

Lecture 1: Introduction to Deep Learning

Efstratios Gavves

Who am I?

- Associate Professor with VISLab
 - Temporal Learning & Dynamics
 - Efficient Computer Vision & Learning
 - Machine Learning for Oncology
- Director of QUVA Lab (with Prof. Snoek, Prof. Welling)
 - Academic-Industry lab between UvA and Qualcomm
- Co-founder [ELLOGON.AI](https://ellogon.ai)
 - World-class AI for oncology, looking for top students (esp. if top software dev skills)
 - Contact me, if interested



egavves@uva.nl

@egavves

Efstratios Gavves

Teaching assistants

Christina



Sindy



Maurice



Tao



Alex



Zenglin



Gabriele



Emiel



Miltos



Phillip



Mariya



Andreas



Jiao Jiao



Alvise



Riaan



Prerequisites

- ⊖ ~~Machine Learning 1~~
- Calculus, Linear Algebra
 - Derivatives, integrals
 - Matrix operations
 - Computing lower bounds, limits
- Probability Theory, Statistics
- Advanced programming
- Time, patience & drive

Philosophy

- Balance between Deep Learning theory and practice
- Course organization
 - Theory (4 hours per week)
 - Labs (4 hours per week)
- All material on <http://uvadlc.github.io>, our GitHub, and Canvas
- Live interactions via [Piazza](#)
- Practicals are individual!

Lectures & learning goals

Lecture	Title
1	Introduction to Deep Learning
2	Modular Learning
3	Deep Learning Optimizations
4	Convolutional Neural Networks
5	Modern ConvNets
6	Recurrent Neural Networks
7	Graph Neural Networks

Lecture	Title
8	Deep Generative Models
9	Deep Variational Inference
10	Generative Adversarial Networks
11	Advanced Generative Models
12	Deep Stochastic Models
13	Bayesian Deep Learning
14	Deep Dynamics

- Textbooks
 - [Deep Learning](#) by I. Goodfellow, Y. Bengio, A. Courville (available online)
 - [Dive Into Deep Learning](#), by A. Zhang, Z. Lipton, M. Li, A. Smola
 - [Mathematics for Machine Learning](#), by M.P. Deisenroth, A. Aldo Faisal, C..S Ong
 - [Neural Networks and Deep Learning: A Textbook](#), by C. Aggarwal
 - [Basics on Neural Nets](#)
- All papers mentioned in the slides

Practicals

- Practical 1: Convnets and Optimizations
 - + A tutorial from SurfSARA on how to use the LISA cluster in the first practical
- Practical 2: Recurrent Networks and Graph CNNs
- Practical 3: Generative Models
- All practicals are individual
 - Theoretical questions and programming assignments
 - All practicals are in PyTorch only
- Tuesdays on campus and online, Thursdays online
- Submit in time, due to the class size delays are not tolerated

Safety in practicals

- Tuesdays on site: students organized in 5 groups
- 1 TA per group
- Please, wear the masks during practicals the University voluntarily provides
- Respect the TAs for making the effort to make this course “more normal”
- You don't know the medical conditions your TAs or fellow students have
 - Already have received lots of concerned emails

Wearing a mask shows...



