CS5242 : Neural Networks and Deep Learning

Administrative (Week 1)

Semester 1 2021/22

Xavier Bresson

https://twitter.com/xbresson

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National University of Singapore (NUS)

About Me

Xavier Bresson

xavier@nus.edu.sg

- Prof of Computer Science at NUS, Singapore
- Undergraduate in France, PhD at EPFL, Switzerland, Postdoctorate at UCLA, US
- Leading researcher in Deep Learning on Graphs
- 2.5M US$ NRF Fellowship on new DL techniques
- Speaker at NeurIPS, ICML, ICLR, CVPR, SIAM, KDD
- Teach Bachelor, Master, PhD courses in DS and DL since 2015 at UCLA, EPFL, NTU, NYU
- Consulting & training for companies

https://twitter.com/xbresson
https://scholar.google.com/citations?user=9pSK04MAAAAJ
https://www.youtube.com/channel/UCeONAtqVKCS30Xn6zy1YQ_g
https://github.com/xbresson
https://www.linkedin.com/in/xavier-bresson-738585b
https://www.facebook.com/xavier.bresson.1
https://graphdeeplearning.github.io
http://www.ntu.edu.sg/home/xbresson

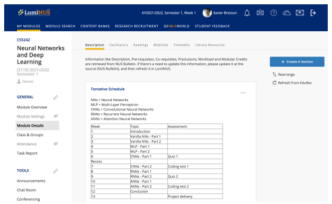
Students

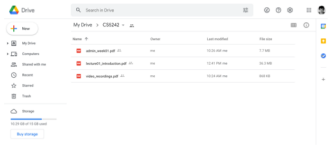
CS5242 Class Logistics

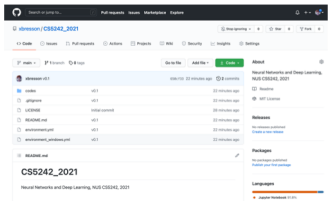
- Class Schedule
  - Lectures+Tutorials : 3 hours on Tuesdays 6:30pm-9:30.
    - Zoom : https://nus-sg.zoom.us/j/82505991629?pwd=cEJMZWpsTldnbWplWXhzVHhMQ2ZCdz09
- Material
  - Admin : LumiNUS https://luminus.nus.edu.sg/modules/33000da0-6a3a-49e2-8484-56fdf735d8cd
  - Slides/video recordings : https://drive.google.com/drive/folders/1LJeeG4CQ4Mea-Nvt5fAXPkKYKxaWEINx

    Note: I reserve the right to change the slides until the lecture.
  - Python notebooks : https://github.com/xbresson/CS5242_2021

    Note: You will need to a Gmail account to use Google Colab.

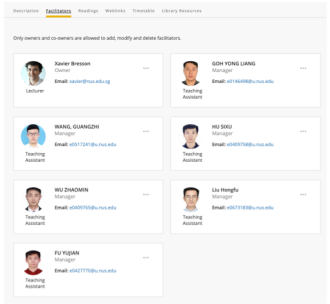


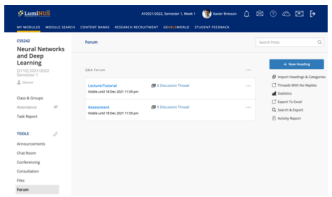




CS5242 Communication

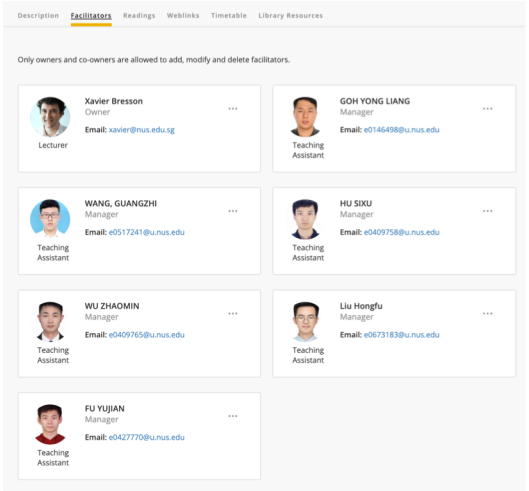
- Questions
  - Before class: Use the Forum in LumiNUS to ask questions (I will answer some of them during the class).
  - During class: Ask me questions during zoom lecture/tutorial with chat box or microphone.
  - After class: Ask questions to TAs during zoom office hours (starting week 2).
- Emails
  - Please, ask TAs first.
  - I will not usually answer individual emails.
- Forum
  - Use Forum in LumiNUS to ask questions to your peers (not only me and TAs).





