

Texas A&M University-Texarkana
CS 363 Neural Networks and Machine Learning
Spring 2011

Class Meeting:

4:00-6:45pm, Wednesday

Instructor:

Dr. Igor Aizenberg

Office: Science and Technology Building, 104C

Phone (903 334 6654)

e-mail: igor.aizenberg@tamut.edu

Office hours:

Tuesday, Wednesday: 11-00a – 4-00p

Class Web Page: <http://www.eagle.tamut.edu/faculty/igor/CS-363.htm>

Course Description

This course provides the basic concepts of neural networks and machine learning including but not limited to: biological foundations of neuronal morphology, basics of neural information processing, artificial neuron and its activation functions, multilayer feedforward neural networks and backpropagation learning, Hopfield neural networks and associative memories, support vector machines. Laboratory exercises provide experience with design and utilization neural and other machine learning algorithms and solving real-world classification, prediction and pattern recognition problems.

Text Book : detailed class notes will be provided

Grading Method

Homework and preparation: 25%

Test 1: 25%

Course Project: 50%

Grading Scale:

90%+ → A

80%+ → B

70%+ → C

60%+ → D

less than 60% → F

COURSE OUTLINE AND CLASS SCHEDULE

Week	#	Date	Topics	Lecture Notes References
1	1	Jan 19, 2011	Introduction. Examples of Fields that use Neural Networks and Machine Learning. Machine Learning Concept and its Fundamentals.	Lecture-1
2	2	Jan 26, 2011	Pattern Recognition. Basics of Neural Information Processing Biological foundations of Neuronal Morphology. Biological Neuron and Biological Neural Networks. Information Processing in Biological Neural Networks. Artificial Neuron. McCulloch-Pitts Neuron.	Lecture-2
3	3	Feb 2, 2011	Threshold Neuron. Linear Separability and Non-linear separability. XOR problem. Rosenblatt's Perceptron. Mechanisms of Learning. Hebbian Learning.	Lecture-3
4	4	Feb 9, 2011	Error-Correction Learning.	Lecture-4
5	5	Feb 16, 2011	A neural network for solving XOR problem. Continuous activation functions	Lecture-5
6	6	Feb 23, 2011	A multilayer feedforward neural network (MLF). A concept of backpropagation learning	Lecture-5, Lecture-6
7	7	Mar 2, 2011	Experiments with MLF	Notes
8	8	Mar 9, 2011	Test	
9	9	Mar 23 2011	Support vector machine and its learning algorithm	Lecture-7
10	10	Mar 30 2011	Multi-valued neuron (MVN) and multiple-valued threshold functions. MVN error-correction and Hebbian learning	Lecture-8
11	11	Apr 6 2011	MVN with a periodic activation function.	Lecture-9
12	12	Apr 13 2011	Experiments with MVN learning	Notes
13	13	Apr 20 2011	A multilayer feedforward neural network based on multi-valued neurons (MLMVN) and its backpropagation learning	Lecture-10
14	14	Apr 27 2011	Experiments with MLMVN	Notes
15	15	May 4 2011	Presentation of Course projects	

Disability Accommodations Students with disabilities may request reasonable accommodations through the A&M-Texarkana Disability Services Office by calling 903-223-3062.

Academic Dishonesty Academic honesty is expected of students enrolled in this course. Cheating on examinations, unauthorized collaboration, falsification of research data, plagiarism, and undocumented use of materials from any source, constitute academic dishonesty, and may be grounds for a grade of "F" in the course and/or disciplinary actions." For additional information see the university policy manual.

Statement on email usage Upon application to Texas A&M University-Texarkana an individual will be assigned an A&M-Texarkana email account. This email account will be used to deliver official university correspondence. Each individual is responsible for information sent and received via the university email account and is expected to check the official A&M-Texarkana email account on a frequent and consistent basis. Faculty and students are required to utilize the university email account when communicating about coursework.