CMPT 1530: Data Science II with Python

EFFECTIVE DATE

March 2021

DEPARTMENT

Computers - City Centre

DESCRIPTION

Starting from the foundation material covered in Data Science I with Python, the student is introduced to a number of fundamental machine learning concepts through Python. These include linear regression, k-nearest neighbour solutions, neural networks, and deep learning. The course ends with a section on data ethics. This course assumes that the student has successfully completed Data Science I with Python, or brings to the class equivalent knowledge through prior experience or education. Required: A computer running Windows, MacOS, or Linux; stable high-speed internet connectivity; a microphone and webcam (ideal).

CREDITS

0.0

YEAR OF STUDY

Continuing Professional Development

PREREQUISITES

Data Science with Python I (CMPT 1520), or equivalent prior knowledge through experience and/or education.

COREQUISITES

None

COURSE LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

- Describe the notions of machine learning (ML) over- and under-fitting, the bias-variance trade-off, and feature extraction.
- Recognize ML problems that lend themselves to a k-nearest neighbour solution.
- Recognize those situations in which a linear regression solution is equivalent to a maximum likelihood solution.
- Identify an ML problem where multiple regression is to likely to lend itself to a more accurate solution.
- Apply appropriately, logistic regression to a binary classification problem.

- Identify all the key technical constructs of an artificial neural network (NN), including perceptrons, feed-forward neural networks, activation functions, and backpropagation.
- Apply in Python the deep learning (DL) notions of layers, loss, and optimization.
- Articulate and explain the fundamental data ethics principles as defined by DataEthics.eu.

PRIOR LEARNING ASSESSMENT & RECOGNITION (PLAR)

None

HOURS

Lecture: 10
Practicum: 0
Self-paced: 20
Other: 20

INSTRUCTIONAL STRATEGIES

GRADING SYSTEM

Satisfactory/Unsatisfactory

PASSING GRADE

S, based on minimum 80% attendance

EVALUATION PLAN

None

COURSE TOPICS

- Machine Learning
  K-Nearest Neighbour Solutions
  Linear Regression
  Neural Networks
  Deep Learning
  Logistic Regression
  Data Ethics

LEARNING RESOURCES

Data Science from Scratch by Joel Grus

Notes:

- Course contents and descriptions, offerings and schedules are subject to change without notice.
- Students are required to follow all College policies including ones that govern their educational experience at VCC. Policies are available on the VCC website at: https://www.vcc.ca/about/governance--policies/policies/.
- To find out how this course transfers, visit the BC Transfer Guide at https://www.bctransferguide.ca.

Broadway campus
1155 East Broadway
Vancouver, B.C. Canada
V5T 4V5

Downtown campus
250 West Pender Street
Vancouver, B.C. Canada
V6B 1S9

Annacis Island campus
1608 Cliveden Avenue
Delta, B.C. Canada
V3M 6P1

604.871.7000
vcc.ca

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