ELEG 5491
Introduction to Deep Learning

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Course Information

- Face-to-face teaching by default
- Course webpage
  - dl.ee.cuhk.edu.hk
- Lecture time
  - Tuesday: 16:30-18:15
  - Wednesday: 15:30-16:15

Course Information

- Instructor: Hongsheng Li
  - Office hours: after class or by appointment
  - E-mail: hsli@ee.cuhk.edu.hk
- Tutor: Keqiang SUN
  - E-mail: kqsun@link.cuhk.edu.hk
- Tutor: Aojun ZHOU
  - E-mail: aojunzhou@link.cuhk.edu.hk
- Tutor: Zhaoyang HUANG
  - E-mail: drinkingcoder@link.cuhk.edu.hk

Course Information

- Homework (30%)
- Quiz 1 (15%)
- Quiz 2 (15%)
- Project (40%)
  - Topics
    - Applications of deep learning
    - Implementation of deep learning
    - Study deep learning algorithms
  - You should submit
    - One page proposal and discuss it with tutor (topic, idea, method, experiments)
    - A term paper of 4 pages (excluding figures) in maximum, double column, font size is equal or larger than 10.
    - Code and sample data
    - Project presentation
  - Survey is not allowed
  - No collaboration

Course Information

- We have different expectations for RPg and UG/MSc students
- Examples of project topics
  - Implement CNN with GPU and compare its efficiency with Caffe
  - Fast CPU implementation of CNN
  - We provide a baseline model of GoogLeNet on ImageNet, and you try to improve it
  - Choose one of the deep learning related competitions (such as ImageNet), and compare your result with published ones
  - Propose a deep model to effectively learn dynamic features from videos
  - Deep learning for speech recognition
  - Deep learning for object detection

Reference Book

- Ian Goodfellow and Yoshua Bengio and Aaron Courville, "Deep Learning," MIT Press, 2016
- This is a 5000-level course, mainly designed for **research postgraduate students**
- We assume that you have good knowledge on calculus, linear algebra, probability
- We will go fast!

Lectures

Week	Topics	Requirements
1	Introduction & Machine Learning Basics	
2	Multi-Layer Perceptron I	
3	Multi-Layer Perceptron II & Convolutional neural networks I	
4	Convolutional neural networks II	
5	Optimization for training deep neural networks	
6	Network structures/Quiz 1	
7	Recurrent neural network	
8	Advanced Architectures	
9	Generative networks and applications	Project proposal
10	Advanced Topic I	
11	Advanced Topic II	
12	Advanced Topic III	
13	Course sum-up/Quiz 2	

Relation to Other Courses

- We assume that you have basic knowledge and concepts on machine learning

- About 25% content overlap with ELEG 5760 Machine Learning for Signal Processing Applications

- About 15% content overlap with ENGG 5202 Pattern Recognition