METR 5803
Data Mining
Fall 2008

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Office hours	By appointment	By appointment

Room/Time: NWC 5720/T-TH 10:00-11:15AM

Course description:
This course provides an introduction to the broad topic of data mining. Since the scope of the tropic is so diverse, we will focus primarily on the basic concepts and selected algorithms relevant to meteorology. Students will be expected to obtain a basic understanding of the software Matlab in order to code various algorithms and do homework. A simulated Tongan rainfall dataset will be provided for mining (wear your hard hat!). Students are encouraged to bring their own data to test algorithms.

Required Textbook: "Pattern Recognition and Machine Learning", Christopher Bishop, Springer 2006 (or 2007), ISBN: 978-0387-31073-2
Optional Textbook: "A Guide to Matlab for Beginners and Experienced Users, Second Edition", Brian R. Hunt, Ronald L. Lipman and Jonathan M Rosenberg, Cambridge, 2006, IBSN: 9-780521-615655**.**

Course web site: Can be accessed on Desire2Learn @ http://learn.ou.edu (log on using your 4+4 ID)

Tentative topics:

Date	Topic	Text Chapter
Week 1 (8/25)	Intro to course; Matlab Basics (MM) Introduction, Statistical moments, Outliers & Probability (MR)	Chapter 1
Week 2 (9/1)	Probability Density Functions, Expectation (MR)	Chapter 1
Week 3 (9/8)	Matrix Algebra (MR), Dimensionality – curse or no curse? (MR), Principal Component Analysis to reduce dimensionality (MR)	Chapter 1 & 12
Week 4 (9/15)	Data mining with Principal Components (MR)	Chapter 12
Week 5 (9/22)	**Test 1**; Cluster Analysis (MM,MR)	
Week 6 (9/29)	Cluster Analysis (MM, MR)	
Week 7 (10/6)	Regression (MM, MR)	Chapter 3
Week 8 (10/13)	Decision Trees (MR)	
Week 9 (10/20)	Neural Networks (MM,MR)	Chapter 5

Week 10 (10/27)	Neural Networks (MM,MR)	Chapter 5
Week 11 (11/3)	Genetic Algorithms (MM)	In Class Notes
Week 12 (11/10)	Genetic Programming (MM)	In Class Notes
Week 13 (11/17)	**Test 2**	
Week 14 (11/24)	*short week Thanksgiving*	
Week 15 (12/1)	Project Presentations	
Week 16 (12/8)	Project Presentations	

Grading:
2 hourly exams – 25% each
Homework – 20%
Term project (class presentations and final paper) – 30%

Important policies:
Reasonable Accommodation: The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodation in this course are requested to speak with me as early in the semester as possible. Students with disabilities **must** be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 325-3852 or TDD only 325-4173.

Academic Misconduct: All provisions of the Norman Campus Academic Misconduct Code shall apply in cases of academic dishonesty. Any violation of the Academic Misconduct Code will result in your removal from this course, and a grade of F will be recorded for the course. Academic misconduct is defined as "any act that improperly affects the evaluation of a student's academic performance or achievement." At the University of Oklahoma, academic integrity is expected from each student. Misconduct such as plagiarism, fabrication, and fraud, as well as attempting to commit such acts or assisting others in doing so, will not be tolerated. Students are responsible for knowing the OU Academic Conduct Code, which can be found at http://www.ou.edu/studentcode and http://www.ou.edu/provost/integrity