

Information Retrieval: Course Introduction

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CSE, IITKGP

January 3rd, 2018

Course Website:

<http://cse.iitkgp.ac.in/~pawang/courses/IR18.html>

Shared with Prof. Animesh Mukherjee

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Meeting Times

- Regular Hours:
 - ▶ Wednesday - 11:00 - 12:00 (NC - 232)
 - ▶ Thursday - 12:00 - 13:00 (NC - 232)
 - ▶ Friday - 8:00 - 9:00 (NC - 232)

My Contact

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- **Office:** CSE - 308
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Teaching Assistants

- Abhik Jana
- Abhishek Dash
- Mayank Bhasin

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%
- Assignments and Shared Task: 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

- Find records with balance > \$50,000 in branches located in Amherst, MA.

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Example search engine query

- *bank scandals in western mass*

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Example search engine 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

Typical IR tasks

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Find:

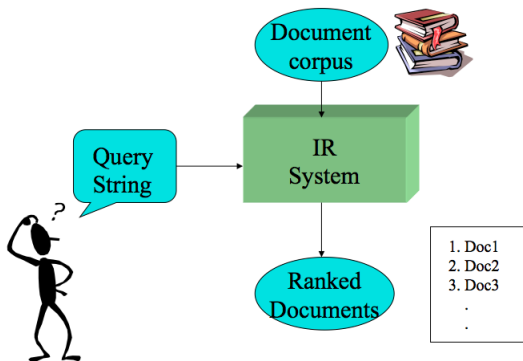
Typical IR tasks

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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Keyword Search

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Keyword Search

- 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 and related conferences,
just indicative, not exhaustive*

What to retrieve

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- *Leveraging User Reviews to Improve Accuracy for Mobile App Retrieval.*
SIGIR 2015.

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- *Exploiting Food Choice Biases for Healthier Recipe Recommendation.* SIGIR 2017.
- *Joint Learning of Response Ranking and Next Utterance Suggestion in Human-Computer Conversation System.* SIGIR 2017.

- *Engaged or Frustrated? Disambiguating Emotional State in Search.* SIGIR 2017.
- *User Interaction Sequences for Search Satisfaction Prediction.* SIGIR 2017.
- *Understanding and Modeling Success in Email Search.* SIGIR 2017.
- *Using Information Scent to Understand Mobile and Desktop Web Search Behavior.* SIGIR 2017.

- *The Utility and Privacy Effects of a Click.* SIGIR 2017.
- *Why People Search for Images using Web Search Engines.* WSDM 2018.
- *Joint Learning of Response Ranking and Next Utterance Suggestion in Human-Computer Conversation System.* SIGIR 2017.
- *Predicting Which Topics You Will Join in the Future on Social Media.* SIGIR 2017.

What do we cover in this course

IR Basics

- Boolean retrieval
- The term vocabulary & postings lists
- Dictionaries and tolerant retrieval
- Index construction and 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

Web Search, Applications, Recent Advances

- Web crawling and indexes
- Link analysis
- Summarization, Tag Recommendation
- Neural IR
- Learning to Rank