First half of the course:

- Introduction (Aug 27–29)
- Regular expressions (Sept 3–5)
- Edit distance (Sept 8)
- Information theory (Sept 10–12)
- Language models (Sept 13–22)
- Parts of speech and HMMs (Sept 22–Oct 3)
- Parsing (Oct 6–Oct 13)
- Review (Oct 15)
- Midterm (Oct 17)

Second half of the course:

- Introduction (Oct 24-27)
- Naïve Bayes Classification (Oct 29–Nov 3)
- Stylometry (Nov 5–Nov 10)
- Neural nets (Nov 12–14)
- Word embeddings (Nov 17–19)
- Machine translation (Nov 21–Dec 3)
- Large language models (Dec 5–Dec 10)

Machine learning is a form of applied statistics with emphasis on the use of computers to statistically estimate complicated functions.

<div align="right">Goodfellow et al., Deep Learning, 2016. Pg 95.</div>

Machine learning is the science (and art) of programming computers so they can learn from data. [In 1959, Arthur Samuel defined machine learning as the] field of study that gives computers the ability to learn without being explicitly programmed.

<div align="right">Géron, Hands-On Machine Learning, 2019. Pg 2.</div>

[Machine learning is] a set of methods that can automatically detect patterns in data and then use the uncovered patterns to predict future data or to perform other kinds of decision-making under uncertainty.

<div align="right">Murphy, Machine Learning: A Probabilistic Perspective, 2012. Pg 1.</div>

Machine learning main tasks:

- ▶ Regression, where the target type is $\mathbb{R}$
- ▶ Classification, where the target type is a finite set
    - ▶ Binary classification, where the target is $\{F, T\}$ (or $\{0, 1\}$ or $\{-1, 1\}$ ...)
- ▶ Density estimation, where the target type is $[0, 1]$.

Other machine learning tasks (see Goodfellow, *Deep Learning*, pg 96–100):

- ▶ Transcription, where the observations are unstructured and the targets are text.
- ▶ Machine translation, where the observations and targets are text.
- ▶ Anomaly detection, where the targets are indicators of whether the observation is atypical.
- ▶ Synthesis and sampling, where there are no observations in deployment, but rather the program produces new observations similar to those in training.
- ▶ Denoising, where the targets are corrected versions of the observations.

Coming up:

- ▶ Do CKY parsing programming assignment (Mon, Oct 27)
- ▶ Take ML basics and bag-of-words quiz (Tues, Oct 28)
- ▶ Read J&M B.(0-8, 10). (Fri, Oct 31)