy Lin, Jiyin He, Arjen P. de Vries

- *Analyzing User's Sequential Behavior in Query Auto-Completion via Markov Processes*. Liangda Li, Hongbo Deng, Anlei Dong, Yi Chang, Hongyuan Zha, Ricardo Baeza-Yates
- *adaQAC: Adaptive Query Auto-Completion via Implicit Negative Feedback*. Aston Zhang, Amit Goyal, Weize Kong, Hongbo Deng, Anlei Dong, Yi Chang, Carl A. Gunter, Jiawei Han

Search experience contd ...

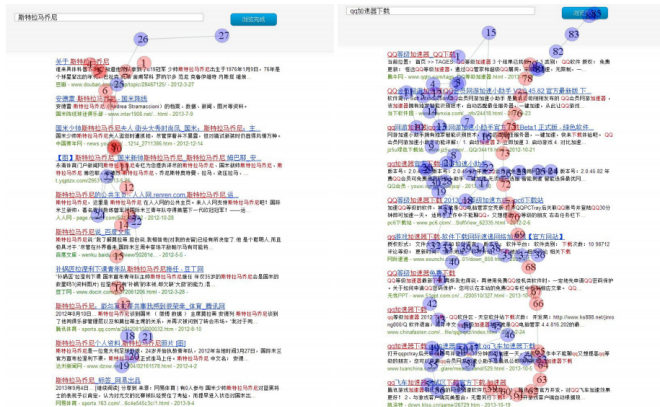


Figure 1: Examples of Users' Mouse Movement Trails on SERPs

Different users, Different Opinions: Predicting Search Satisfaction with Mouse Movement Information. Yiqun Liu, Ye Chen, Jinhui Tang, Jiashen Sun, Min Zhang, Shaoping Ma, Xuan Zhu

Heart Disease and Aspirin Therapy

Save This Article For Later Share this: Font size: A A A

For more than 100 years, aspirin has been used as a pain reliever. Since the 1970s, aspirin has also been used to prevent and manage heart disease and stroke.

How Does Aspirin Benefit the Heart?

Aspirin benefits the heart in several ways:

- ◆ **Decreases pain.** Aspirin fights pain and inflammation associated with heart disease by blocking the action of an enzyme called cyclooxygenase. When this enzyme is blocked, the body is less able to produce a substance called prostaglandin, which is a chemical that signals an injury and triggers pain.
- ◆ **Inhibits blood clots.** Some of the prostaglandins in the blood trigger a series of events that cause blood platelets to clump together and form blood clots. Thus, when aspirin inhibits prostaglandins, it inhibits the formation of blood clots as well. Blood clots are harmful because they can clog the arteries supplying the heart muscle and brain, increasing the risk of heart attack and stroke. Aspirin has been shown to reduce the risk of heart attack and stroke and reduce the short-term risk of death among people suffering from heart attacks.
- ◆ **Reduces the risk of death.** Research has shown that regular aspirin use is

Figure 1: Eye-gaze patterns of Session 001 prior to query reformulation show strong evidence for acquisition of the medical term “prostaglandin” occurring in a paragraph of user-highlighted text.

An Eye-Tracking Study of Query Reformulation. Carsten Eickhoff, Sebastian Dungs, Vu Tran

- *How many results per page? A Study of SERP Size, Search Behavior and User Experience.* Diane Kelly, Leif Azzopardi
- *Influence of Vertical Result in Web Search Examination.* Liu Zeyang, Yiqun Liu, Ke Zhou, Min Zhang, Shaoping Ma
- *Unconscious Physiological Effects of Search Latency on Users and Their Click Behaviour.* Miguel Barreda-Angeles, Ioannis Arapakis, Xiao Bai, B. Barla Cambazoglu, Alexandre Pereda-Banos
- *Context-Aware Web Search Abandonment Prediction.* Yang Song, Xiaolin Shi, Ryen W. White, Ahmed Hassan

What do we cover in this course

IR Basics - PG

- Boolean retrieval
- The term vocabulary & postings lists
- Dictionaries and tolerant retrieval
- Index construction
- Index compression
- Scoring, term weighting & the vector space model
- Computing scores in a complete search system
- Evaluation in information retrieval
- Relevance feedback & query expansion
- Probabilistic information retrieval
- Language models for information retrieval

Classification, clustering and Web - AM

- Text classification & Naive Bayes
- Vector space classification
- Flat clustering
- Hierarchical clustering
- Matrix decompositions & latent semantic indexing
- Web crawling and indexes
- Link analysis