STOR566: Introduction to Deep Learning

Lecture 1: Overview

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UNC Chapel Hill

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Outline

- Course information
- Overview of machine learning

Course Information - Instructor

Instructor:

- Name: Yao Li
- Email: yaoli@email.unc.edu
- Office Hours: W 4PM-5PM, Hanes 334
- Course Website: `https://liyao880.github.io/stor566/`

Course Information - Tutorial

Tutorial

- Length: 30 - 40 min
- Topic: homework review and coding
- Time: Check the Course Website

Don't forget to bring your laptop on tutorial day.

Course Information - Assistant

TA:

- Name: Kyung Rok Kim
- Email: kkrok@unc.edu
- Office Hours: M 10AM - 12PM
- zoom link:

Grader:

- Name: Chengze Xie
- Email: cxie@unc.edu

Course Information - General

- There is no textbook. Most of the topics are covered in

  "Elements of Statistical Learning" (by Friedman, Tibshirani, and Hastie)

  "Deep Learning" (by Goodfellow, Bengio, Courville)

Topics

- Deep Learning Foundation
  - Background (Linear model, loss function, generalization)
  - Optimization
  - Neural network and back-propagation
  - Basic training techniques (e.g., dropout, normalization)
- Convolutional Neural Network and Computer Vision:
  - CNN, GAN, ...
- Recurrent neural network and NLP:
  - RNN, word2vec, NLP pipeline
- Transformer for Vision and NLP
- Graph neural networks
- Advanced topics:
  - Adversarial Robustness
  - Interpretability
  - ...

Grading

- Homework (40%)
  - 5 homeworks (tentative)
- Final project (50%)
- Participation (10%)

A	94 to 100	B	83 to 86.99	C	73 to 76.99	D	60 to 66.99
A-	90 to 93.99	B-	80 to 82.99	C-	70 to 72.99	F	0 to 59.99
B+	87 to 89.99	C+	77 to 79.99	D+	67 to 69.99		

Homework

- Around 5 homeworks will be assigned and will be collected via Canvas.
- Late homework will receive a grade of 0.
- You are allowed to work with other students but identical solutions will receive 0.
- Questions regarding HW grade should be addressed to the grader.

Participation

Quiz:

- There will be around 10 in-class quizzes.
- The final participation score would be $10 \times n \times \frac{m}{n}$
- n: the total number of quizzes
- m: total scores you got from all the quizzes. Each quiz is worth 0 to 1 point.

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Extra credit: Paper presentation

- Score: 10 points.
- Check the paper list on the course website.
- Discuss with the instructor.
- Each student can only do it once. Each paper can have at most two presenters.

Final project

- Group of 4 students.
- Form the group before August 30th, and sign up using the shared spreadsheet.
- Four parts:
  1. Project Proposal (10%)
  2. Project Presentation (30%)
  3. Project Paper (50%)
  4. Peer score (10%)

Final project - Topics

- Work on some research projects:
  - Solve an interesting problem or new problem with existing method
  - Develop a new algorithm
  - Compare state-of-the-art algorithms on some problems
  - ...
- I'll recommend some topics in the course.

Final project - Proposal

Project Proposal:

- Page limit: 2 (excluding reference)
- Latex template at link
- Contains:
  1. Problem Description
  2. Related Works
  3. Proposed Work
  4. Evaluation Metric
  5. Reference
- Project Proposal Meeting

Final project - Presentation

Project Presentation:

- All groups will present their final projects in the last two lectures before Thanksgiving.
- Every group member is expected to join the presentation.
- The length of the presentation depends on the number of groups (10–20min).

Final project - Paper

Project Paper:

- Each team must submit a written project report:
  - Introduction
  - Related Works
  - Proposed Work
  - Experiments
  - Conclusion and Future Directions
- It is required to use the NeurIPS Latex style files and submit the report in PDF format.
- The report should be less than 8 pages (excluding references).

Final project - Peer Review

Peer score:

- Each group member should score every person in their group on a continuous scale from 0 (Bad) to 10 (Good).
- Deadline: same as the project paper
- Survey: link
- 2 points penalty for late or no submission

Final project - Important Dates

Important Dates:

Part	Description	Method of Submission	Due Date (Time)
P1	Project Proposal	Canvas	Sep. 29 (11:59PM)
	Proposal Meeting	Hanes 334	Oct. 01 / Oct. 03 (3:30PM-4:45PM)
P2	Presentation Slides	Canvas	Nov. 20 / Nov. 25 (11:59PM)
	Final Presentation	Class	Nov. 21 / Nov. 26 (3:30PM-4:45PM)
P3	Final Report	Canvas	Dec. 04 (11:59PM)
P4	Peer Score	Google Survey	Dec. 04 (11:59PM)

Thank you