



CISC 684: Introduction to Machine Learning

Dr. Amo G. Tong

Fall, 2019

Course Information:

Class Hours: M/W 8:40 am - 9:55am Class Room: Smith 201

Instructor Information:

Dr. Tong

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Office Location: 412 Smith Hall

Office Hours: M/W 10:15 - 11:30am

TA Information:

Zhenzhu Zheng

E-mail: zzzheng@udel.edu

Office Location: 102 A Smith Hall

Office Hours: TBD

Course Description

Basic knowledge of machine learning. Explore different machine learning algorithms/techniques.

Materials

- *Machine Learning*, Tom Mitchell, McGraw Hill, 1997. 1st Edition.
<http://www.cs.cmu.edu/~tom/mlbook.html>
- *Machine Learning: a Probabilistic Perspective*, Kevin Patrick Murphy, 1st Edition.
<https://www.cs.ubc.ca/~murphyk/MLbook/>
- *Pattern Recognition and Machine Learning*, C. Bishop, Springer
<https://www.microsoft.com/en-us/research/people/cmbishop/#!prml-book>

Prerequisites

Prerequisites: probability/statistics and discrete math. (simple calculus, linear algebra preferred)

Course Structure

- **Homework.** There will be **four** homework assignments including individual problem and group problems. Copying posted solutions in web or from other students will be counted as **CHEATING**¹.
- **Exam.** There will be one midterm and one final exam.
 - **Midterm one** . The first midterm is an in-class exam which consists of several problems related to the course material covered by the exam day. This is a closed book and note exam. **One A4 page double-side cheating sheet allowed.**
 - **Final exam** The final exam consists of several problem related to the course material covered after the first midterm. This is a closed book and note exam. **One A4 page double-side cheating sheet allowed.**
- **Project.** There is a group project with two deliverables.
- **Quiz.** No announcement for Quiz. A student will automatically get full credit for pop quiz if they get no less than 90% of the total in the final exam.
- **Extra Credit.** Solving certain challenging problems; participating in course evaluation

Group Information

- A group should have two to four members, unless otherwise permitted by the instructor. Each student should be in a group. If you have difficulties in finding a group, please email the instructor.
- A group will work on group homework and project.
- A group should have a leader who is responsible for communications and making submissions. Each group should make one submission each time, with the names of group members.
- The leader should send the names of the group members to the TA.
- Each group member should actively work on each problem and project. During the semester, group members will be asked to evaluate each other member of the group, and themselves, on their performance as a member of the group. These evaluations will be the major factor in the Group Participation portion of the course grade.

Grade Breakdown

- Homework (30%)
- Exam (50%)

¹<http://www1.udel.edu/stuguide/18-19/code.html>

- Midterm One (25%)
 - Final Exam (25%)
- Project (10%).
- Group Participation (5%).
- Quiz (5%).
- Extra Credit (5% more or less)

Grading and Submission Policy

- Homework. Please submit your homework to Canvas. Please cc the TA when you send me an email regarding homework submission. The homeworks will be graded by the TA. Please first visit or contact the TA for any issues regarding homework grading. Late homework will be graded only with the prior permission of the instructor. Please try to do not submit your work right before the deadline time to avoid network system traffic.
- Midterm One. This exam will be graded by the instructor.
- Final Exam. This exam will be graded by the instructor.
- Students absent from exam without the permission of the instructor will receive 0.
- Regrading. Appeals for re-grading of exams or homeworks must be initiated within one week of when the scores were available to you. Please note that your scores could go down after regrading.
- Final Grading Letter. The score in each category is less important than the score relative to the class average. There is no fixed curve. If everyone performs well in the class then everyone can get top grades.

Topics (tentative)

- Decision Tree Induction
- Point Estimation
- Naive Bayes
- Logistic Regression
- Perceptrons,
- Neural Networks,
- Instance-Based Learning,
- Support Vector Machines,
- Model Selection

- Bias/Variance Tradeoff, Boosting and Bagging,
- Unsupervised Learning, Clustering, EM algorithm.
- Bayesian networks
- Hidden Markov models
- Computational Learning Theory
- Advanced topics: deep learning, reinforcement learning, semi-supervised learning, and etc.

Documented Policies

Academic Integrity

Please familiarize yourself with UD policies regarding academic dishonesty. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, to re-submit the same assignment for different classes, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance. Complete details of the university's academic integrity policies and procedures can be found at [PAGE²](#), Office of Student Conduct, 218 Hullihen Hall, (302) 831-2117. E-mail: student-conduct@udel.edu

Harassment and Discrimination

The University of Delaware works to promote an academic and work environment that is free from all forms of discrimination, including harassment. As a member of the community, your rights, resource and responsibilities are reflected in the non-discrimination and sexual misconduct policies. Please familiarize yourself with these policies at [PAGE³](#). You can report any concerns to the University's Office of Equity & Inclusion, at 305 Hullihen Hall, (302) 831-8063 or you can report anonymously through UD Police (302) 831-2222 or the EthicsPoint Compliance Hotline at [PAGE⁴](#). You can also report any violation of UD policy on harassment, discrimination, or abuse of any person at this [PAGE⁵](#).

Faculty Statement on Disclosures of Instances of Sexual Misconduct

If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated to inform the university's Title IX Coordinator. The university needs to know information about such incidents in order to offer resources to victims and to ensure a safe campus environment for everyone. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in a paper assignment, or in office hours, I promise to protect your privacy—I will not disclose the incident to anyone but the Title IX Coordinator. For more information on Sexual Misconduct policies, where to get help, and how to reporting information, please refer to www.udel.edu/sexualmisconduct. At UD, we provide 24-hour crisis assistance and victim advocacy and counseling. Contact 302-831-1001, UD Helpline 24/7/365, to get in touch with a sexual offense support advocate.

For information on various places you can turn for help, more information on Sexual Misconduct policies, where to get help, and reporting information please refer to [PAGE⁶](#).

²www.udel.edu/studentconduct/policyref.html

³www.udel.edu/oei

⁴www1.udel.edu/compliance

⁵<http://sites.udel.edu/sexualmisconduct/how-to-report/>

⁶www.udel.edu/sexualmisconduct

Inclusion of Diverse Learning Needs

Any student who thinks he/she may need an accommodation based on a disability should contact the Office of Disability Support Services (DSS) office as soon as possible. The DSS office is located at 240 Academy Street, Alison Hall Suite 130, Phone: 302-831-4643, fax: 302-831-3261, DSS website (www.udel.edu/DSS/). You may contact DSS at dssoffice@udel.edu

Non-Discrimination

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions policies, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment including sexual harassment and sexual violence.

For inquiries or complaints related to non-discrimination policies, please contact: Director, Institutional Equity & Title IX Coordinator- Susan L. Groff, Ed.D. groff@udel.edu, 305 Hullihen Hall Newark, DE 19716 (302) 831-8063

For complaints related to Section 504 of the Rehabilitation Act of 1973 and/or the Americans with Disabilities Act, please contact: Director, Office of Disability Support Services, Anne L. Jannarone, M.Ed., Ed.S. - ajannaro@udel.edu Alison Hall, Suite 130, Newark, DE 19716 (302) 831-4643 OR contact the U.S. Department of Education - Office for Civil Rights ([PAGE⁷](#))

⁷wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm