

CS 6405: CLUSTERING ALGORITHMS COURSE SYLLABUS -- SPRING 2024



Instructor: Tao Wu, Donald Wunsch
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Meeting time and classroom: TuTh 3:30PM - 4:45PM, Emerson Hall 104

Textbook: Data Clustering: Algorithms and Applications, Charu C. Aggarwal et al. 2014. (available online)
Clustering, Rui Xu and Donald Wunsch, 2008

Course objective:

- To gain a deep understanding of clustering algorithms from traditional K-means to modern deep learning-based methods, and their applications in appropriate scenarios.
- To implement mainstream clustering algorithms in Pytorch and contribute to an opensource library.
- To conduct an original research project culminating in a draft research paper and presentation.

Grading:

Grading Policy:

Attendance: 10%, Assignment: 20%, Paper reproduction:30%, Final project: 40%

Grading Scale:

90 - 100 == A, 80 - 89.99 == B, 70 - 79.99 == C, 60 - 69.99 == D, below 60 == F

Late class assignment: 10% penalty after the first 24 hours (1st day); 30% penalty after the next 24 hours (2nd day); No credit after 3 days.

Study hints: (Understanding = Intuition + Math + Coding)

- Complete the reading assignment on Canvas whenever available in advance of class.
- Attend classes and do the mathematical formula derivation on the paper.
- Implement algorithms in Python to ensure understanding every details.

Please be aware of the following university services and policies:

- **Statement about Copyright, FERPA, and Use of Video:** It is vitally important that our classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions whether in class or online. Please obtain instructor permission before recording any class activity. It is a violation of University of Missouri policy to distribute such recordings without authorization and the permission of all who are recorded. More information is provided [online](#).
- **Student Well-Being** (<https://wellbeing.mst.edu/>): Student Well-Being provides counseling services, health promotion initiatives, and prevention programs to empower the S&T community to thrive and enhance personal, academic, and professional success. Department office hours are Monday-Friday, 8am-5pm. On the website, you can find information related to individual and group counseling, wellness consultations and trainings, resources for many health and wellness topics, and help for mental health crisis situations.
- **UCARE** (<https://go.mst.edu/ucare-report>): Any of us may experience strained relationships, increased anxiety, feeling down, alcohol/drug misuse, decreased motivation, challenges with housing and food insecurity, and any other number of mental health or well-being concerns. If you notice these or other alarming concerns in a friend or fellow student and would like to consult with a Care Manager, please make a UCARE referral for support and

assistance.

- **Student Honor Code and Academic Integrity:** The Honor Code all students are expected to follow can be found at this link: <http://stuco.mst.edu/honor-code/>. Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the University of Missouri System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism and sabotage (<http://registrar.mst.edu/academicregs/index.html>), **all of which will be reported to the Vice Provost for Academic Support.**

Additional guidance including the University's Academic Dishonesty Procedures is available at <http://academicsupport.mst.edu>. Other resources for students regarding ethics and integrity can be found at <http://academicsupport.mst.edu/academicintegrity/studentresources-ai>.

- **Nondiscrimination, Equity, and Title IX:** Missouri S&T is committed to the safety and well-being of our campus community, and to creating an environment free from discrimination and harassment.

The University does not discriminate on the basis of race, color, national origin, ancestry, religion, sex, pregnancy, sexual orientation, gender identity, gender expression, age, disability, protected veteran status, and any other status protected by applicable state or federal law. As used in this policy, the word "sex" is also inclusive of the term "gender."

Additionally, US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Violations of this law include sexual harassment, sexual assault, dating/domestic violence, and stalking.

In accordance with the University of Missouri's Collected Rules and Regulations, all faculty and staff are required to report any information concerning discrimination disclosed through communication including, but not limited to, direct conversation, email, social media, classroom papers and homework exercises to the Equity Officer/Title IX Coordinator.

Office of Equity and Title IX

Equity Officer and Title IX Coordinator: Dr. Paul Hirtz

Phone: (573) 341-7734

Location: 900 Technology Drive, Suite 500

E-mail: equity@mst.edu

- **S&T Writing Center** (<https://writingcenter.mst.edu/>): The Writing Center's mission is to assist **all students** in their efforts to become better writers through structured one-on-one conversations with peer consultants. Writing Center consultants are fellow students whose strong writing skills and special training allow them to offer meaningful feedback and guidance. More information can be found at their website and through email: writing@mst.edu
- **The Student Success Center:** The Student Success Center (SSC) supports student development through individualized tutoring, peer-to-peer life skill coaching, and campus programming – all while providing free coffee and hot beverages! The SSC was developed to provide additional assistance for students academically and help bolster non-academic life skills. All student Miners are encouraged to utilize the SSC's free services to get timely support and to enhance their S&T Miner Experience. Visit the SSC at 198 Toomey Hall, contact us at success@mst.edu, or join us on social media @sandtssc.
- **S&T Connect** (<https://canvas.mst.edu/> "Starfish" icon on toolbar): S&T Connect enables students to request appointments with their instructors and advisors via the S&T Connect calendar, which syncs with the Outlook Exchange calendar. S&T Connect tracks each student's performance across all courses. S&T Connect Early Alert enables students to be provided with services as needs arise.