

Syllabus

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1 Logistics

Class: CS 6301.502.18F Special Topics in Computer Science – Convolutional Neural Networks
Link: <https://coursebook.utdallas.edu/search/searchresults/cs6301.502.18f>
Location: Mon and Wed from 5:30 – 6:45 pm in FN 2.102
Office hours: TBA
TA: TBA

2 Description

Description: This course provides an introduction to convolutional neural networks (CNNs). The theory part of the course is motivated by the realization that many information extraction problems can be reduced to a classification or regression problem, neural networks are universal approximators and CNNs are an efficient neural network structure for multidimensional data. Network design and training methods are discussed along with software and hardware requirements for high performance CNN implementations. Theory and implementation are demonstrated and expanded on in the context of applications.

Outline:	Background	– linear algebra, calculus and probability
	Theory	– machine learning and convolutional neural networks
	Implementation	– hardware and software

Application – vision, speech, language and games

Objectives: Course learning objectives include:

1. Ability to understand, design and train convolutional neural networks
2. Ability to create software for mapping convolutional neural network designs to hardware
3. Ability to specify hardware for convolutional neural network optimized data movement and compute
4. Ability to evaluate convolutional neural network performance
5. Ability to apply convolutional neural networks to applications including vision, speech, language and games

References: No required book to purchase, links to open source materials will be provided.

3 Plan

Exact plan subject to change

01 Mon Aug 20	Introduction	
02 Wed Aug 22	Linear algebra	
03 Mon Aug 27	Calculus	
04 Wed Aug 29	Probability	HW due
05 Mon Sep 03	Labor Day	
06 Wed Sep 05	Machine learning	HW due
07 Mon Sep 10	Convolutional neural networks	
08 Wed Sep 12	Convolutional neural networks	HW due
09 Mon Sep 17	Convolutional neural networks	
10 Wed Sep 19	Convolutional neural networks	HW due
11 Mon Sep 24	Practical / review	
12 Wed Sep 26	Theory test	
13 Mon Oct 01	Hardware	
14 Wed Oct 03	Hardware	HW due
15 Mon Oct 08	Hardware	
16 Wed Oct 10	Software	HW due
17 Mon Oct 15	Software	
18 Wed Oct 17	Software	HW due
19 Mon Oct 22	Practical / review	
20 Wed Oct 24	Implementation tool	
21 Mon Oct 29	Vision	
22 Wed Oct 31	Vision	HW due
23 Mon Nov 05	Vision	
24 Wed Nov 07	Speech	HW due

25	Mon Nov 12	Speech	
26	Wed Nov 14	Language	HW due
27	Mon Nov 19	Fall break	
28	Wed Nov 21	Fall break	
29	Mon Nov 26	Games	
30	Wed Nov 28	Summary and next	HW due
31	Mon Dec 03	Project (1/2)	
32	Wed Dec 05	Project (2/2)	
33	Mon Dec 10	Reading day	

4 Grades

25%	Theory test
25%	Implementation tool
25%	Project
25%	Homework

No final exam