COURSE DESCRIPTION

Machine learning is a scientific discipline concerned with the design and development of algorithms that allows computers to modify their actions based on empirical data. In the age of the data deluge it is very important to see the existing current techniques and to understand applications used in various disciplines of the natural and social sciences – including bioinformatics, financial engineering, robotics, data mining etc.

GOALS:

This course will provide a survey of some of the most popular machine learning algorithms, including neural networks, genetic algorithms, reinforcement learning, and statistical methods. Students will implement and test a subset of these algorithms on real data sets. Prerequisites for the course are COMP210 and Calculus.

COURSE STRUCTURE:

Weekly topics will be discussed during class. Short projects will be assigned. In addition, small groups will be formed to work on final projects.

THE ROLE OF THE TEACHING ASSISTANT:

Ildikó's main role is to supervise the short and final projects. If you have problem understanding the lecture or questions regarding the projects, please contact her via email.
to make an appointment.

**EXAM:**

There will be a final oral examination. Written and oral report on the group project is a pre-requisite of making the final examination.

**GRADES**

are calculated by your results of short projects (25%), report about a scholar paper (10%), final projects (25%), and final exams (40%).


There are lots of Python code examples in the book. Codes are available here: http://wwwist.massey.ac.nz/smarsland/MLbook.html

Further readings and supplementary materials: CMU, Andrew Moore's Statistical Data Mining Tutorials: http://www.autonlab.org/tutorials/

**DISCUSSION of scholar papers:**

During the second half of the quarter, several class sessions will be devoted to 20-30 minute discussions of research papers. Each student will be responsible for facilitating one of these discussion sessions. This will involve giving a brief overview of the paper as well as leading the discussion.

You should choose a scholar paper, preferentially from the Journal of Machine Learning Research:

http://jmlr.csail.mit.edu/papers/

**DETAILED TENTATIVE WEEKLY COURSE PLAN**
1. Introduction


2-3. The Multi-Layer Perceptron


4. Learning with Trees. Ensemble Learning


5. Probability and Learning


8. Reinforcement learning


10. Machine learning: where we are now?

Summary. Final projects reports. Open discussion forum. Preparation for the exam.

Short projects

Final projects

The final projects should be about Ranking! To be discussed with Raoul!!