Syllabus

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1 Logistics

Class:	CS 6301.501.21S Special Topics in Computer Science – Convolutional Neural Networks
Location:	Mon and Wed from 5:30 – 6:45 pm online + recordings
Office hours:	Fri 12:00 – 1:00 pm online
Course material:	https://github.com/arthurredfern/UT-Dallas-CS-6301-CNNs

2 Description

Description: This course provides an introduction to neural network variants (xNNs) including convolutional neural networks (CNNs), recurrent neural networks (RNNs) and attention based models. The course is motivated by the realization that many information extraction problems can be reduced to a classification or regression problem and neural networks are universal function approximators. Network design and training methods are discussed along with software and hardware requirements for high performance implementations. Theory and implementation are demonstrated and expanded on in the context of applications.

Outline:

Math	–	linear algebra, algorithms, probability, calculus and analysis
Networks	–	design, training and implementation
Applications	–	vision, language, speech and games

Objectives: Course learning objectives include:

1. Ability to design xNNs
2. Ability to train xNNs
3. Ability to implement xNNs
4. Ability to apply xNNs to applications including vision, language, speech and games

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

3 Plan

01	Wed Jan 20	Introduction	
02	Mon Jan 25	Overview	
03	Wed Jan 27	Linear algebra	
04	Mon Feb 01	Linear algebra	
05	Wed Feb 03	Linear algebra	
06	Mon Feb 08	Algorithms	
07	Wed Feb 10	Probability	
08	Mon Feb 15	Probability	
09	Wed Feb 17	Calculus	
10	Mon Feb 22	Calculus	
11	Wed Feb 24	Analysis	
12	Mon Mar 01	Design	
13	Wed Mar 03	Design	
14	Mon Mar 08	Design	Project 1 due: math
15	Wed Mar 10	Training	
00	Mon Mar 15	No class	
00	Wed Mar 17	No class	
16	Mon Mar 22	Training	
17	Wed Mar 24	Training	
18	Mon Mar 29	Implementation	
19	Wed Mar 31	Implementation	
20	Mon Apr 05	Vision	
21	Wed Apr 07	Vision	Project 2 due: networks
22	Mon Apr 12	Vision	
23	Wed Apr 14	Language	
24	Mon Apr 19	Language	
25	Wed Apr 21	Speech	
26	Mon Apr 26	Speech	
27	Wed Apr 28	Games	
28	Mon May 03	Games	
29	Wed May 05	Summary	
00	Mon May 10	No class	Project 3 due: applications

4 Grades

25%	Project 1:	linear algebra, algorithms, probability, calculus and analysis
25%	Project 2:	network design, training and implementation
25%	Project 3:	vision, language, speech and games
25%	Homework	