CEng 783 – Deep Learning

Department of Computer Engineering @ METU – Fall 2017

Instructor: Asst. Prof. Dr. Emre Akbas; Office B-202; emre@ceng.metu.edu.tr; Office hours by appointment

Lectures: Fridays 13:40-16:30 at BMB-3

Website: `http://user.ceng.metu.edu.tr/~emre/Fall2017-DeepLearning.html` E-mail list, forum and homework submission: `https://odtuclass.metu.edu.tr/`

Credits: METU: 3 theoretical, 0 laboratory; ECTS: 8.0

Description: This is a graduate course aiming to teach the fundamentals of "deep learning." We will study major types of deep neural networks and take an in-depth look at commonly used deep architectures. We will also explore recent advances in the field and state of the art applications of deep neural networks in computer vision, speech recognition and natural language processing.

Textbook: There is no official textbook for the class. We will follow the state of the art mainly with papers and by using parts of the following books that are available online:

- Y. Bengio, I. Goodfellow and A. Courville, "Deep Learning," MIT Press, 2016.
- L. Deng and D. Yu, "Deep Learning: Methods and Applications," NOW Publishers, 2014.

Grading: Assignments 30%; Written exam 30%; Project 40%

Prerequisities: Basic probability and statistics, basic linear algebra, basic machine learning, and proficiency in Python are required.

Tentative schedule:

Date		*Topic*	*Assignments*	*Exam & Project*
1	Oct 6	High-level introduction to deep learning. Machine learning background and basics	Hw1 given on Oct 6	
2	Oct 13	Background and basics	Hw1 due Oct 16	
3	Oct 20	Artificial neural networks		
4	Oct 27	Convolutional neural networks (ConvNets)	Hw2 given Oct 27	Project proposals due Oct 30
5	Nov 3	Convolutional neural networks (ConvNets)		
6	Nov 10	Applications of ConvNets	Hw2 due Nov 6	
7	Nov 17	Recurrent and recursive neural networks (RNNs)		Midterm exam Nov 17
8	Nov 24	Applications of RNNs	Hw3 given Nov 24	
9	Dec 1	Generative deep learning		
10	Dec 8	Deep reinforcement learning (DRL)	Hw3 due Dec 4	
11	Dec 15	Project progress demos and presentations		Project progress report due
12	Dec 22	Applications of DRL		
13	Dec 29	Deep hierarchies in human vision		
14	Jan 5	Project demos and presentations		Projects due