CS 480/680 - Topics in Neural Networks
Fall 2019 Syllabus

Instructor: Dr. J. Genetti
Email: jdgenetti@alaska.edu
Office / Phone: 541 Duckering / 474-5737
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:

<table>
<thead>
<tr>
<th>Task</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwritten digit recognition</td>
<td>10%</td>
</tr>
<tr>
<td>CNN training data (quality &amp; amount)</td>
<td>10%</td>
</tr>
<tr>
<td>CNN to recognize Alaska birds</td>
<td>20%</td>
</tr>
<tr>
<td>Go implementation (based on book)</td>
<td>20%</td>
</tr>
<tr>
<td>Project &amp; Final Report</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam (take-home due end of finals week)</td>
<td>20%</td>
</tr>
</tbody>
</table>
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/departmental-policies/](http://www.cs.uaf.edu/departmental-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.