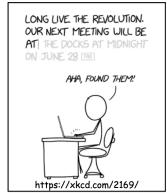
Print to PDF Important links

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WHEN YOU TRAIN PREDICTIVE MODELS ON INPUT FROM YOUR USERS, IT CAN LEAK INFORMATION IN UNEXPECTED WAYS.

DSCI 575 Advanced Machine Learning

- Course Jupyter book
- Course GitHub page
- Slack Channel
- Canvas
- Gradescope
- Class + office hours calendar

In this course, we will learn some advanced machine learning methods in the context of natural language processing (NLP) applications, including Markov chains, hidden Markov models, recurrent neural networks, and self-attention and transformers.

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This course will be run in person. We will meet three times every week: twice for lectures and once for the lab. You can refer to the <u>Calendar</u> for lecture and lab times and locations. Lectures of this course will be a combination traditional live lecturing, class activities, and prerecorded videos. Drafts of the lecture notes for each week will be made available earlier in the week.

This course occurs during **Block 6** in the 2024/25 school year.

Lecture	Торіс	Assigned videos/Readings	Resources and optional readings
0	Course Information	Videos: <u>16.1</u>	
1	Markov Models		Markov chains in action
2	Language models, PageRank, text preprocessing	Videos: <u>16.2</u>	 OpenAl GPT3 demo Dan Jurafsky's videos on PageRank Dan Jurafsky's video on tokenization
3	Hidden Markov models		 Nando de Freitas' lecture on HMMs A gentle intro to HMMs by Eric Fosler-Lussier
4	HMMs decoding and inference)	(optional) HMM Baum- Welch (unlisted)	 Nando de Freitas' lecture on HMMs A gentle intro to HMMs by Eric Fosler-Lussier
5	Introduction to Recurrent Neural Networks (RNNs)		 The Unreasonable Effectiveness of Recurrent Neural Networks Highly recommended: Sequence Processing with Recurrent Networks

Lecture	Торіс	Assigned videos/Readings	Resources and optional readings
6	Introduction to Transformers	 Videos: <u>Introduction</u> <u>to Self-Attention</u> 	
7	Applications of Transformers		
8	Large Language Models		

The labs are going to be in person. There will be a lot of opportunity for discussion and getting help during lab sessions. Please make good use of this time.

We are providing you with a conda environment file which is available <u>kere</u>. You can download this file and create a conda environment for the course and activate it as follows.

```
conda env create -f env-dsci-575.yml
conda activate 575
```

We've only attempted to install this environment file on a few machines, and you may encounter issues with certain packages from the yml file when executing the commands above. This is not uncommon and may suggest that the specified package version is not yet available for your operating system via conda. When this occurs, you have a couple of options:

- 1. Modify the local version of the yml file to remove the line containing that package.
- 2. Create the environment without that package.
- 3. Activate the environment and install the package manually either with conda install or pip install in the environment.

Note that this is not a complete list of the packages we'll be using in the course and there might be a few packages you will be installing using conda install later in the course. But this is a good enough list to get you started.

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Please see the general MDS policies.