CSE 5526 - Autumn 2019

Introduction to Neural Networks

Time/Place: TR 9:35am - 10:55pm, 480 Dreese Lab

Instructor: Prof. DeLiang Wang, 598 Dreese Lab; Phone: 292-6827;
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Class website: www.cse.ohio-state.edu/~dwang/teaching/cse5526

Office Hours: M 2:00pm - 3:00pm and R 1:00pm - 2:30pm

Grader: Hao Zhang

Course Description: An introduction to fundamental methods in neural networks. Single- and multi-layer perceptrons; radial-basis function networks; support vector machines; stochastic machines and deep networks; convolutional and recurrent networks; supervised and unsupervised learning; application to pattern classification and function approximation problems.

Prerequisite: CSE 3521/5521 (Intro to AI), or ECE 5200 (Intro to DSP)/ECE 5362 (Computer Architecture/Design)

Required Text: "Neural networks and learning machines," by Simon Haykin. Pearson, 2009

Supplemental Material: "Deep learning," by Ian Goodfellow, Yoshua Bengio, and Aaron Courville. MIT Press, 2016

Class Project: There will be three class projects. Each student is required to write programs to implement three of the neural network models studied in the class. Each student needs to turn in a report for each programming assignment, which summarizes what has been done. More detailed information will be provided in due time.

Grading Plan: Homework: 20% (5 x 4%), Midterm: 20%,
                 Final exam: 30%, Class project: 30% (3 x 10%)

Policy:

      Homeworks and projects are due at the beginning of class (9:35AM). Late projects result in a 10% penalty each calendar day. Excuse from scheduled exams or late homework will not be accepted without substantial documentation. Cell phones must be turned off or muted during the class.

Tentative Schedule

Week	Topics:	Readings
Week 1:	Introduction, McCulloch-Pitts networks	Intro., Ch. 1
Week 2:	Perceptrons	Ch. 1
Week 3:	Regression and least mean square algorithm	Ch. 2, Ch. 3
Week 4:	Multilayer perceptrons	Ch. 4
Week 5:	Multilayer perceptrons: Continued	Ch. 4
	(**No class on Thursday, Sept. 19**)	
Week 6:	Radial-basis function networks	Ch. 5
Week 7:	Radial-basis function networks: Continued	Ch. 5
Week 8:	**Midterm on Tuesday** (Autumn Break on Thursday)	
Week 9:	Support vector machines	Ch. 6
Week 10:	Support vector machines: Continued	Ch. 6
Week 11:	Unsupervised learning and self-organization	Ch. 9
Week 12:	Boltzmann machines and deep networks	Ch. 11
Week 13:	Deep networks: Continued	Ch. 11
Week 12:	Convolutional networks	Ch. 4
Week 13:	Recurrent networks	Ch. 15
Week 16:	Catch up, review, and current topics	

Finals Week: **Final Exam:** 8:00 to 9:45am, Friday, Dec. 6