

CEng 783 – Deep Learning

Department of Computer Engineering @ METU – Fall 2016

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

Lectures: Mondays 12:40-15:30 at BMB-4

Website: http://user.ceng.metu.edu.tr/~emre/Fall2016_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 35%; Midterm exam 25%; Project 40%

Prerequisites: Basic probability and statistics, basic linear algebra, basic machine learning, and most importantly, proficiency in Python or MATLAB are required.

Tentative schedule:

<i>Date</i>	<i>Topic</i>	<i>Assignments</i>	<i>Exam & Project</i>
1 Oct 3	High-level introduction to deep learning. Machine learning background and basics	Hw1 given on Oct 3	
2 Oct 10	Background and basics	Hw1 due Oct 13	
3 Oct 17	Artificial neural networks		
4 Oct 24	Convolutional neural networks (ConvNets)	Hw2 given Oct 24	Project proposals due Oct 28
5 Oct 31	Convolutional neural networks (ConvNets)		
6 Nov 7	Applications of ConvNets	Hw2 due Nov 6	
7 Nov 14	Recurrent and recursive neural networks (RNNs)		Midterm exam Nov 17
8 Nov 21	Applications of RNNs	Hw3 given Nov 21	
9 Nov 28	Generative deep learning		
10 Dec 5	Deep reinforcement learning (DRL)	Hw3 due Dec 4	
11 Dec 12	Project progress demos and presentations		Project progress report due
12 Dec 19	Applications of DRL		
13 Dec 26	Deep hierarchies in human vision		
14 Jan 2	Project demos and presentations		Projects due