

COSC 7336
Advanced Natural Language Processing:
Deep Learning for Text Analysis and Understanding
Fall 2017
Syllabus

Course Information

Instructors: Fabio Gonzalez, fagonzalez@unal.edu.co,
Office Hours: MW 5:30-6:30pm in PGH 589 or by appointment.
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Office Hours: W 3:30-4:30 in PGH 584 or by appointment.

Lecture times: Fridays, 4:00PM - 7:00PM in AH 108.

Class website: <https://fagonzalezo.github.io/dl-tau-2017-2/>

Description

The goal of the course is to study deep learning models, i.e. neural networks with several layers, and their application to solve challenging Natural Language Processing (NLP) problems. The course will cover the foundations of deep learning models as well as the practical issues associated with their design, implementation, training and deployment. A hands-on approach will be used through the course focused on solving different NLP tasks motivated by real world problems.

Prerequisites

This course is intended for students that have taken COSC 6336 Introduction to Natural Language Processing. The course assumes knowledge and understanding of machine learning basic concepts, such as those studied in an introductory machine learning or data mining class, as well as knowledge of fundamental concepts of linear algebra and probability theory. The course also requires familiarity with programming in Python, as there will be several practical assignments.

Textbook

[Goodfellow2016] Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press. <http://www.deeplearningbook.org/>

Major Topics

The course has two main axes: the first has to do with the problem domain, which is text analysis and understanding, and the second with the methods to address this problem that are based on neural networks in general, and deep learning in particular. The tentative topics that we plan to address, subject to changes, on both axes, are the following:

- Deep learning (DL):
 - Review of machine learning and neural networks fundamental concepts
 - Computational frameworks for neural network implementation
 - DL models:
 - Convolutional neural networks
 - Recurrent neural networks (RNN): including LSTM, GRU, sequence to sequence RNN, bidirectional RNNs.
 - Attention models
 - Other models: generative adversarial networks, memory neural networks.
- Text analysis and understanding:
 - Review of natural language processing and analysis fundamental concepts.
 - Word level semantics
 - Text classification: book recommendation, author profiling, author identification, text categorization
 - Language modeling: real-word error correction
 - Conditional language models: summarization, translation, image captioning
 - Textual Similarity: community question answering, paraphrase detection, text entailment

Grading:

Final grades will be based on a combination of a final project, assignments, and one midterm exam. The approximate percentages are as follows:

- 45% - Assignments (mini projects, 3 total, each worth 15%)
- 20% - Midterm exam (tentative date: October 20th)
- 10% - Paper presentations
- 25% - End of semester project (includes proposal, final report and poster presentation)

Additionally, any one of the following will result on a final grade of F, even if the overall average is greater than 60%.

- Obtaining an average of less than 60% on the assignments
- Obtaining an average of less than 60% on the exam
- Missing more than four lectures

The nominal percentage-score-to-letter-grade conversion is as follows:

89 and above	A
86 – below 89	A-
83 – below 86	B+
79 – below 83	B
75 – below 79	B-
72 – below 75	C+
69 – below 72	C
66 – below 69	C-
60 – below 66	D
0 - below 60	F

We reserve the right to adjust these criteria downward, e.g., so that 85% represents an A-, based on overall class performance. The criteria will not be adjusted upward, however. These decisions are made only by the instructor's team.

Late assignments:

There will be no rescheduling of the assignments due dates. All assignments up to one day late will receive up to 80% percent of full credit. Assignments submitted more than one day late will receive no credit.

Collaboration:

Discussion of homework and projects among students is encouraged, but your answers and your code should be written and tested by you alone. **Do not exchange programs or let someone look at your code or solutions, even if "just so they can see how you did it."** If you need help, consult the instructor or the TA. Do not post your code anywhere online.

Standards of Conduct and Academic Dishonesty:

You are expected to conduct yourself in a professional and courteous manner, as prescribed by the UH Student Code of Conduct. Academic dishonesty includes but is not limited to abetting, cheating, plagiarism, fabrication and misrepresentation. *Abetting* involves collaborating with another person to commit an academically dishonest act, for instance allowing another student to copy your homework or present your work as their own. *Cheating* may involve copying from another student, or possessing unauthorized materials during a test. *Plagiarism* occurs when someone represents the work or ideas of another person as his/her own. *Fabrication* is the act of presenting falsified data as genuine. Examples of *misrepresentation* include falsifying data (for example program outputs) in laboratory reports or projects.

Any violation of the UH Student Code of Conduct will result in a grade of 0 for the given assignment and possible failure of the course and a report to the Dean of Students.

Disabilities:

If you feel that you may have a disability that requires accommodation, contact the Center for students with disabilities at (713)- 743-5400, or email: uhcsd@central.uh.edu

Counseling:

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to the demands of a professional program, or feeling sad and hopeless. You can reach CAPS (www.uh.edu/caps) by calling [713-743-5454](tel:713-743-5454) during and after business hours for routine appointments or if you or someone you know is in crisis. No appointment is necessary for the "Let's Talk" program, a drop-in consultation service at convenient locations and hours around campus. http://www.uh.edu/caps/outreach/lets_talk.html