CSE 6363-005: Machine Learning
Spring 2021

Instructor Information

Instructor(s)
Dajiang Zhu

Office Number
SEIR 323

Office Telephone Number
CSE

Email Address
dajiang.zhu@uta.edu

Faculty Profile
https://mentis.uta.edu/explore/profile/dajiang-zhu

Office Hours
Monday and Wednesday 1:00-2:30 PM
Because of the pandemic, students are encouraged to schedule online meeting via Teams

Course Information

Section Information
CSE6363-001

Time and Place of Class Meetings
Monday and Wednesday 2:30-3:50 PM
Modality: Fully Online Option 2
- All instruction and testing are online, but some synchronous online class attendance or participation is required.
- For the first class (01/20/2021 2:30-3:50 PM) and all the presentations by the students, all the students are encouraged to attend via Teams (synchronous).
- For a full definition of the course modalities, please go to https://www.uta.edu/academics/courses-and-schedules.

Description of Course Content
This course is for the graduate-level students to study the background in the methodologies, mathematics and algorithms in machine learning or who may need to apply machine learning techniques to scientific applications (e.g. computer vision, bioinformatics, data mining, information retrieval, natural language processing, etc.).

Student Learning Outcomes
Understanding the machine learning algorithms, implement some of them in the programming projects.

Required Textbooks and Other Course Materials
Pattern Recognition and Machine Learning, Christopher M. Bishop, 2006.

Descriptions of major assignments and examinations
The programming project sets will be assigned in class. Each student will also select one paper to read and present in class.

**Technology Requirements**
- Online teaching tools: The synchronous content (e.g. student presentation) is via Teams (you will see a group named with our course number). The asynchronous content (e.g. recorded video) will be uploaded to Canvas.
- Webcam is needed in synchronous lectures (e.g. the first class and the presentations).
- The quiz will be posted at the beginning of the classes, you need to answer the questions with handwriting and scan or take a picture, save as pdf, and upload to Canvas by the end of the class. Late submission will NOT be accepted. For example, the quiz will be posted at 2:30 pm, you need to upload you answers (pdf) by 3:50 pm (the same day).

**Grading Information**

**Grading**
- Project sets. (60%)
- Paper review. (10%)
- Quiz. (10%)
- Class presentations. (20%)

For example, if you have 80 (project), 90 (paper review), 80 (quiz), 90 (presentation), your final score will be $80 \times 0.6 + 90 \times 0.1 + 80 \times 0.1 + 90 \times 0.2 = 83$

The cutoff (threshold) of A will be Avg+1*STD, the cutoff of B will be Avg-2*STD. For example, if the score average of the class (all the students) is 80, STD is 3.1, the cutoff of A will be 83.1 and cutoff of B will be 73.8. In this situation, if your final score is 83 you will get B, and if your final score is 73.7 you will get C.

Note: the calculated cutoff is a hard line and your final score will NOT be rounded.

*The grading information will be mentioned in the first class.

**Course Schedule**

<table>
<thead>
<tr>
<th>Week 1.</th>
<th>Wed Jan 20: Introduction to Machine Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 2.</td>
<td>Mon Jan 25: Linear Algebra Review</td>
</tr>
<tr>
<td></td>
<td>Wed Jan 27: Linear Regression</td>
</tr>
<tr>
<td>Week 3.</td>
<td>Mon Feb 1: Ridge Regression</td>
</tr>
<tr>
<td></td>
<td>Wed Feb 3: Lasso Regression</td>
</tr>
<tr>
<td>Week 4.</td>
<td>Mon Feb 8: Sparse Learning and ICA</td>
</tr>
<tr>
<td></td>
<td>Wed Feb 10: SVD and PCA I</td>
</tr>
<tr>
<td>Week 5.</td>
<td>Mon Feb 15: SVD and PCA II</td>
</tr>
<tr>
<td></td>
<td>Wed Feb 17: Dimension Reduction, Feature Selection</td>
</tr>
<tr>
<td>Week 6.</td>
<td>Mon Feb 22: Probability Distributions and Information Theory</td>
</tr>
<tr>
<td></td>
<td>Wed Feb 24: MLE-MAP I</td>
</tr>
<tr>
<td>Week 7.</td>
<td>Mon Mar 1: MLE-MAP II</td>
</tr>
<tr>
<td></td>
<td>Wed Mar 3: NB Classifier</td>
</tr>
<tr>
<td>Week 8.</td>
<td>Mon Mar 8: Logistic Regressions</td>
</tr>
<tr>
<td></td>
<td>Wed Mar 10: Kernel Support Vector Machine, Kernel Methods</td>
</tr>
</tbody>
</table>
Week 9.
- Mon Mar 15: Spring break
- Wed Mar 17: Spring break

Week 10.
- Mon Mar 22: KNN
- Wed Mar 24: Validations and Evaluation

Week 11.
- Mon Mar 29: Clustering I
- Wed Mar 31: Clustering II

Week 12.
- Mon Apr 5: Structure Learning (TBD, invited speaker)
- Wed Apr 7: Neural Network

Week 13.
- Mon Apr 12: Intro to TensorFlow
- Wed Apr 14: Intro to Weka

Week 14.
- Mon Apr 19: Class Presentations
- Wed Apr 21: Class Presentations

Week 15.
- Mon Apr 26: Class Presentations
- Wed Apr 28: Class Presentations

Week 16.
- Mon May 3: Class Presentations

“As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – Dajiang Zhu.”

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Mandatory Face Covering Policy
All students and instructional staff are required to wear facial coverings while they are on campus, inside buildings and classrooms. Students that fail to comply with the facial covering requirement will be asked to leave the class session. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center’s front desk or in their department. Students who refuse to wear a facial covering in class will be asked to leave the session by the instructor, and, if the student refuses to leave, they may be reported to UTA’s Office of Student Conduct.

Attendance
At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I recommend all the students to attend the class via Teams (for synchronous lectures, presentations). Because the quiz is conducted during class time (i.e. 2:30-3:50 pm), all the students are required to submit the answers on time. Late submission will NOT be accepted. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal
Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must contain the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at [http://www.uta.edu/oit/cs/email/mavmail.php](http://www.uta.edu/oit/cs/email/mavmail.php).

**Campus Carry:** Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit [http://www.uta.edu/news/info/campus-carry/](http://www.uta.edu/news/info/campus-carry/).

**Student Feedback Survey:** At the end of each term, students enrolled in face-to-face and online classes categorized as “lecture,” “seminar,” or “laboratory” are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback via the SFS database is aggregated with that of other students enrolled in the course. Students’ anonymity will be protected to the extent that the law allows. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit [http://www.uta.edu/sfs](http://www.uta.edu/sfs).

**Final Review Week:** for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Student Support Services:** UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at [http://www.uta.edu/universitycollege/resources/index.php](http://www.uta.edu/universitycollege/resources/index.php).

**The IDEAS Center** (2nd Floor of Central Library) offers free tutoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. To schedule an appointment with a peer tutor or mentor email IDEAS@uta.edu or call (817) 272-6593.
Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Research or General Library Help
Ask for Help
- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources
- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#/course_reserves)
- Study Room Reservations (openroom.uta.edu/)