



ASCI-EDL winterschool on Efficient Deep Learning

Nov 22-25, 2021 (Monday – Thursday)

Kasteel Oud Poelgeest, Poelgeesterweg 1, 2341 NM Oegstgeest

Daily schedule:

- 9.00– 10.45 : slot 1,2
- break
- 11.00 – 12.45 : slot 3,4
- lunch
- 14.00 – 15.45 : slot 5,6
- break
- 16.00 – 17.45 : slot 7,8
- 18.30 dinner



Extra Material:

1. For the Tuesday lecture: Hyperbolic Deep Neural Networks: A Survey
Wei Peng, Tuomas Varanka, Abdelrahman Mostafa, Henglin Shi, Guoying Zhao
<https://arxiv.org/abs/2101.04562>
2. Intelligent Architecture course at TUE (all slides can be downloaded):
<https://www.es.ele.tue.nl/~heco/courses/IA-5LIL0>
3. Reproducing papers:
 - a. <https://reproducedpapers.org/>
 - b. ReproducedPapers.org: Openly teaching and structuring machine learning reproducibility, Burak Yildiz e.a.: <https://arxiv.org/abs/2012.01172>
4. Background Transformers, Thursday lecture:
 - a. Transformers from scratch: <http://peterbloem.nl/blog/transformers>
 - b. Illustrated Self-Attention: <https://towardsdatascience.com/illustrated-self-attention-2d627e33b20a>
5. On NAS:
 - a. Specifically [lecture 13A](#) from the already mentioned TU/e course IA-5LIL0
 - b. Elsken et al., **Neural Architecture Search: A Survey**,
<https://arxiv.org/abs/1808.05377>
 - c. Benmeziane et al., **A Comprehensive Survey on Hardware-Aware Neural Architecture Search**: <https://arxiv.org/abs/2101.09336>
6. Efficient Processing of Deep Neural Networks: A Tutorial and Survey, Vivienne Sze and Yu-Hsin Chen and Tien-Ju Yang and Joel S. Emer

Schedule details:

Slot	Speakers	Topics
Monday Nov 22		Introduction DL and Mapping Optimizations
2	Henk Corporaal (TUE)	Welcome and introduction to course and the DL field
3	Jan van Gemert (TUD)	Intro Deep Learning, once over lightly
4		Intro DL
Lunch break		
5	Jan van Gemert (TUD)	Reproducability Assignment Introduction
6	Floran de Putter (TUE) Maurice Peemen (ThermoFischer)	Inference Optimization: Pruning
7		Inference Optimization: Quantization
8		Inference Optimization: Quantization, incl TNN & BNN architectures
Tuesday Nov 23		Data reuse / Data efficient learning / Mapping
1	Pascal Mettes (UD UvA)	Hyperbolic Deep Neural Networks (Data efficient learning)
2		Hyperbolic Deep Neural Networks
3	Barry de Bruin (TUE)	Inference Opt: Data reuse / scheduling / loop transformations
4	Henk Corporaal (TUE)	Inference Opt: Data reuse / scheduling / Halide? + ANN processors & Accelerators
Lunch break		
5	Floran de Putter (TUE)	Mapping exploration Zig/Zag / Timeloops
6-8	Social event: Museum Naturalis Leiden	
Wednesday Nov 24		DL at the Edge, NAS + ANN architectures
1	Lydia Chen (TUD)	Hyper parameter tuning
2		Fast model inference at the Edge
3	Willem Sanberg (NXP) Sebastiaan Vogel (NXP) Hiram Rodriguez (NXP)	Challenges of scaling and applying NAS for embedded systems
4	Sebastiaan Vogel (NXP)	Efficient NNs without multipliers and ML-enabled RISC-V for NNs
Lunch break		
5	Damian Podareanu (SURFsara)	Overview of SURF ML cases ran on HPC infrastructure, each with scaleout and efficiency considerations
6	Giuseppe Sarda (IMEC/KUL)	Analog in-Memory Computing design and integration for deep neural network inference at the edge
7	Lin Wang (VU)	Introduction to Edge AI Systems
8	Henk Dreuning (UvA)	Data-, model- and pipeline-parallelism and memory efficiency in DNN training
Thursday Nov 25		SNN models&architectures / Transformers (eff. training)
1	Bojian Yin (UvA)	Tutorial on Spiking neural network on time-based data
2	Sander Bohte (UvA)	Tutorial on Spiking neural network on time-based data
3	Paul Detterer (IMEC) Federico Corradi (IMEC)	IMEC SNN architecture: μ Brain chip
4	Julien Dupeyroux (TUD) Guido de Croon (TUD)	SNNs in Drones: Event-based vision for tiny systems
Lunch break		
5	Jan van Gemert (TUD)	Transformers (incl. intro to RNN, LSTM, TCN: recurrent networks)
6		Transformers: efficient training
7	Students	Pitch presentations on selected topics / assignments
8	All	Q&A
END of Winterschool 2021		