

CS224n: Natural Language Processing with Deep Learning

(index.html)

Schedule and Syllabus

Unless otherwise specified the course lectures and meeting times are:

Tuesday, Thursday 4:30-5:50

Location: NVIDIA Auditorium (https://campus-map.stanford.edu/?srch=NVIDIA+Auditorium)

Event	Date	Description	Course Materials
Lecture	Jan 10	Introduction to NLP and Deep Learning	Suggested Readings: 1. [Linear Algebra Review (http://cs229.stanford.edu/section/cs229-linalg.pdf)] 2. [Probability Review (http://cs229.stanford.edu/section/cs229-prob.pdf)] 3. [Convex Optimization Review (http://cs229.stanford.edu/section/cs229-cvxopt.pdf)] 4. [More Optimization (SGD) Review (http://cs231n.github.io/optimization-1/)]
			[python tutorial (http://cs231n.github.io/python-numpy-tutorial/)] [slides (lectures/cs224n-2017-lecture1.pdf)] [Lecture Notes 1 (lecture_notes/cs224n-2017-notes1.pdf)]
Lecture	Jan 12	Word Vector Representations: word2vec	Suggested Readings: 1. [Word2Vec Tutorial - The Skip-Gram Model (http://mccormickml.com/2016/04/19/word2vec-tutoria the-skip-gram-model/)] 2. [Distributed Representations of Words and Phrases and their Compositionality (http://papers.nips.cc/paper/5021-distributed-representations-of-words-and-phrases-and-their-compositionality.pdf)] 3. [Efficient Estimation of Word Representations in Vector Space (http://arxiv.org/pdf/1301.3781.pdf)]
			[slides (lectures/cs224n-2017-lecture2.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture2-highlight.pdf)] [paper (https://openreview.net/pdf?id=SyK00v5xx)]
A1 released	Jan 12	Assignment #1 released	[Assignment 1 (assignment1/index.html)][Written solution (assignment1/assignment1_soln.pdf)]
Lecture	Jan 17	Advanced Word Vector Representations	Suggested Readings: 1. [GloVe: Global Vectors for Word Representation (http://nlp.stanford.edu/pubs/glove.pdf)] 2. [Improving Distributional Similarity with Lessons Learned fromWord Embeddings (http://www.aclweb.org/anthology/Q15-1016)] 3. [Evaluation methods for unsupervised word embeddings (http://www.aclweb.org/anthology/D15-1036)]
			[slides (lectures/cs224n-2017-lecture3.pdf)] [Lecture Notes 2 (lecture_notes/cs224n-2017-notes2.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture3-highlight.pdf)] [paper (https://arxiv.org/pdf/1601.03764v2.pdf)]
Lecture	Jan 19	Word Window Classification and Neural Networks	Suggested Readings: 1. cs231n notes on [backprop (http://cs231n.github.io/optimization-2/)] and [network architectures (http://cs231n.github.io/neural-networks-1/)] 2. [Review of differential calculus (lecture_notes/cs224n-2017-review-differential-calculus.pdf)] 3. [Natural Language Processing (almost) from Scratch (https://arxiv.org/pdf/1103.0398v1.pdf)] 4. [Learning Representations by Backpropogating Errors (http://www.iro.umontreal.ca/~vincentp/ift3395/lectures/backprop_old.pdf)]
			[slides (lectures/cs224n-2017-lecture4.pdf)] [Lecture Notes 3 (lecture_notes/cs224n-2017-notes3.pdf)]

