CEng 783 – Deep Learning

Fall 2017 – Week 1

Misc. info about the class

Emre Akbas
• Course webpage: [link](#)
• Syllabus: [link](#)
Prerequisites

• Basic probability and statistics, basic linear algebra, basic machine learning, and proficiency in Python are required.
Machine Learning Background Test

How familiar are you with the following:

- Train set, test set validation set
- Supervised learning, unsupervised learning
- SVM, logistic regression
- Bias/Variance trade-off
- Underfitting, overfitting
- Regularization (L1, L2)
• Regularization
• Basic numerical optimization, gradient descent
• Hyper parameter
• Capacity of a model
• VC dimension
• Generative model, Discriminative model
• ...

...
• Due to high demand, 783 is opened every semester.
• So, if you could take it later, please do so.
3 assignments

1st: Machine learning background and basics
2nd: Multilayer perceptrons and Convolutional Neural Networks
3rd: Recurrent Neural Networks (+ Auto-encoders?)
Assignment 1 (HW1)

• It will be available today.
• This is a good test of your machine learning background.
• PI check the website of the course.
• It is due in 10 days (Oct 16)
• The policy for late submission is on the webpage of the class.
Midterm exam 25%

Machine learning background

ANNs (perceptron, MLPs)

CNNs, RNNs, backpropagation, optimization, etc.
Reading assignments

• Will not be graded, they are to aid your learning
• Parts from the textbook(s)
• Relevant papers
• Reading assignment for next week:


  http://www.deeplearningbook.org/contents/ml.html
Project is very important!!

- Start thinking about your project.
- 40% of your grade.
- It should have the potential to result in a research paper.
- Can be done in pairs.
- Some ideas:
Project ideas

• Apply DL on your own dataset.
• Participate in vision competitions
  – E.g. ILSVRC, cancer metastases detection (https://grand-challenge.org/site/camelyon16/home/)
• Participate in a Kaggle challenge and apply DL
• Take a state-of-the-art deep model and analyze its errors, and try to fix it.
Theory is good but what about practice?

We will use the Keras API for practical tasks
• Examples, small workshops in class
• Homeworks

https://keras.io/
If you would like to take the class, please provide the following information.

- Name, METU id, email address
- School, department
- Program: undergraduate, MS, PhD
- Year in current program
- Machine learning background (previous courses, projects)
- Thesis topic
- Research advisor
- Why do you want to take 783? (max 3 sentences)