TEXAS A&M UNIVERSITY

SYLLABUS

Course title and number	CSCE 636: Deep Learning
Term	Fall 2019
Meeting times and location	MWF 11:30 am - 12:20 pm, Zachry Engineering Ed. Complex 244

Course Description and Prerequisites

An introduction to the field of deep learning, including basic machine learning, supervised learning, logistic regression, loss functions, neural networks, optimization, error back-propagation, regularization and generalization, convolutional neural networks, recurrent neural networks, graph neural networks, attention models, applications to natural language processing and computer vision.

Prerequisites include basic machine learning (e.g., supervised learning, linear regression, logistic regression, support vector machines), linear algebra (e.g., singular value decomposition), multivariate calculus, access to GPU, proficiency in Python programming

Learning Outcomes or Course Objectives

Student learning outcomes include (1) understanding the foundation, major techniques, applications, and challenges of deep learning; (2) the ability to apply basic deep learning algorithms for solving real-world problems. The learning outcomes will be assessed based on a combination of homework assignments, exams, projects and presentations.

Instructor Information

Name	Shuiwang Ji
Telephone number	(979) 458-1547
Email address	sji@tamu.edu
Office hours	MW 10:00 am - 11:00 am
Office location	HRBB 410C

Textbook and/or Resource Material

Main text:
Charu C. Aggarwal: Neural Networks and Deep Learning, Springer, September 2018
https://www.amazon.com/dp/3319944622
http://www.charuaggarwal.net/neural.htm
https://rd.springer.com/book/10.1007/978-3-319-94463-0

Additional materials:
YS Abu-Mostafa, M Magdon-Ismail, HT Lin: Learning from Data, only Chapters 3 and 7
http://amlbook.com/
https://www.amazon.com/Learning-Data-Yaser-S-Abu-Mostafa/dp/1600490069

Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola
Dive into Deep Learning
https://www.d2l.ai/

Grading Policies

Homework (4): 40%: There will be four homework assignments containing both written and programming components.

Exam (2): 35%: There will be two exams covering the foundations of neural networks and deep learning. Exam 1 will be 15% and final exam will be 20%.
Final exam schedule: Wednesday, December 11, 2019, 10:30 a.m. – 12:30 p.m.

Project (1): 25%: There will be one semester-long, team project. Students are required to form teams of 2-3 students and carry out a project related to deep learning and applications to computer vision or natural language processing. Example projects include (1) implementation and comparison of several existing methods on benchmark data sets and gain some insights, (2) extension of existing methods by incorporating more functions and features, (3) improvements to current models and algorithms with experimental evaluation. The minimal requirement is that each project must have an experimental section with results. Most deep learning code requires GPU, thus students are required to have access to GPU.

Project milestones are as follows:

Project proposal: Each team is required to discuss their project proposal with the instructor and submit a one-page proposal before the meeting.

Mid-term report: Each team is required to submit a mid-term report of 3 pages to report the results of project. Preliminary experimental results and plan for the remaining parts of the project are required.

Final report and presentation: At the end of semester, each team will be asked to submit a report (minimum of 6 pages excluding references) and do a presentation on their research project. The presentation should be done by all team members and the contributions of each team member should be made clear in both presentation and in report.

Students are encouraged to use LaTex for typesetting and the NeurIPS LaTex template (https://nips.cc/) is highly recommended.

Example projects from Stanford Deep Learning classes can be found at:
http://cs231n.stanford.edu/project.html

Late Policies

For homework assignment, 25% is deducted for each late day for up to three days (including weekends) after which submissions are not accepted. Late project reports will not be accepted. Student Rule 7 explains attendance policies and excused absences. https://student-rules.tamu.edu/rule07/

Grading Scale

Final letter grades will be based on absolute percentage as follows:
A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60

Course Topics, Calendar of Activities, Major Assignment Dates

Week	Topic	Required Reading

1	Introduction to machine learning	Chapter 1
2	Introduction to deep learning	Chapter 1
3	Loss functions and shallow models	Chapter 2
4	Loss functions and shallow models	Chapter 2, Project proposal due
5	Training and optimization	Chapter 3
6	Training and optimization	Chapter 3
7	Regularization and generalization	Chapter 4, Exam 1
8	Regularization and generalization	Chapter 4, Project mid-term report due
9	Convolutional neural networks	Chapter 8
10	Convolutional neural networks	Chapter 8
11	Recurrent neural networks	Chapter 7
12	Advanced topics	Chapter 10
13	Project presentation	
14	Project presentation	Project final report due

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity

All homework assignments are individual and collaboration among students is strictly prohibited. Project reports should be treated as scientific publications, and all rules governing paper-writing apply.

For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."