



Course Syllabus: Special Topics in Machine Learning - CS 390DD

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 390DD
Course Title	Special Topics in Machine Learning
Academic Semester	Fall
Academic Year	2019/2020
Semester Start Date	08/25/2019
Semester End Date	12/10/2019
Class Schedule (Days & Time)	02:30 PM - 04:00 PM Sun Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
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Teaching Assistant(s)

Name	Email
N / A	N / A

Course Information

Comprehensive Course Description	This course provides an overview of deep learning applications in visual computing. We will cover some basics of deep learning (optimization, network architecture, compression, ...) as well as selected applications (image recognition, segmentation, image synthesis, object detection, object synthesis, mesh segmentation, point cloud processing, ...). The selection of the applications is expected to change with different course offerings and will be adapted to the latest research papers in computer vision and computer graphics.
Course Description from Program Guide	
Goals and Objectives	The goals of the course are to learn: *) basics of neural networks *) applications of neural networks in visual computing *) implementation of neural networks that solve visual computing problems in practice
Required Knowledge	*) Python programming skills *) Machine Learning *) Visual Computing (Vision or Graphics) experience *) Knowledge of PyTorch or TensorFlow
Reference Texts	This list will be provided in the course notes. A general reference is the deep learning book, but it might be more useful to start watching courses online.
Method of evaluation	90.00% - Course Project(s)
Nature of the assignments	The course will have multiple types of evaluation. The main type will be the evaluation of implementation skills in projects.

Course Policies	Fairly standard rules.
Additional Information	

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Sun 08/25/2019 Wed 08/28/2019	These are just example topics. The course details will still be developed over the summer. Course Introduction and Convolutional Neural Network Examples
2	Sun 09/01/2019 Wed 09/04/2019	Image Classification
3	Sun 09/08/2019 Wed 09/11/2019	Loss Functions and Optimization
4	Sun 09/15/2019 Wed 09/18/2019	Backpropagation
5	Sun 09/22/2019 Wed 09/25/2019	CNNs
6	Sun 09/29/2019 Wed 10/02/2019	Activation Functions, initialization, dropout, normalization
7	Sun 10/06/2019 Wed 10/09/2019	Update rules, ensembles, data augmentation, transfer learning
8	Sun 10/13/2019 Wed 10/16/2019	Deep Learning Hardware and Software: CPUs, GPUs, TPUs, Pytorch, Tensorflow
9	Sun 10/20/2019 Wed 10/23/2019	Neural Network Architectures: Alexnet, VGG, ResNet, ...
10	Sun 10/27/2019 Wed 10/30/2019	Recurrent Neural Networks
11	Sun 11/03/2019 Wed 11/06/2019	Visualizing and Understanding Neural Networks
12	Sun 11/10/2019 Wed 11/13/2019	Reinforcement Learning
13	Sun 11/17/2019 Wed 11/20/2019	Generative Adversarial Networks, Autoencoder, Variational Autoencoder
14	Sun 11/24/2019 Wed 11/27/2019	Point Cloud Processing
15	Sun 12/01/2019 Wed 12/04/2019	deep learning on graphs
16	Sun 12/08/2019	deep learning on meshes

Note

The instructor reserves the right to make changes to this syllabus as necessary.