Supervised Learning (COMP0078)

**Description**

**Aims:**
This module covers supervised approaches to machine learning (ML). Our goal will be to gain intuition about a number of ML methodologies, how they function, where they perform well, poorly and so forth. These intuitions will be given as mathematical results which will be supported by proof.

**Learning outcomes:**
Gain in-depth familiarity with various classical and contemporary supervised learning algorithms, understand the underlying limitations and principles that govern learning algorithms and ways of assessing and improving their performance.

**Content:**
The course consists of both foundational topics for supervised learning such as Linear Regression, Nearest Neighbours and Kernelisation as well contemporary research areas such as multi-task learning and optimisation via proximal methods. In a given year topics will be drawn non-exclusively from the following:
- Nearest Neighbours;
- Linear Regression;
- Kernels and Regularisation;
- Support Vector Machines;
- Gaussian Processes;
- Decision Trees;
- Ensemble Learning;
- Sparsity Methods;
- Multi-task Learning;
- Proximal Methods;
- Semi-supervised Learning;
- Neural Networks;
- Matrix Factorization;
- Online Learning;
- Statistical Learning Theory;

**Key information**

**Year** 2019/20

**Credit value** 15 (150 study hours)

**Delivery** PGT L7, Campus-based

**Reading List** View on UCL website

**Tutor** Dr Mark Herbster

**Term** Term 1

**Timetable** View on UCL website

**Assessment**

**Find out more**
For more information about the department, programmes, relevant open days and to browse other modules, visit [ucl.ac.uk](http://ucl.ac.uk)

**Disclaimer:** All information correct as of August 2019. Please note that aspects of the module may be subject to change. UCL will make best efforts to inform applicants of major changes.
In order to be eligible to select this module, a student must be registered on a programme for which it is a formally-approved option or elective choice AND must have high competency with Multivariable Calculus, Probability and Combinatorics, and Linear Algebra such that they can reprove basic results as well as novel results.

The module is mathematical in nature; as such there is significant proportion devoted to formal theorems and proofs.

**Self-Assessment Test:**
Students should take the self-test available here: www.cs.ucl.ac.uk/SAT/SAT-COMP0078.pdf to assess their ability for this module.
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