Kindness

Tutorials

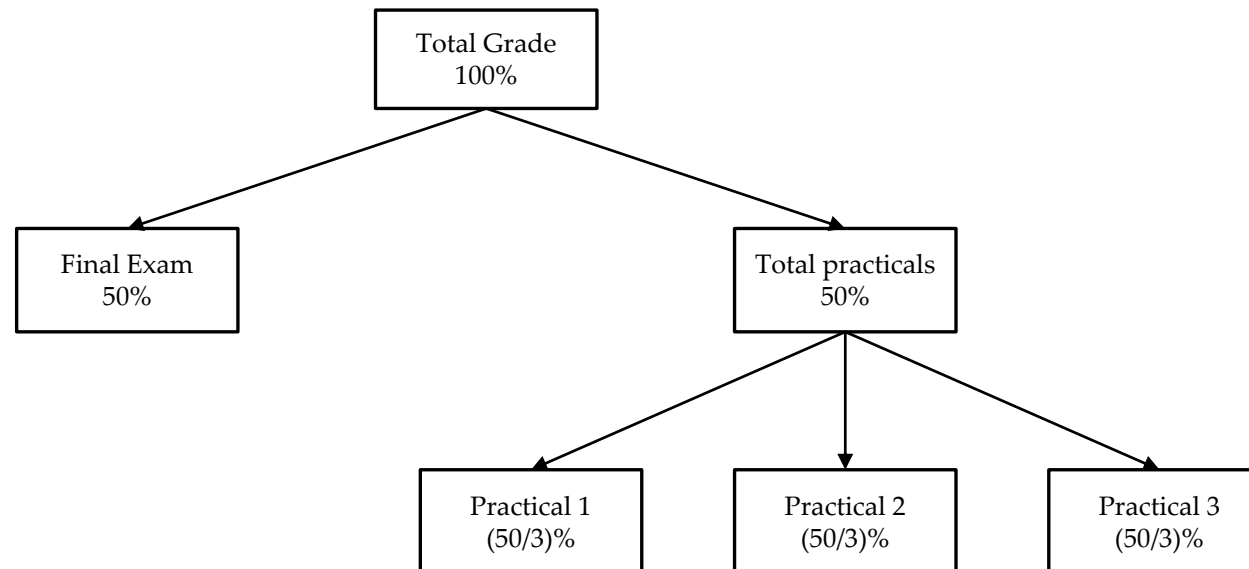
- Alongside the lectures and the practicals, we have prepared tutorials
- In the tutorials we go step by step through fundamental concepts
- The tutorials include code, visualizations and explanations
- <https://uvadlc-notebooks.readthedocs.io/>
- Also, in the website <http://uvadlc.github.io>

Exam

- Via Zoom and with proctoring
- Answers written on papers, photographed and sent to us
- Exam is about easy/medium/hard 10 questions usually
- Likely to use AnsDelft for grading and feedback

Grading & expectations

- To be graded: 3 individual assignments + exam
- No minimum grade for practicals or exams
 - you can have less than 5 in either, for as long as the final grade is passable
- 7-7.5 is the expected grade, also for thesis, as per [NUFFIC instructions](#)
 - Advice: Don't go after grades, go after knowledge and the grade will come



Scheduling

- All lectures online
 - During the 2 hours lectures we play the 15-20' “sublecture” videos comprising the lecture
 - After each “sublecture” we have 2 min for questions
 - After 45' we have a 15' break for resting and Q&A
- Hybrid practicals
 - Tuesdays on campus and online. Please respect the TAs, wear masks and take precautions
 - Thursdays online
- Online exam + Proctoring
 - Not perfect, but we must all take one for the team
 - Similar to last year, we will use Ans-Delft
- Please, use Piazza as much as possible
 - Faster and better than office hours

Plagiarism

- Plagiarism **will not be** tolerated
 - You can have academic discussions and help each other
 - [What is plagiarism?](#) Copying from each other is plagiarism. Sharing is plagiarism. Seeing someone else's code and retyping is plagiarism Copying ideas & structure. Copying from existing GitHub accounts is plagiarism. Of course, re-using past answers is plagiarism.
 - You devalue your own diploma, you make no good use of your money, and you take time we spend from teaching and reporting to do something we don't enjoy
- Last year we had about 15 suspected cases
 - Most got assignment nullified, some lost this/next year exam opportunities
 - We check answer sheets from previous years, existing GitHubs and code repos, each other's answer sheets and other resources
 - Please, don't!
- Contact examiw-science@uva.nl for questions



If you encounter any problems during programme related event or a course and you want to file a complaint or submit separate feedback, please do not hesitate to contact the programme committee at: ocai-science@uva.nl

For more information, please see [this](#) page.

MSc thesis & Honors projects

- This course serves as great intro for your thesis
- If you have common interests, or you are interested in some of the materials presented in this course, please contact me
- In VISLab we have many top researchers, including me, who can guide you and even get you to publish

MIDL 2020

Subm. to ICLR 2021



Announcement:

- Lisa introduction by SurfSARA on Wednesday at 11:00
- Check Canvas for the precise announcements and details
- You will learn how to use supercomputers for the course and beyond

Lecture Overview

- ⊖ ~~Course information~~
- A brief history of neural networks and perceptrons
- Deep learning arrives
- Deep learning: The what and why
- Types of (deep) learning & neural network cheatsheet