Teaching Assistants

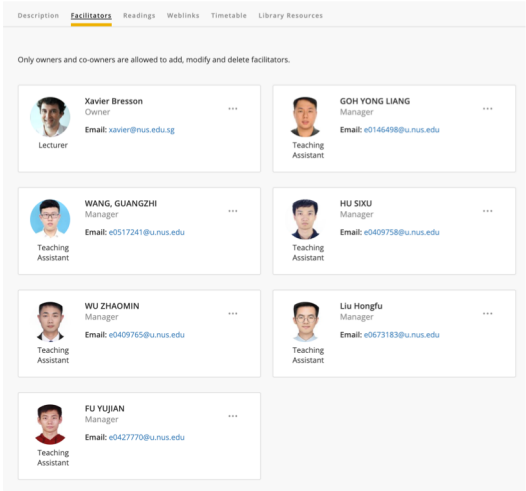
- Teaching Assistants :
  - Mr Goh Yong Liang, gyl@u.nus.edu
  - Mr Wang Guangzhi, guangzhi.wang@u.nus.edu
  - Mr Hu Sixu, husixu@u.nus.edu
  - Mr Wu Zhaomin, zhaomin@u.nus.edu
  - Mr Liu Hongfu, e0673183@u.nus.edu
  - Mr Fu Yujian, e0427770@u.nus.edu



- Please, be considerate and respectful with the Teaching Assistants.

Teaching Assistants

- Zoom office hour (1 hour for each TA) :
  - Weeks 2-7 (recess week included)
    - Every xx xxpm-xx : Mr xxx, zoom : xxx
    - Every xx xxpm-xx : Mr xxx, zoom : xxx
    - Every xx xxpm-xx : Mr xxx, zoom : xxx
  - Weeks 8-13
    - Every xx xxpm-xx : Mr xxx, zoom : xxx
    - Every xx xxpm-xx : Mr xxx, zoom : xxx
    - Every xx xxpm-xx : Mr xxx, zoom : xxx



Tentative Schedule

Week	Topic	Assessment
1	Introduction	
2	Vanilla NNs - Part 1	
3	Vanilla NNs - Part 2	
4	MLP - Part 1	
5	MLP - Part 2	
6	CNNs - Part 1	Quiz 1
Recess		
7	CNNs - Part 2	Coding test 1
8	RNNs - Part 1	
9	RNNs - Part 2	Quiz 2
10	ANNs - Part 1	
11	ANNs - Part 2	Coding test 2
12	Conclusion	
13		Project delivery

NNs = Neural Networks
MLP = Multi-Layer Perceptron
CNNs = Convolutional Neural Networks
RNNs = Recurrent Neural Networks
ANNs = Attention Neural Networks

CS5242 Evaluation

- This module is 100% CA, i.e., there is no final exam.
- There are 3 components:
  - 2 quizzes, each 15% (Weeks 6 & 9). The quizzes are individual. There is no makeup quiz. The weight of quizzes is 30% in total.
  - 2 coding tests, each 20% (Weeks 7 & 11). The coding tests are individual. Check the schedule for the date of each coding test. There is no makeup coding test. The weight of quizzes is 40% in total.
  - 1 group project, 30% (Week 13). Check the schedule for the date of the project delivery. The project is group-based with a group size of at most 3. Choose your group wisely -- each teammate must contribute equally to the project. Each project will deliver a python notebook with the code and the description of the project (in Markdown), and a short video presentation (each student will present her/his contribution to the project).

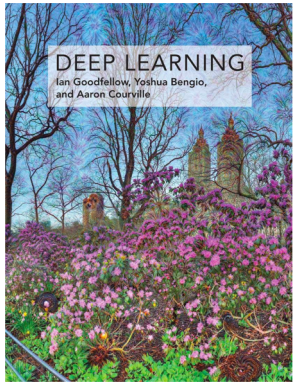
Learning Outcomes

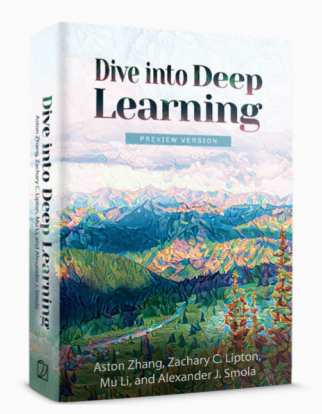
- At the end of this semester, students should be able to
  - Explain the principles different layers and training algorithms.
  - Compare different neural network architectures.
  - Identify and apply deep learning techniques to different data problems.
  - Implement popular neural networks and training algorithms (with PyTorch).
  - Analyze and solve real-world problems using neural networks.

- Short-term goal : Learn how to apply the current most powerful data analysis tools.
- Long-term goal : Data scientists/deep learning experts have become one of the most-wanted jobs in industry.

Reference Books

- Available online :
  - Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, https://www.deeplearningbook.org
  - Aston Zhang, Zack C. Lipton, Mu Li, Alex J. Smola, Dive into Deep Learning, https://d2l.ai





Questions?