

Syllabus

Arthur J. Redfern

axr180074@utdallas.edu

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0 Outline

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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 hrs: 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, probability
	Theory	– machine learning, convolutional neural networks
	Implementation	– hardware, software

Application – vision, speech, language, 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

01 Mon Aug 20	Introduction		
02 Wed Aug 22	Linear algebra		
03 Mon Aug 27	Linear algebra	HW1 assigned	
04 Wed Aug 29	Calculus		
00 Mon Sep 03	Labor Day		
05 Wed Sep 05	Calculus	HW2 assigned	HW1 due
06 Mon Sep 10	Probability		
07 Wed Sep 12	Probability		
08 Mon Sep 17	Algorithms / design	HW3 assigned	HW2 due
09 Wed Sep 19	Design		
10 Mon Sep 24	Design		HW3 due
11 Wed Sep 26	Theory test review		
12 Mon Oct 01	Theory test		
13 Wed Oct 03	Design	HW4 assigned	
14 Mon Oct 08	Training		
15 Wed Oct 10	Training	HW5 assigned	HW4 due
16 Mon Oct 15	Training		
17 Wed Oct 17	Project discussion	HW6 assigned	HW5 due
18 Mon Oct 22	Training		
19 Wed Oct 24	Implementation	Tool assigned	HW6 due
20 Mon Oct 29	Implementation		
21 Wed Oct 31	Implementation		Project proposal due
22 Mon Nov 05	Implementation		
23 Wed Nov 07	Vision		
24 Mon Nov 12	Vision		
25 Wed Nov 14	Speech		Tool due

00 Mon Nov 19	Fall break	
00 Wed Nov 21	Fall break	
26 Mon Nov 26	Speech	
27 Wed Nov 28	Language	
28 Mon Dec 03	Summary	Project slides due
29 Wed Dec 05	Project presentations	
00 Mon Dec 10	Reading day	

4 Grades

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

No final exam