CS 594: Deep Learning for Natural Language Processing
Fall 2020

Course Information & Syllabus

Instructor: Cornelia Caragea
Office: 3-190E Daley Library, Chicago, IL 60607-7053
Email: cornelia@uic.edu
WWW: https://www.cs.uic.edu/∼cornelia/

Course Objectives: Natural language processing (NLP) is one of the most important technologies today due to the large and growing amount of online text that needs to be understood in order to get the enormous value out of it. Although many machine learning models have been developed for NLP applications, recently, deep learning approaches have achieved remarkable results across many NLP tasks. The course provides an introduction to research in deep learning applied to NLP. We will cover topics such as word vector representations, convolutional neural networks, recurrent neural networks, and long-short-term-memory networks. We will also cover tools and software available for building and training deep neural networks. Through lectures and programming and reading assignments students will learn the necessary skills for applying and designing neural networks for practical NLP problems.

Course Work and Evaluation: Students will be evaluated based on reading and programming assignments, quizzes, and a class project. Classes are help online asynchronous. Students are encouraged to view lectures online and ask questions during office hours.

The grading criterion is shown below:

Section	Weight
Reading Assignments	20%
Programming Assignments	30%
Quizzes	20%
Class Project	30%

Collaboration policies:
- Students are encouraged to discuss the course material, concepts, and assignments, but they must write their answers independently.
- For each assignment, students are required to list other students with whom they have discussed the assignment.
- Students' submissions should reflect their own knowledge and they should be able to reproduce the material they turn in at any time.
- Sharing answers will not be tolerated.

Prerequisites: Linear algebra and calculus, machine learning, natural language processing. CS 412: Introduction to Machine Learning; CS 421: Natural Language Processing.

Targeted audience: *Graduate students from Computer Science and related areas.*

Textbooks:
- Neural Network Methods for Natural Language Processing (Synthesis Lectures on Human Language Technologies), by Yoav Goldberg.

- Deep Learning by Ian Goodfellow, Yoshua Bengio and Aaron Courville. Online version available at: https://www.deeplearningbook.org/.

- Introduction to Deep Learning, by Eugene Charniak.

Tentative topics: The tentative topics for the course are as follows:

1	08/24	Intro to NLP and Deep Learning
2	08/31	Word Embeddings (word2vec, Glove, FastText)
3	09/07	No class (Labor Day)
4	09/14	Word Window Classification and Neural Networks
5	09/21	Language Models and Recurrent Neural Networks
6	09/28	Recurrent Neural Networks Variants (LSTMs and GRUs)
7	10/05	Sequence-to-Sequence Models and Attention Mechanisms
8	10/12	Natural Language Generation - Evaluation and Metrics
9	10/19	Convolutional Neural Networks for Sentence Classification
10	10/26	Transformers and Self-Attention
11	11/02	Bidirectional Encoder Representations from Transformers (BERT)
12	11/09	Multi-Task Learning and Transfer Learning
13	11/16	Adversarial Learning
14	11/23	Auto-encoders
15	11/30	Project Presentations
16	12/08	Final week (project report due)

Students with Disabilities: Any student with a disability who needs an accommodation or other assistance in this course should make an appointment to speak with one of the instructors as soon as possible.