CS 6890: Deep Learning
Spring 2018

Class Meetings: Tue, Thu 9:00–10:20am, ARC 121
Instructor: Razvan Bunescu
Office: Stocker 341
Office Hours: Tue, Thu 10:30–11:00am, or by email appointment
Email: bunescu @ ohio edu
Course Website: http://ace.cs.ohio.edu/~razvan/courses/dl6890

Prerequisites:
Previous exposure to basic concepts in machine learning, such as: supervised vs. unsupervised learning, classification vs. regression, linear regression, logistic and softmax regression, cost functions, overfitting and regularization, gradient-based optimization. Substantial experience with programming and familiarity with basic concepts in linear algebra and statistics.

Textbook:
Deep Learning

Recommended introductory resources:
Listed on the course website.

Supplemental deep learning lectures:
Listed on the course website.

Course Description:
This course will introduce the multi-layer perceptron, a common deep learning architecture, and its gradient-based training through the backpropagation algorithm. Fully connected neural networks will be followed by more specialized neural network architectures such as convolutional neural networks (for images), recurrent neural networks (for sequences), and memory-augmented neural networks. The later part of the course will explore more advanced topics, such as generative adversarial networks and deep reinforcement learning. The lectures will cover theoretical aspects of deep learning models, whereas homework assignments will give students the opportunity to build and experiment with shallow and deep learning models, for which skeleton code will be provided.

Proposed Topics:
Logistic and Softmax Regression, Feed-Forward Neural Networks, Backpropagation, Vectorization, PCA and Whitening, Deep Networks, Convolution and Pooling, Recurrent Neural Networks, Long Short-Term Memory, Gated Recurrent Units, Neural Attention Models, Sequence-to-Sequence Models, Memory Networks, Distributional Representations, Generative Adversarial Networks, Deep Reinforcement Learning.
Implementation Platforms:
Python, NumPy/SciPy, PyTorch or TensorFlow.

Grading:
- 30%: 5 Homework Assignments
- 10%: 1 Class Presentation or Extra Assignment or Final Project.
- 30%: 2 Exams (Mar 8 and Apr 26, in class)
- 30%: Final Project

Important Dates:
- Tuesday, Mar. 13: Spring Break, no class.
- Thursday, Mar. 15: Spring Break, no class.
- Thursday, Apr. 26: Last day of this class.

Course and Attendance policies:
- Assignments: All homework assignments are due before the class. No late submissions will be accepted without prior approval.
- Attendance: It is in your best interest to attend all the lectures. Some of the material will not be found in the reading materials or on the slides. Extra credit will be awarded for class activity. Also, be sure to check your OU email for important announcements on a regular basis.

Academic Dishonesty Policy:
All work must be the student's own. All external references used in reports must be properly cited. No credit will be given for duplicate or plagiarized work. Additional measures may be imposed by the Office of Community Standards and Student Responsibility, when conditions warrant. Students may appeal academic sanctions through the grade appeal process. The OU Student Code of Conduct Policy is available online at:
http://www.ohio.edu/communitystandards/academic/students.cfm

Disability-based Accommodation:
Any student who suspects s/he may need an accommodation based on the impact of a disability should contact the class instructor privately to discuss the student’s specific needs and provide written documentation from the Office of Student Accessibility Services. If the student is not yet registered as a student with a disability, s/he should contact the Office of Student Accessibility Services.

Other Policies:
Be sure to notify the professor of any exam conflicts or other extenuating circumstances well in advance. No missed exams will be made up without prior approval. Medical excuse forms need to explicitly mention that the student could not have attended the exam at the specified time due to health concerns.