Advanced Machine Learning: Course Overview

Rich Turner

Course Overview and Schedule

Non-linear dimensionality reduction (2L, RET)

Embedding methods, auto-encoders, multi-view extensions

Bayesian Neural Networks and Approximate Inference (4L, RET)

Bayesian Neural Networks
Approximate Inference: Laplace's method, variational Inference, Hamiltonian Monte Carlo

Neural Processes and Meta-learning (2L, RET)

meta-learning, conditional neural processes, neural processes

Approximate Inference for Gaussian Processes (2.5L, RET)

pseudo-points, variational free-energy methods and EP

Sequential Monte Carlo (2.5L, RET)

Importance sampling, sequential importance sampling, particle filtering

Plus guest lectures: **Trustworthy Machine Learning** (Adrian Weller) and **Probabilistic Programming** (Hong Ge)

Assessment: Paper Replication Exercise

Task

Replicate (optionally extend) experiments in a published paper

List of suggested papers will be provided, but additional suggestions will be considered

Teams of three people (we will make the assignment randomly)

MPhil students separate from others taking MLMI4 for credit

Timings

issued today

initial plan (paper selection, rough plan) emailed to me by 12pm on the first day of week 4

preliminary results will be presented at a **poster session** that takes place on the Monday after lectures have finished [35%]

written report from each group will be due ten days after the poster session [65%]

MLMI Teams

team 1	Benedict King, Alistair McLeay, Adrian Black
team 2	Stuart Burrell, Patrik Gergely, Ana Sofia Uzsoy
team 3	Shane Weisz, Anthony Buonomo, Yuang Li
team 4	Federico Barbero, Kaiqu Liang, Haoran Peng
team 5	David Goldfarb, Alejandro Santorum Varela, Vishaal Udandarao
team 6	Ryan Anderson, Lucia Lopez Rivilla, Trevor Clark
team 7	Alan Clark, Yufan Wang, Maximiliaan Bronckers
team 8	Haitz Sáez De Ocáriz Borde, Ryan Crowley, Katherine Collins

Other students taking course for credit: sign up using this **google doc** to let me know your team / or if you are in need of a team.