

# IRRS: Information Retrieval and Recommender Systems

FIB, Master in Data Science

Slides by Marta Arias, José Luis Balcázar,  
Ramon Ferrer-i-Cancho, Ricard Gavaldá  
Department of Computer Science, UPC

Fall 2025

<http://www.cs.upc.edu/~ir-miri>

## 0. Presentation

# Instructors

- ▶ Ramon Ferrer-i-Cancho (lectures + exercices + lab)
  - ▶ `rferrericancho@cs.upc.edu`
  - ▶ Omega 220, 93 413 4028

# Class Logistics

Theory + problems: weekly.

- ▶ Mondays, 17–19 (theory).
- ▶ Wednesdays, 15–16 (problems).
- ▶ Problem list proposed regularly
- ▶ To be handed 1 week later

Labs / tutoring, 2 hours every 2 weeks **approx** (tentative plan).

- ▶ Wednesdays, 16–18.
- ▶ Some extra work, 2 hours on average per session Report to be handed 2 weeks later
- ▶ A total of 5 sessions, on dates<sup>1</sup>: shedule in progress

---

<sup>1</sup>Dates may be subjected to change; if so it will be appropriately announced in advance through Racó

# Evaluation I

- ▶ Exercises: Collected in exercise sessions. 25 %
- ▶ Lab work: Weighted average of report grades. 25 %
- ▶ Exam (January): 30 %
- ▶ Presentation of a paper (January): 20 %

Check here date of Exam and Presentations

<https://www.fib.upc.edu/en/studies/masters/master-data-science/exams>.

Lab work and exercises will be scored on a 4-point scale:

- ▶ 0 - not really tried
- ▶ 1 - tried, but with major flaws
- ▶ 2 - main ideas correct, but incomplete or some insight missing
- ▶ 3 - basically ok (normally here if some silly numerical error - not systematic errors).

# Evaluation II

## About exercise and lab assignments

- ▶ To be solved in teams of two people.
- ▶ The partner for exercises cannot be repeated for exercises. The partner for lab cannot be repeated for lab. The partner for exercises and the partner for lab may coincide.
- ▶ In case that the number of students available is odd, teams of three people are not allowed (thus one student will work alone).
- ▶ Post solution through the “Racó” (one team member is enough, but please state authors clearly in your delivered document)

# Contents I

## First half:

- ▶ Core Information Retrieval:
  - ▶ Introduction: Concept. The IR process
  - ▶ Information Retrieval Models
  - ▶ Indexing and Searching, Implementation
  - ▶ Information Retrieval Evaluation, Feedback Models
- ▶ Web Search:
  - ▶ Link analysis: Page Rank
  - ▶ Crawling the web
  - ▶ Architecture of a Web search system

# Contents II

## Second half:

- ▶ The “Big Data” Slogan
  - ▶ Architecture of large-scale web search systems
  - ▶ The Map-Reduce paradigm
  - ▶ Introduction to NoSQL databases
  - ▶ The Apache ecosystem for web search.
- ▶ Social Network Analysis:
  - ▶ Characterizing of real complex networks
  - ▶ Communities, influence, information diffusion
- ▶ Clustering and Locality Sensitive Hashing
- ▶ Recommender Systems

# Bibliography

- ▶ R. Baeza-Yates, B. Ribeiro-Neto: Modern Information Retrieval (2nd ed.). Addison Wesley, 2010.
- ▶ I.H. Witten, A. Moffat, T. Bell: Managing Gigabytes. Morgan Kaufmann, 1999.
- ▶ C.D. Manning, P. Raghavan, H. Schütze: Introduction to Information Retrieval. Cambridge 2008.
- ▶ Z. Markov, D.T. Larose: Data Mining the Web. Wiley, 2007.
- ▶ Russell, Matthew , Mining the Social Web: Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Site. O'Reilly , 2011
- ▶ ... There's a whole web out there