General Information
Instructor: Tong Shu Office: Discovery Park F277
E-mail: Tong.Shu@unt.edu Office hours: 10:00 AM - 12:00 noon on Fridays

Course Description
Hands-on introduction to deep learning emphasizing application using GPU-accelerated hardware to train multilayer machine learning models directly on raw input signals. Discusses the foundations of feedforward networks, convolutional neural networks, and recurrent networks, as well as their usage within popular reinforcement learning frameworks. Using real datasets and popular deep learning tools (e.g. PyTorch, Tensorflow, Keras) students create systems to make inferences from rich and varied raw data including speech, video and other sensor signals.

Prerequisite
None.

Required Textbook

Reference Books

Evaluation
Grading components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>Project</td>
<td>20%</td>
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<tr>
<td>Mid-term exam</td>
<td>30%</td>
</tr>
<tr>
<td>Final exam</td>
<td>30%</td>
</tr>
<tr>
<td>Attendance (bonus)</td>
<td>5%</td>
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Grading scale*:
Late Policy:
Students are expected to complete work on schedule. Late work within 24 hours can only have 80% credit for delay penalty. Late work beyond 24 hours is not accepted with any excuse. For multiple submissions with partial delay, 80% credit is only applied to the delayed portion.

Academic Integrity and Student Conduct

Plagiarism or cheating behavior in any form is unethical and detrimental to proper education and will not be tolerated. All work submitted by a student (projects, programming assignments, lab assignments, quizzes, tests, etc.) is expected to be a student's own work. The plagiarism is incurred when any part of anybody else's work is passed as your own (no proper credit is listed to the sources in your own work) so the reader is led to believe it is therefore your own effort. Students are allowed and encouraged to discuss with each other and look up resources in the literature (including the internet) on their assignments, but appropriate references must be included for the materials consulted, and appropriate citations made when the material is taken verbatim.

This course follows the Department of Computer Science and Engineering Cheating Policy. If plagiarism or cheating occurs, the student will receive a failing grade on the assignment and (at the instructor’s discretion) a failing grade in the course. Specifically, students caught cheating or plagiarizing will receive a “0” for that particular assignment or exam for the first offense. Additionally, the incident may be reported to the Dean of Students, who may impose a further penalty. The second instance of cheating in this class will result in a grade of F in the class, and referral to the Department Chairperson and Dean of Engineering, whereby a dismissal hearing may be initiated by the Dean of Engineering.

Individual assignments, including laboratory exercises and programming assignments, in this course, must be the sole work of the individual student. You should not work with other students on shared program solutions or use solutions found on the Internet. Specifically, you should never copy someone else’s solution or code, and never let a classmate examine your code. If you are having trouble with an assignment, please consult with your instructor or TA/IA assigned to this course. Failure to adhere to these strict standards may be cause for disciplinary action even leading to expulsion from the University.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score</th>
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<tbody>
<tr>
<td>A- / A</td>
<td>90 – 93; 94 – 100</td>
</tr>
<tr>
<td>B- / B / B+</td>
<td>79 – 81; 82 – 86; 87 – 89</td>
</tr>
<tr>
<td>C- / C / C+</td>
<td>68 – 70; 71 – 75; 76 – 78</td>
</tr>
<tr>
<td>D / D+</td>
<td>60 – 64; 65 – 67</td>
</tr>
<tr>
<td>F</td>
<td>59 and below</td>
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*Final grades will not be curved unless necessary.*
Students are responsible for being familiar with the university standard for academic integrity. In the case that the above description or any in-class discussion of appropriate and inappropriate collaboration does not answer all of your questions, please meet with your instructor and look at the university Student Rights and Responsibilities web page.

Course Syllabus

- Syllabus, background, questionnaire (2 hours)
- Chapter 1: An introduction to neural networks (5.5 hours)
- Chapter 2: Machine learning with shallow neural networks (5.5 hours)
- Chapter 3: Training deep neural networks (5.5 hours)
- Chapter 4: Teaching deep learners to generalize (5.5 hours)
- Chapter 5: Radial basis function networks (5.5 hours)
- Chapter 6: Restricted boltzmann machines (5.5 hours)

This syllabus is subject to change based on the needs of the class.