COMS30035, Machine learning:
Unit Overview

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Teaching Strategy

- In an ideal world this unit would both be:

  Broad Covering many ML models and methods, and
  Deep Enabling a thorough understanding of each of them

- But time constraints makes this impossible.
- The unit is reasonably broad but this means that some depth has been sacrificed.
- So there is less maths than there might be (sorry about that).
- A key objective is that when presented with a new data analysis task you can choose an appropriate method (since you know what modelling assumptions are made by that method), and moreover you know where to find and use the software that implements it.

Important topics that are missing

Pretty much all of the *Foundations* chapter of Murphy's *Probabilistic Machine Learning An Introduction* is missing . . .

- ▶ Lots of important maths (esp. linear algebra)
- ▶ Most of statistics
- ▶ Dimensionality reduction
- ▶ Optimisation algorithms
- ▶ Conjugate Bayesian analysis
- ▶ Reinforcement learning
- ▶ Inductive Logic Programming
- ▶ Causal machine learning (that's my area, so it's important of course)

Relation to other units

- ▶ Everyone on this unit will have done:
  1. *Mathematics for Computer Science A* (COMS10014)
  2. *Mathematics for Computer Science B* (COMS10013)
  3. *Algorithms and Data* (COMS20017)
- ▶ So we don't reteach material from those units (so e.g. no PCA).
- ▶ *Applied Data Science* (COMS30050) has a different 'angle': focusing on practical issues such as data cleaning, deploying ML solutions, ethics of ML, etc.
- ▶ If you're on the MEng then *Applied Deep Learning* (COMSM0043) "introduces the students to the latest deep architectures," and allows students "to learn about the state-of-the-art in Deep Learning."
- ▶ In this unit we do one week on deep learning.

Schedule