GRAPH MINING AND SOCIAL NETWORKS

FOUILLE DE GRAPHES ET RESEAUX SOCIAUX

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GRAPH MINING AND SOCIAL NETWORKS

- Course description

  Study the theory, design, and implementation of **graph analysis and mining** from the perspectives of:

  - ✓ **Data structure**: focus on *social networks*
  - ✓ **Tasks**: focus on *community detection and link prediction*
  - ✓ **Usage**: focus on *social-based recommender systems and information retrieval systems*

- Learning objectives

  - ✓ Charcterize social networks through properties and measures;

  - ✓ Recall and discuss well-known methods of link prediction and communauty detection in social networks;

  - ✓ Design and Implement social network-based recommendation and information retrieval techniques

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- Prerequisites
  - ✓ Python programming
  - ✓ Basics in graph theory
  - ✓ Basics in information retrieval

- Course material
  - ✓ Copies of the lecture slides are posted on the MOODLE page of this course 24h before the session
  - ✓ Book and readings references are provided at each chapter

- Grading
  - ✓ Hands-on sessions: *assignment of 30% of the final score*
    - o Hands-on experience: implement techniques discussed in class, must be done individually
    - o Project: implement software solutions on real-world data, done by groups
  - ✓ Final written exam in class: *assignment of 70% of the final score*
    - o *Bonus [0-2]: develop your skills by self-learing a notion and sharing with the class*

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- Self-learning a notion and sharing with my class
  - ✓ Target a **notion not developped in class**
  - ✓ Explore and learn based on referenced material
  - ✓ Share your learning in class

- How to share?
  - ✓ Presentation (10 mn)
  - ✓ Code : notion, use case exploiting the notion, evaluation
  - ✓ Elaborate a quizz: evaluate what others learned (10 mn)
  - ✓ Make a feedback of misunderstanding based on answer failures
  - ✓ Push on Moodle: 1) presentation, 2) referenced material, 3) code, 4) quizz results and feedback

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- Lecture organization

  o Introduction to the course

  o Chapter 1: Graph analysis and mining

   "*How to identify structural properties and patterns in the social web?*

   Keywords: social network, graph, communauty detection, link prediction

  o Chapter 2: Mining social networks

   "*How to mine knowledge from the (social) Web?*"

   Keywords: user profile, recommender systems, social-media information retrieval

- Schedule: **Lecture and monitoring**

Session	Duration	Nature	Topic
1	2H	Lecture	Introduction, Graph analysis (Part 1)
2	2H	Lecture Exercices	Graph Analysis (1 H) Graph Analysis (1 H)
3	2H	Exercices Group.presentation	Exercices Present a notion (2 X 30 mn)
4	2H	Lecture	Communauty detection
5	2H	Lecture	Link prediction
6	2H	Exercices	Use case
7	2H	Lecture	Social-based Recommender systems (part 1)
8	2H	Lecture	Social-based Recommender systems (part 2) Present a notion (2X 30 mn)
9	2H	Lecture	Social-based information retrieval

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- Course schedule: **Hands-on sessions**

Session	Duration	Nature	Topic
1	2H	Soft. Dev.	Graph analysis
2	2 H	Soft. Dev.	Community detection
3	2 H	Soft. Dev.	Link prediction
4	2 H	Project: Design and Soft.Dev.	Social network analysis, graph embeddings, information retrieval and recommendation