High Performance Deep Learning

- 5 & 6 October 2023
- Trainers: Robert Jan Schlimbach, Bryan Cardenas Guevara, Monica Rotulo, Caspar van Leeuwen

EuroHPC
Joint Undertaking

SURF

EURO

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About EuroCC & EuroHPC JU

EuroHPC JU:

- joint initiative between EU, EU member states, and private partners to develop a World Class Supercomputing Ecosystem in Europe
- https://eurohpc-ju.europa.eu/

EuroCC

- A key program in EuroHPC JU
- EuroCC acts as gateway for industry and academia to find providers with suitable HPC expertise
- EuroCC facilitates HPC-skill oriented trainings

About SURF

- Collaborative organization for ICT in Dutch education and research
- National Competence Center in EuroCC for The Netherlands
- Offers HPC services (and many others, data storage, cloud, networking, etc)

Course plan

Day 1:

- Introduction to Deep Learning
- Using the PyTorch framework
- Fully connected networks, Convolutional networks, Transformers (time permitting)

Day 2:

- Software installations on HPC systems
- Packed file formats for Machine Learning
- Parallel computing for deep learning
- Hardware (e.g. Tensor cores) and software features (e.g. low level libraries for deep learning) to accelerated deep learning
- Profiling PyTorch with TensorBoard

Course plan Day 1

- 9:30 – 9:45 Welcome and course overview (Caspar van Leeuwen)
- 9:45 – 10:30 Introduction to ML & DL basic principles (Bryan Cardenas Guevara)
- 10:30 – 10:50 Introduction to PyTorch (Bryan Cardenas Guevara)
- 10:50 – 11:05 Coffee break
- 11:05 – 11:45 Hands-on: Fully connected network (Robert Jan Schlimbach)
- 11:45 – 12:00 Recap Hands-on (Robert Jan Schlimbach)
- 12:00 – 13:00 Lunch Break
- 13:00 – 14:00 Convolutional neural networks (Bryan Cardenas Guevara)
- 14:00 – 14:45 Hands-on: Convolutional neural networks (Bryan Cardenas Guevara)
- 14:45 – 15:00 Recap hands-on (Bryan Cardenas Guevara)
- 15:00 – 15:15 Coffee Break
- 15:15 – 16:00 Self-attention / Transformers (Bryan Cardenas Guevara)
- 16:00 – 16:45 Hands-on / demo notebook: Transformers (Monica Rotulo)
- 16:45 – 17:00 Questions, wrap up

Course plan Day 2

- 9:30 – 10:45 Software installations on HPC systems (Caspar van Leeuwen)
- 10:45 – 11:00 Coffee break
- 11:00 – 11:30 Packed file formats (Caspar van Leeuwen)
- 11:30 – 12:15 Hands-on: Packed file formats (Monica Rotulo)
- 12:15 – 13:15 Lunch Break
- 13:15 – 14:45 Parallel Computing for Deep Learning (Caspar van Leeuwen & Monica Rotulo)
- 14:45 – 15:00 Coffee Break
- 15:00 – 15:45 Hardware and software features to accelerate deep learning (Robert Jan Schlimbach)
- 15:45 – 16:45 Profiling to understand your neural network's performance (Robert Jan Schlimbach)
- 16:45 – 17:00 Questions, wrap up

https://github.com/sara-nl/MLonHPC_2day_Okt2023

Introductions!

In 3 sentences, tell us

- Your name
- Your job
- Why you’re attending this course

Logins

Access to the Dutch National Supercomputer (Snellius) for this course

- Snellius Supercomputer (GPU-based Jupyter Notebook environment, GPU batch jobs)
  - Did you get a login ‘scurXXX’?
  - The e-mail contains a link to choose a password – please do so
  - Log in to https://portal.cua.surf.nl/ and accept the End User Agreement
  - Try to login at https://jupyter.snellius.surf.nl/jhssrf004
  - Select the ‘outside course hours’ profile, and click ‘spawn’

- If not, did not receive a login, or starting a notebook server does not work: contact me on the chat, so I can resolve it during the next session.