CPSC 633-600 Machine Learning: Spring 2015

Syllabus

NEWS: *1/20/15, 09:02AM (Tue)*

- [01/20/15] No electrical device usage allowed in class (cell phones, laptops, tablets).
- [01/20/15] **Important notice**: If you are on the waiting list, please **do not** come to the class. Wait for official notification from the department. The class is full to the room's capacity (80), and if a lot of those on the waiting list (there are about 50) also come to the class the room will become too crowded.
- [01/17/15] Course web page goes online.
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- **For older announcements, see the archive**

Read-Only Bulletin Board.: 1/16/15, 01:56PM (Fri)

Page last modified: 1/17/15, 10:26AM Saturday.

General Information | Resources | Weekly Schedule | Lecture Notes

I. General Information

Instructor:

Dr. Yoonsuck Choe
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Phone: 845-5466
Office hours: TR 1-2pm

TA:

Noah Larsen
Email:
Office:
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Office hours:

Prerequisite/Restrictions:

CPSC 420, 625, or consent of instructor.

Lectures:

TR 3:55pm–5:10pm, ETB 1020.

Introduction:

Machine learning is the study of self-modifying computer systems that can acquire new knowledge and improve their own performance; survey machine learning techniques, which include induction from examples, Bayesian learning, artificial neural networks, instance-based learning, genetic algorithms, reinforcement learning, unsupervised learning, and biologically motivated learning algorithms. Prerequisite: CPSC 420 or 625.

Goal:

The goal of this course is to

1. learn various problems and solution strategies in machine learning.
2. learn practical methodology for applying ML algorithms to problem domain of your choice.

Textbook:

- Main text (required): Ethem Alpaydin (2014) Introduction to Machine Learning, 3rd edition, MIT Press. [Book home page (3rd edition)] [Book home page (2nd edition)] [Book home page (1st edition)]
- Secondary text (optional): Tom Mitchell (1997) Machine Learning, McGraw-Hill. [Book home page]

Administrative details:

1. Computer accounts: if you do not have a unix account, ask for one on the CS web page.
2. Programming languages permitted: C/C++, Java, or Matlab (or octave), and must be executable on CS unix hosts or other public systems in the departmental lab.

Topics to be covered:

See the Weekly Schedule section for more details. The content will closely reflect a combination of Alpaydin + Mitchell.

Grading:

1. 4 assignments (including written and programming components), 15% each = 60%
2. 2 exams (in class), 15% each = 30%
3. Class participation 10% (repeated absences in the class will weigh most heavily [in the negative direction] in the determination of this score).

The cutoff for an `A' will be at most 90% of total score, 80% for a `B', 70% for a `C', and 60% for a `D'. However, these cutoffs might be lowered at the end of the semester to accomodate the actual distribution of grades.

Academic Integrity Statement:

AGGIE HONOR CODE: An Aggie does not lie, cheat, or steal or tolerate those who do.

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: http://aggiehonor.tamu.edu/

Local Course Policy:

- All work should be done **individually** and **on your own** unless otherwise allowed by the instructor.
- Discussion is only allowed immediately before, during, or immediately after the class, or during the instructor's office hours.
- If you find solutions to homeworks or programming assignments on

the web (or in a book, etc.), you may (or may not) use it. Please check with the instructor.
- Assignments turned in that are significantly similar will be reported to the Aggie Honor System Office.

Students with Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.

Resources:

1. UCI Machine Learning Repository: datasets to test machine learning algorithms.
2. Research resources page

III. Weekly Schedule and Class Notes

- **Lecture notes (in PDF format)**: all notes will be uploaded in this directory.
- It is **your responsibility** to download, print, and bring the notes to the class. Notes will be available 24 hours before each class.
- See the **2015 Spring TAMU Calendar** for breaks.

Week	Date	Topic	Reading	Assignments	Notices and Dues	Notes
1	1/20	Introduction	Alpaydin chap 1; Mitchell 1.1–1.2, 1.3–1.5			slide01.pdf slide01b.pdf
1	1/22	"				
2	1/27	Supervised Learning (general)	Alpaydin chap 2; Mitchell 7.1–7.2, 7.4			slide02.pdf
2	1/29	"				

3	2/3	Multilayer perceptrons	Alpaydin chap 11; Mitchell chap 4			slide03.pdf
3	2/5	"				
4	2/10	"		Homework 1 announced		
4	2/12	"				
5	2/17	Reinforcement learning	Alpaydin chap 18; Mitchell chap 13			slide04.pdf
5	2/19	"				
6	2/24	"	Advanced topics	Homework 2 announced	Homework 1 due	slide04.pdf
6	2/26	Decision tree learning	Alpaydin chap 9; Mitchell chap 3			slide05.pdf
7	3/3	"				
7	3/5	Genetic Algorithms	Mitchell chap 9			slide06.pdf
8	3/10	"		Homework 3 announced	Homework 2 due	
8	3/12	**Exam #1**				
9	3/17	**Spring break**	No class			
9	3/19	**Spring break**	No class			
10	3/24	Genetic Algorithms: Advanced topics				slide07.pdf
10	3/26	Dimensionality reduction	Alpaydin chap 6: 6.1–3, 6.7, 6.8			slide08.pdf
11	3/31	"		Homework 4 announced	Homework 3 due	

11	4/2	Local models	Alpaydin chap 12			slide09.pdf
12	4/7	"				
12	4/9	Bayesian learning	Mitchell chap 6			slide10.pdf
13	4/14	"				slide10.pdf
13	4/16	Kernel machines	Alpaydin 13.1–13.5			slide11.pdf
14	4/21	"			Homework 4 due	slide11.pdf
14	4/23	**Exam #2**				
15	4/28	Deep learning	Optional reading: Jürgen Schmidhuber's Deep Learning Page: [LINK]. Optional reading: Hinton's tutorial on deep belief networks			slidedl.pdf slidebm.pdf web_link;
15	4/30	Learning in biological vision	Miikkulainen et al. (2005)			web_link;

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