

Advance Information Retrieval

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Course team live in 463

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Agenda

1. How the course is taught and organized
 - a. Lectures and labs
 - b. Grading
 - c. Exam
2. What is “information retrieval” (IR)
 - a. Definitions
 - b. Topic overview

How the course is taught and organized

Major statements

Course consists of 15 weeks including **15 lectures and 15 labs**.

Course ends **in May**.

No exam.

Course materials are in **moodle**, [github](#) (W.I.P.) and telegram.

Main **book** is “[An Introduction to Information Retrieval](#)” by Manning, Raghavan, Schütze; other materials will be published in Moodle or [referred in github](#).

Grading and exam

- **Project**
- **No exam (except retakes)**

Information retrieval

Definition

Information retrieval (IR) is finding material (usually documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually stored on computers).

[The Book]

Let's speculate on the definition

1. Where are borders among **algorithms, IR, and DB**?
 - a. How these disciplines answer the question
 “How old is John Doe”?
 - b. What is the difference in terms of software?
2. Is IR a static area?
3. Name some IR systems

Scales of IR systems

- From **personal information retrieval**
 - Indexing vs find -r /
 - Classification (e.g. photo collection) and Filters
 - Background monitoring
- Via **enterprise and domain-specific search**
 - Specific domain information (law, chemistry, math)
 - Enterprise network (machine access)
- To **Web search**
 - Large scale
 - Commercial interest (SEO, exploits, advertisements)
 - Very heterogeneous data

Major research milestones (1)

Early days (late 1950s to 1960s): foundation of the field

Luhn's work on automatic indexing (KWIC)

Cleverdon's Cranfield evaluation methodology and index experiments

Salton's early work on SMART system and experiments

1970s-1980s: a large number of retrieval models

Vector space model

Probabilistic models

language...
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... and it's as simple a

Major research milestones (2)

1990s: further development of retrieval models and new tasks

- Language models

- TREC evaluation

- Web search

2000s-present: more applications, especially Web search and interactions with other fields

- Learning to rank

- Scalability (e.g., MapReduce)

- Real-time search

Highlights about today's IR

- Process **quickly** (no grep)
- **Flexible** match (consider language, typos, ...)
- Ranked retrieval (closer to query, to intent, to user, ...)
 - **Relevance** (*relevant*) - *the user perceives as containing information of value with respect to their personal information need*

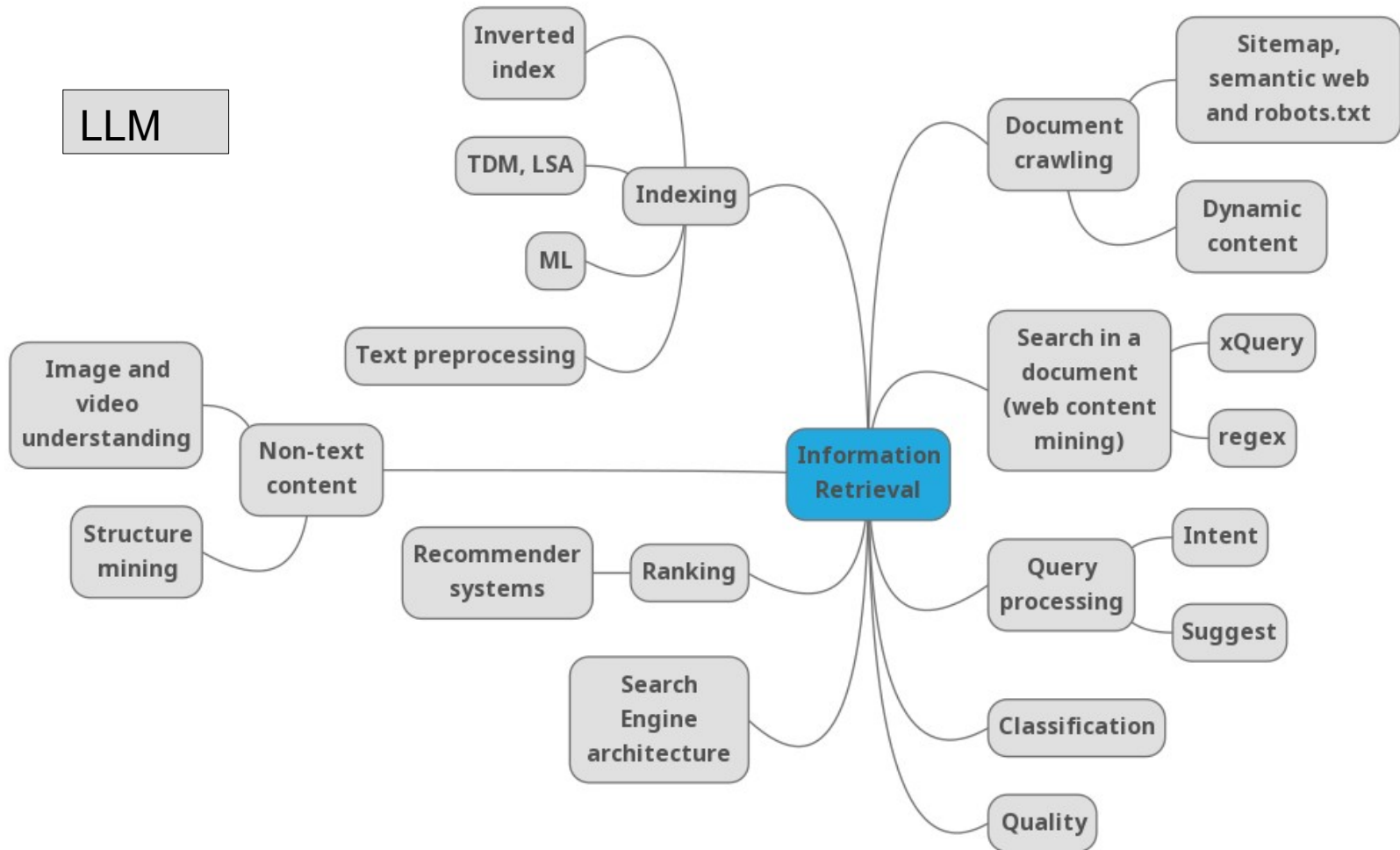
What does IR care about?

- **Query representation**
 - Lexical gap
 - Semantic gap: ranking model vs. retrieval method
- **Document representation**
 - Specific data structure for efficient access
 - Lexical gap and semantic gap
- **Retrieval model**
 - Algorithms that find the most relevant documents for the given information need
- **Speed and space**
- ...

IR covers ...

- Search (obviously)
- Recommendations
- Question answering
- Text mining
- Online ads
- Audio, images, video understanding
- ...

Topic overview (by 2025)



How search works

Watch this video: <https://youtu.be/0eKVizvYSUQ>

Answer the questions:

1. Did you understand how Google search works?
2. What is an **index**?
3. What is **scam** site?
4. Name or propose some **factors**
5. What is **side by side** and how is it used?

At home: read <https://www.google.com/search/howsearchworks/>

Whiteboard time!



Whiteboard

