CMPT 984 - G100 Spec.Top. Base-Mining-CMPT Bio

Instructor(s): Martin Ester, Maxwell Libbrecht

SFU Burnaby

Calendar Objective/Description:
Spec.Top. Base-Mining-CMPT Bio

Instructor's Objectives:
This course introduces machine learning methods for the life-sciences, focusing on molecular-level data, in particular genomic data. Such data plays a crucial role in precision medicine, e.g. drug response prediction, and in public health, e.g. the tracking of infectious diseases. However, genomic data poses special challenges to machine learning, due to the small number of examples (e.g. patients with clinical information) and great complexity of every example (e.g., SNP, CNV, RNA-seq, omics).

The instructors will start the course with a few tutorial-style introductions of foundations. Students will prepare and give presentations on a state-of-the-art research paper. Students will, in small groups, perform a course research project in which they reproduce and extend the results of a recent paper from one of the four given focus areas (see the Topics below). In the last phase of the course, students will present the results of their projects. General guidelines and strategies for writing clearly and giving good talks will be given, and students will receive constructive feedback on their presentations and project reports from the instructor and other students.

Prerequisites:
see go.sfu.ca

Topics:
- Epigenomics and gene regulation
- Microbial genomics and antibiotic resistance
- Precision medicine
- Single-cell data analysis

Grading:
Note the prerequisites: CMPT 726 (Machine Learning) or CMPT 741 (Data Mining) or equivalent. Please, consult with one of the instructors if you have not taken one of these two courses. Grading will be based on participation (10%), research paper presentation (30%), course project presentation (20%), course project report (40%). Details to be discussed in the first class.

Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).