COMP9444
Neural Networks and Deep Learning

1a. Overview

Course Web Page

- https://www.cse.unsw.edu.au/~cs9444/19T3/
- https://webcms3.cse.unsw.edu.au/COMP9444/19T3/

Lecturer-in-Charge

- Alan Blair
- blair@cse.unsw.edu.au
- K17-412C
- 9385-7131

Lecture / Lab Schedule

- Lectures (Weeks 1-3, 5-11)
  - Monday 6-9pm in Central Lecture Block 7
- Labs (Optional, tentative)
  - Tue 2-3 (Drum) (Weeks 1-10)
  - Tue 5-6 (Drum) (Weeks 5-6, 9-10)
  - Wed 12-2 (Drum) (Weeks 5-6, 9-10)
  - Wed 6-7 (Piano) (Weeks 5-6, 9-10)
  - Fri 1-3 (Piano) (Weeks 5-6, 9-10)

Lectures

- You must keep up with lectures, either by attending in person or watching the recordings. Students enrolled in the Web stream are welcome to attend in person if space is available.
- As well as attending lectures, consider doing these things:
  - review the lecture material after the lecture
  - discuss the material with fellow students if possible
  - read up on the topics covered in each lecture
  - complete relevant assignments and exercises, if any
  - explore the topic by writing and running your own programs
  - attend a consultation session and ask questions

Textbook

The textbook for this course is:

Deep Learning

By Ian Goodfellow, Yoshua Bengio and Aaron Courville

MIT Press

`http://www.deeplearningbook.org`

`https://mitpress.mit.edu/books/deep-learning`

Assumed Knowledge

The course will assume knowledge of the following mathematical topics:

- Linear Algebra (2.1-2.8)
- Probability (3.1-3.14)
- Calculus and Chain Rule (6.5.2)

Students should study the relevant sections of the textbook (shown in brackets) and, if necessary, try to revise these topics on their own during the first few weeks of the course.

Planned Schedule

Week 1:	Neuroanatomy and Perceptrons	(1.2, 9.10)
Week 2:	Backpropagation, Probability, Variations	(4.3, 5.1-5, 6.1-5)
Week 3:	Hidden Units, Convolutional Networks	(7.9,7.11-12, 8.2-3, 9.1-5)
Week 4:	—	(Labour Day Holiday)
Week 5:	Image Processing	(7.4, 8.4, 8.7.1)
Week 6:	Recurrent Networks, LSTM and GRU	(10.2, 10.7, 10.10)
Week 7:	Language Processing	(10.4, 12.4)
Week 8:	Deep Reinforcement Learning	(12.5.1.1, 18.1, 20.9)
Week 9:	Hopfield Network & Boltzmann Machine	(16.7, 17.4, 18.2, 20.1-4)
Week 10:	Autoencoders	(14.1-5, 20.10.3)
Week 11:	Generative Adversarial Networks	(20.10.4)

Assessment

Assessment will consist of:

Assignment 1	16%
Assignment 2	24%
Written Exam	60%

In order to pass the course, you must score

- at least 16/40 for the assignments
- at least 24/60 for the written exam
- a combined mark of at least 50/100

Assignments

The assignments may involve, for example:

- using code written in pytorch
- writing your own code
- running experiments and analysing the results

Further details will be provided on the course Web site.

Pytorch

Please try to install Pytorch on your own laptop, and try to match the environment on the CSE Lab machines as closely as possible:

python3	3.7.3
torch	1.2.0
numpy	1.16.1
sklearn	0.20.0

Plagiarism

- Plagiarism is taken seriously by UNSW/CSE and treated as Academic Misconduct. ALL work submitted for assessment must be your own work.
- For an individual assignment, collaborative work in the form of "think tanking" is encouraged, but students are not allowed to derive code together as a group during such discussions. In the case of a group assignment, code must not be obtained from outside the group.
- Plagiarism detection software may be used on submitted work.
- Academic Integrity and Plagiarism:
  `https://student.unsw.edu.au/plagiarism`

Related Courses

- COMP3411/9414 Artificial Intelligence
- COMP9417 Machine Learning and Data Mining
- COMP9418 Advanced Topics in Statistical Machine Learning
- COMP4418 Knowledge Representation and Reasoning
- COMP3431 Robotic Software Architecture
- COMP9517 Machine Vision
- 4th Year Thesis topics