Computing Workshop: Machine Learning – Syllabus

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Website http://computing-workshop.com/

Location B21, 651 rue Sherbrooke Ouest (Northeast corner of University street)

Time Mondays from 2:00PM to 4:00pm

Learning Goals

At the end of the workshop, participants will be able to:

- Describe at a high level what machine learning is and how it works, the uses and applications of machine learing, as well as the limits and ethical implications of machine learning;

- Explain in plain English the following algorithms work: k-nearest neighbour, decision trees, neural networks; k-means, and DBSCAN;

- Implement the following algorithms using the appropriate Python libraries: k-nearest neighbour, decision trees, and neural networks.

Lesson sequence

0. (January 14) Intro to machine learning and Python

1. (January 21) k-nearest neighbours

2. (January 28) Decision trees

3. (February 4) Neural networks

4. (February 11) Guest speaker and lab

5. (February 18) Other kinds of machine learning and ethics of machine learning

Description

This instance in Computing Workshop focuses on machine learning, a field of computer science that allows algorithms to "learn". This means improving a computer's performance on a given task without hardcoding the improvement. This workshop focuses on a handful of machine learning algorithms, covering how they work in plain English and how to code them in Python. We hope to give participants a general introduction to machine learning. This workshop ends with discussing at a high level the limits and ethics of machine learning.

Rationale

We created this workshop to provide a guided first step into machine learning to anyone interested in the subject. Machine learning is a highly popular field of computer science, and for good reason: when algorithms can learn, they can become a very powerful and practical tool that are increasingly employed in our daily lives. As these algorithms become more and more pervasive and influential in our society, it's important that people learn about machine learning so they can be informed as to the limitations, uses and potential misuses of these alrogithms. This workshop aims to provide participants with little to no coding background with a solid introduction to machine learning using hands on acitivites, laying the foundation for further exploration of the topic.