

CS 480/680 - Topics in Neural Networks

Fall 2019 Syllabus

Instructor: Dr. J. Genetti
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Office Hours: MW 2:30-4:00 or by appointment

Prerequisites: AI Course
Required Text: *Deep Learning and the Game of Go*, Max Pumperla & Kevin Ferguson
Recommended Text: *Python for Programmers (with AI Case Studies)*, Paul Deitel & Harvey Deitel
Location/Time: Duckering 535, MW 5:30-6:50

Course goals: Explore recent advances in Neural Networks and their application to Deep Learning.

1. Explore and implement handwritten digit recognition
 - a. Generate additional training/testing data
 - b. Implement and test using Python
2. Explore Convolutional Neural Networks (CNNs) and develop a CNN to recognize Alaska birds
 - a. Generate training/testing data (shared with class)
 - b. Implement a CNN to give YES/NO answer to “Is an Alaska bird in this photo?”
 - c. Implement a CNN to identify 10 specific Alaska birds in a photo
3. Explore Deepmind’s advances in Deep Learning and how they defeated Go
 - a. Explore previous approaches to game playing AI
 - i. Brute-force approaches
 - ii. Neural Network evaluation functions
 - iii. Evolutionary learning
 - b. Explore Deepmind’s approach to Go, Chess and Shogi
 - c. Use code from the book to implement proof-of-concept
4. Define and implement a project that applies deep learning to a problem

Grading:

Handwritten digit recognition	10%
CNN training data (quality & amount)	10%
CNN to recognize Alaska birds	20%
Go implementation (based on book)	20%
Project & Final Report	20%
Final Exam (take-home due end of finals week)	20%

Final grades will be assigned based on the following percentage intervals: A+ [95%,100%], A [90%,95%), A- [85%,90%), B+ [80%,85%), B [75%,80%), B- [70%,75%), C+ [65%,70%), C [60%,65%), C- [55%,60%), D+ [50%,55%), D [45%,50%), D- [40%,45%), F [0%,40%).

Policies: Department policies can be found at www.cs.uaf.edu/departamental-policies/

Disabilities Services: The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. I will work with the Office of Disabilities (208 Whitaker Bldg, 474-5655) to provide reasonable accommodation to students with disabilities.