

CS412: An Introduction to Data Mining

Fall, 2020

Course Objective

Provide a comprehensive overview of the fundamental concepts and techniques of data mining.

- Be able to understand the key concepts of data mining techniques, including data preprocessing, data warehousing and cube, frequent pattern mining, classification, clustering.
- Be able to apply the key data mining techniques to realistic setting, evaluate and analyze the mining results.

Basic Information

Class meeting: online

Instructor: Hanghang Tong (htong@illinois.edu)

TAs:

- Jian Kang, jiank2@illinois.edu
- Yu Zhang, yuz9@illinois.edu
- Dawei Zhou, dzhou21@illinois.edu
- Yao Zhou, yaozhou3@illinois.edu

Office hours:

[All CT time, all on Zooms. Note that each of us have a different zoom link & pwd. See above]

- Hanghang Tong: 10-11am, Monday; 10-11pm Wednesday
- Jian Kang: 10-11pm, Tuesday; 2-3pm, Thursday
- Yu Zhang, 10-11pm, Monday, 11am-noon, Thursday
- Dawei Zhou: 11am-noon, Tuesday; 4-5pm, Tuesday
- Yao Zhou: 11am-noon, Wednesday; 3-4pm, Friday

Online resources:

- Piazza: piazza.com/illinois/fall2020/cs412
- Compass 2g

Schedule (Tentative, subject to slight adjustment)

- Class Outline / Chapter 1: Introduction (week 1)
- Chapter 2: Know Your Data (week 1 & 2)
- Chapter 3: Data Preprocessing (week 2 & 3)
- Chapter 4: Data Warehousing & OLAP (week 4)
- Chapter 5: Data Cube Technology (week 4 & 5)
- Chapter 6: Mining Frequent Patterns and Associations: Basic Concepts (week 5 & 6)
- Chapter 7: Mining Frequent Patterns, Associations: Advanced Methods (week 7, 8 & 9)
- Chapter 8: Classification: Basic Concepts (week 9, 10, 11)
- Chapter 9: Classification: Advanced Methods (week 12 & 14)
- Chapter 10: Cluster Analysis: Basic Concepts (week 14, 15)
- Chapter 11: Deep Learning (week 16)

Coursework and Grading

- Assignments, Programming Assignments, and Exams
 - Written Assignments: 15% (three homework assignments expected)
 - Programming assignments: 20% (two programming assignments expected)
 - Midterm exam: 30%
 - Final exam: 35%
- For students taking 4th credit
 - For students registering 4 credits: 25%. The overall scores will be scaled proportionally
 - Group project: 2-3 members

Key Dates

- Assignments
 - A1: Sep. 3rd out, Sep. 19th due
 - A2: Sep. 19th out, Oct. 8th due
 - A3: Oct. 8th out, Nov. 7th due
 - A4: Nov. 7th out, Dec. 10th due
 - A5: Nov. 14th out, Dec. 10th due
- Exams
 - Mid-term: 9:30-11:00am, Oct. 20th, Tuesday
 - Final: 1:30pm-4:30pm, December 15th, Tuesday
- Project (for students taking 4th credit)
 - Project proposal due: Sep. 24th
 - Mid-point report due: Oct. 22nd
 - Paper submission due: Dec. 3rd
 - Review submission due: Dec. 3rd

Textbooks

Required: Jiawei Han, Micheline Kamber and Jian Pei, Data Mining: Concepts and Techniques (3rd ed), Morgan Kaufmann, 2011

Reference:

- Charu C. Aggarwal, Data Mining: The Textbook, Springer, 2015
- P.-N. Tan, M. Steinbach and V. Kumar, Introduction to Data Mining, Wiley, 2005 (2nd ed. 2016)
- Mohammed J. Zaki and Wagner Meira Jr., Data Mining and Analysis: Fundamental Concepts and Algorithms, Cambridge University Press, 2014

Mental Health

Diminished mental health, including significant stress, mood changes, excessive worry, substance/alcohol abuse, or problems with eating and/or sleeping can interfere with optimal academic performance, social development, and emotional wellbeing. The University of Illinois offers a variety of confidential services including individual and group counseling, crisis intervention, psychiatric services, and specialized screenings at no additional cost. If you or someone you know experiences any of the above mental health concerns, it is strongly encouraged to contact or visit any of the University's resources provided below. Getting help is a smart and courageous thing to do -- for yourself and for those who care about you.

Counseling Center: 217-333-3704, 610 East John Street Champaign, IL 61820

McKinley Health Center: 217-333-2700, 1109 South Lincoln Avenue, Urbana, Illinois 61801

Sexual Misconduct Reporting Obligation

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX Office. In turn, an individual with the Title IX Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: wecare.illinois.edu/resources/students/#confidential.

Other information about resources and reporting is available here: wecare.illinois.edu.

Academic Integrity

The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <https://studentcode.illinois.edu/article1/part4/1-401/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Religious Observances

Illinois law requires the University to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements. You should examine this syllabus at the beginning of the semester for potential conflicts between course deadlines and any of your religious observances. If a conflict exists, you should notify your instructor of the conflict and follow the procedure at <https://odos.illinois.edu/community-of-care/resources/students/religious-observances/> to request appropriate accommodations. This should be done in the first two weeks of classes.

Disability-Related Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 333-4603, e-mail disability@illinois.edu or go to <https://www.disability.illinois.edu>. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available that can help diagnosis a previously undiagnosed disability. You may access these by visiting the DRES website and selecting "Request an Academic Screening" at the bottom of the page.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.