Syllabus

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Jan 13, 2020

0 Outline

1 Logistics

Class: CS 6301.502.20S Special Topics in Computer Science –
             Convolutional Neural Networks
Link: https://coursebook.utdallas.edu/search/searchresults/cs6301.502.20s/term_20s
Location: Mon and Wed from 5:30 – 6:45 pm in ECSS 2.412 from Jan 13 – Mar 11
             Mon and Wed from 5:30 – 6:45 pm online from Mar 30 – Apr 29
Office hrs: TBA via WebEx

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

The original class plan is updated as indicated below for the time period from Mar 23 – Apr 29 due to the extra week of Spring Break and the shift to online classes for the remainder of the semester.

01	Mon Jan 13	Introduction	
02	Wed Jan 15	Linear algebra	
00	Mon Jan 20	Martin Luther King Day	
03	Wed Jan 22	Linear algebra	
04	Mon Jan 27	Algorithms	
05	Wed Jan 29	Probability	
06	Mon Feb 03	Probability	
07	Wed Feb 05	Calculus	
08	Mon Feb 10	Calculus	
09	Wed Feb 12	Analysis	
10	Mon Feb 17	Test 1: math	
11	Wed Feb 19	Design	
12	Mon Feb 24	Design	
13	Wed Feb 26	Design	
14	Mon Mar 02	Training	
15	Wed Mar 04	Training	
16	Mon Mar 09	Training	
17	Wed Mar 11	Implementation	
00	Mon Mar 16	Spring Break	
00	Wed Mar 18	Spring Break	
00	Mon Mar 23	Spring Break	
00	Wed Mar 25	Spring Break	
18	Mon Mar 30	Implementation	Project 2: networks (assigned)
19	Wed Apr 01	Vision	
20	Mon Apr 06	Vision	
21	Wed Apr 08	Language	Project 2: networks (due Apr 10)

22 Mon Apr 13   Language
23 Wed Apr 15   Speech   Project 3: applications (assigned)
24 Mon Apr 20   Speech
25 Wed Apr 22   Games
26 Mon Apr 27   Games
27 Wed Apr 29   Summary   Project 3: applications (due May 01)

4 Grades

The original grade plan is updated as indicated below for Project 2 and Project 3 due to the extra week of Spring Break and the shift to online classes for the remainder of the semester.

25%   Test 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

No final exam