**159. 738 Advanced Machine Learning**

**Xiaofeng Zhu**

Machine learning focuses on teaching computers or developing computer programs to learn knowledge from data. The goal of this course is to give an introduction of advanced machine learning algorithms, i.e., deep learning. Upon completion of this course you will be able to apply advanced machine learning algorithms to extract knowledge from the data in enterprise and your domains.

**Details**

* Year: 2019
* Mode: Block
* Semester: Semester One full semester
* Location: Auckland Campus
* Coordinator: A/Pro Xiaofeng Zhu
* Subject: Information Technology
* College: College of Sciences

**Requirements**

* You may enrol in a postgraduate course (that is a 700-, 800- or 900-level course) if you meet the prerequisites for that course and have been admitted to a qualification which lists the course in its schedule.
* You should have been taken related courses, such as 159.740, 158.222 and 158.333. In particular, 159.740 explains the foundations of neural networks, while this course focuses on the applications of deep learning techniques.
* You should know Python already.

**Contact workshops/block courses**

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| --- | --- | --- | --- | --- |
| Delivery model | Venue | Start date | End date | Attendance |
| In Person | Auckland Campus | Thursday 07 March, 2019 | Saturday 09 March, 2019 | Compulsory |
| In Person | Auckland Campus | Thursday 02 May, 2019 | Saturday 05 May, 2019 | Compulsory |

**Learning outcomes**

Students who successfully complete this course should be able to:

* Describe in detail of deep learning algorithms including convolutional neural networks (CNNs), recurrent neural networks (RNNs), long/short-term memory networks (LSTMs), and their variants.
* Implement these deep learning algorithms by Python or Matlab.
* Improve the classical deep learning algorithms based on the demand of real applications.
* Apply these deep learning algorithms on different kinds of data sets, including text data, image data, audio data, and so on.

Please note: Learning Outcomes are subject to change until the beginning of the semester in which the course is delivered.

**Class timetable**

|  |  |
| --- | --- |
| Time | Topic |
| Thursday March 07  09:00 - 17:00 | Background of deep learning; Introduction of autoencoders, generative adversarial networks, etc. |
| Friday March 08  09:00 - 17:00 | Introduction of deep supervised learning, e.g., convolutional neural networks, AlexNet, GoogleLeNet, etc. |
| Saturday March 09  09:00 - 13:00 | Recurrent Neural Network, Long Short Term Memory network, gated recurrent units, etc. |
| Thursday May 02  09:00 - 17:00 | Transfer deep learning, combing shallowing learning with deep learning |
| Friday May 03  09:00 - 17:00 | Developing new deep learning models |
| Saturday May 04  09:00 - 13:00 | Presentation of developed deep learning models |

**Assessments**

During this course, the following assessments will contribute to your final mark.

|  |  |  |  |
| --- | --- | --- | --- |
| Assessment | | Weighting | Note |
| 1 | Presentation | 20% |  |
| 2 | Report | 50% |  |
| 3 | Computer Programming | 30% |  |

Please note: Assessment weightings are subject to change until the beginning of the semester in which the course is delivered.

\* Specific dates for assessments will be finalised in information provided on Stream at the start of the Course.

**Textbooks**

There are no set texts for this course.

**Classroom**

TBD