Lecture	Jan 24	Backpropagation and Project Advice	Suggested Readings: 1. [Vector, Matrix, and Tensor Derivatives (http://cs231n.github.io/optimization-2/)] 2. Section 4 of [A Primer on Neural Network Models for Natural Language Processing (http://u.cs.biu.ac.il/~yogo/nnlp.pdf)] [slides (lectures/cs224n-2017-lecture5.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture5-highlight.pdf)] [paper (https://arxiv.org/pdf/1607.01759.pdf)]
Lecture	Jan 26	Dependency Parsing	 Suggested Readings: Joakim Nivre. 2004. Incrementality in Deterministic Dependency Parsing (https://www.aclweb.org/anthology/W/W04/W04-0308.pdf). Workshop on Incremental Parsing. Danqi Chen and Christopher D. Manning. 2014. A Fast and Accurate Dependency Parser using Neural Networks (http://cs.stanford.edu/people/danqi/papers/emnlp2014.pdf). EMNLP 2014. Sandra Kübler, Ryan McDonald, Joakim Nivre. 2009. Dependency Parsing (http://www.morganclaypool.com/doi/abs/10.2200/S00169ED1V01Y200901HLT002). Morgan and Claypool. [Free access from Stanford campus, only!] Daniel Andor, Chris Alberti, David Weiss, Aliaksei Severyn, Alessandro Presta, Kuzman Ganchev, Slav Petrov, and Michael Collins. 2016. Globally Normalized Transition-Based Neural Networks (https://arxiv.org/pdf/1603.06042.pdf). ACL 2016. Marie-Catherine de Marneffe, Timothy Dozat, Natalia Silveira, Katri Haverinen, Filip Ginter, Joakim Nivre and Christopher D. Manning. 2014. Universal Stanford Dependencies: A cross-linguistic typology. Proceedings of the Ninth International Conference on Language Resources and Evaluation (LREC-2014). Revised version for UD v1. (http://nlp.stanford.edu/~manning/papers/USD_LREC14_UD_revision.pdf) Universal Dependencies website (http://universaldependencies.org/)
			[slides (lectures/cs224n-2017-lecture6.pdf)] [Lecture Notes 4 (lecture_notes/cs224n-2017-notes4.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture6-highlight.pdf)] [paper (https://levyomer.files.wordpress.com/2015/03/improving-distributional-similarity-tacl-2015.pdf)]
A1 Due	Jan 26	Assignment #1 due	
A2 Released	Jan 26	Assignment #2 released	[Assignment 2 (assignment2/index.html)][Written solution (assignment2/assignment2-soln.pdf)]
Lecture	Jan 31	Introduction to TensorFlow	Suggested Readings: 1. [TensorFlow Basic Usage (https://www.tensorflow.org/get_started/basic_usage)]
			[slides (lectures/cs224n-2017-tensorflow.pdf)] [Lecture Notes Tensorflow (lecture_notes/cs224n-2017-tensorflow.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture7-highlight.pdf)] [paper (https://arxiv.org/pdf/1611.08669v2.pdf)]
Lecture	Feb 2	Recurrent Neural Networks and Language Models	[slides (lectures/cs224n-2017-lecture8.pdf)] [vanishing grad example (lectures/vanishing_grad_example.html)] [vanishing grad notebook (lectures/vanishing_grad_example.ipynb)] Spotlight: [slides (lectures/cs224n-2017-lecture8-highlight.pdf)] [paper (http://www.petrovi.de/data/acl15.pdf)]
Lecture	Feb 7	Machine translation and advanced recurrent LSTMs and GRUs	[slides (lectures/cs224n-2017-lecture9.pdf)] [Lecture Notes 5 (lecture_notes/cs224n-2017-notes5.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture9-highlight.pdf)] [paper 1 (http://www.fit.vutbr.cz/~imikolov/rnnlm/char.pdf)] [paper 2 (https://openreview.net/pdf?id=H1VyHY9gg)] [paper 3 (https://arxiv.org/abs/1602.02410)]
Review	Feb	Midterm Review	[slides (lectures/cs224n-midterm-review.pdf)]
	Гоb	Final project	[Project page (project.html)]
Project Proposal Due	Feb 9	proposal due	

A3 Released	Feb 13	Assignment #3 released	[Assignment 3 (assignment3/index.html)][Written solution (assignment3/assignment3-soln.pdf)]
Midterm	Feb 14	In-class midterm	[Gradient Computation Notes (lecture_notes/cs224n-2017-gradient-notes.pdf)] Practice midterms: [Midterm 1 (lectures/cs224n-practice-midterm-1.pdf)] [Midterm 2 (lectures/cs224n-practice-midterm-2.pdf)] [Midterm 1 Solutions (restricted/cs224n-practice-midterm-1-sol.pdf)] [Midterm 2 Solutions (restricted/cs224n-practice-midterm-2-sol.pdf)]
Lecture	Feb 16	Neural Machine Translation and Models with Attention	Suggested Readings: 1. [Sequence to Sequence Learning with Neural Networks (https://arxiv.org/pdf/1409.3215.pdf)] 2. [Neural Machine Translation by Jointly Learning to Align and Translate (https://arxiv.org/pdf/1409.0473.pdf)] 3. [Effective Approaches to Attention-based Neural Machine Translation (http://nlp.stanford.edu/pubs/emnlp15_attn.pdf)]
			[slides (lectures/cs224n-2017-lecture10.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture10-highlight.pdf)] [paper (https://arxiv.org/abs/1611.04558)]
Lecture	Feb 21	Gated recurrent units and further topics in NMT	Suggested Readings: 1. [On Using Very Large Target Vocabulary for Neural Machine Translation (https://arxiv.org/pdf/1412.2007.pdf)] 2. [Pointing the Unknown Words (https://arxiv.org/pdf/1603.08148.pdf)] 3. [Neural Machine Translation of Rare Words with Subword Units (https://arxiv.org/pdf/1508.07909.pdf)] 4. [Achieving Open Vocabulary Neural Machine Translation with Hybrid Word-Character Models (https://arxiv.org/pdf/1604.00788.pdf)]
			[slides (lectures/cs224n-2017-lecture11.pdf)] [Lecture Notes 6 (lecture_notes/cs224n-2017-notes6.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture11-highlight.pdf)] [paper (https://arxiv.org/pdf/1611.05358.pdf)]
Lecture	Feb 23	End-to-end models for Speech Processing	[slides (lectures/cs224n-2017-lecture12.pdf)]
A3 Due	Feb 25	Assignment #3 due	
A4 Released	Feb 25	Assignment #4 released	Default final project [Assignment 4 (assignment4/index.html)]
Lecture	Feb 28	Convolutional Neural Networks	Suggested Readings: 1. [A Convolutional Neural Network for Modelling Sentences (http://www.aclweb.org/anthology/P14-1062)] 2. [Convolutional Neural Networks for Sentence Classification (http://www.aclweb.org/anthology/D14-1181)] [slides (lectures/cs224n-2017-lecture13-CNNs.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture13-highlight.pdf)] [paper (https://arxiv.org/pdf/1508.06615.pdf)]
Lecture	Mar 2	Tree Recursive Neural Networks and Constituency Parsing	Suggested Readings: 1. [Parsing with Compositional Vector Grammars
			[Lecture Notes 7 (lecture_notes/cs224n-2017-notes7.pdf)] Spotlight: [slides (lectures/cs224n-2017-lecture14-highlight.pdf)] [paper (https://arxiv.org/pdf/1606.01541.pdf)]

Lecture	Mar	Coreference	Suggested Readings:
	7	Resolution	 [Easy Victories and Uphill Battles in Coreference Resolution (http://www.aclweb.org/anthology/D13 1203)]
			2. [Deep Reinforcement Learning for Mention-Ranking Coreference Models
			(http://cs.stanford.edu/people/kevclark/resources/clark-manning-emnlp2016-deep.pdf)]
			[slides (lectures/cs224n-2017-lecture15.pdf)]
Lecture	Mar	Dynamic Neural	[slides (lectures/cs224n-2017-lecture16-DMN-QA.pdf)]
	9	Networks for	[Lecture Notes 8 (lecture_notes/cs224n-2017-notes8.pdf)]
		Question	Spotlight: [slides (lectures/cs224n-2017-lecture16-highlight.pdf)] [paper
		Answering	(http://www.jmlr.org/proceedings/papers/v37/piech15.pdf)]
Lecture	Mar	Issues in NLP	[slides (lectures/cs224n-2017-lecture17.pdf)]
	14	and Possible	Spotlight: [slides (lectures/cs224n-2017-lecture17-highlight.pdf)] [paper
		Architectures for NLP	(http://www.aclweb.org/anthology/N16-1181)]
Lecture	Mar	Tackling the	[slides (lectures/cs224n-2017-lecture18.pdf)]
	16	Limits of Deep	Spotlight: [slides (lectures/cs224n-2017-lecture18-highlight.pdf)] [paper 1
		Learning for NLP	(https://arxiv.org/pdf/1410.5401.pdf)] [paper 2
			(http://www.nature.com/nature/journal/v538/n7626/pdf/nature20101.pdf)]
Final Project	Mar	Final course	
Due	17	project /	
		Assignment #4	
		due	
Poster	Mar	Final project	12:15-3:15, Lathrop Library Second Floor
Presentation	21	poster	[Piazza Post on Logistics (https://piazza.com/class/iw9g8b9yxp46s8?cid=2527)] [Facebook Event
		presentations	(https://www.facebook.com/events/277533656001374/?
			notif_t=plan_admin_added¬if_id=1489444386772633)]