



Education

MS | Computer Science

University of Freiburg | 2017

- Research: Computer Vision, Machine Learning
- Advisor: Thomas Brox
- Collaborators: Wojciech Samek
- GPA: 3.75 (US) - 1.6 (German)

BS | Computer & Communications Engineering

Alexandria University | 2014

- CS GPA: 3.48
- Concentration in AI/Computer Vision

Skills

Programming Languages

Proficient

Python • C • C++

Experienced

CUDA • Java • Matlab • C#

Machine Learning

Frameworks

Pytorch • Keras • Caffe

Tensorflow • Torch7

Algorithms

Attention • Autoencoders

GANs • CNNs • RNNs

Tools

Containerization

Kubernetes • Singularity • Docker

HPC

Slurm • SGE • TORQUE

OS

Linux • Mac • Windows

Languages

Fluent

English • Arabic

Basic

German • French

Related Activities

Reviews

I reviewed papers for ICML 2020, AAAI 2020, ICIP 2020, MICCAI 2019, ICASSP 2019, ACL 2019.

Fun

I run 50+ services on a 4-node multi-architecture (x86/ARM) Kubernetes cluster at home.

Experience

Fraunhofer HHI | Machine Learning Researcher

Nov. 2017 - Present

- Led and developed the communication services for a pollution forecasting project with €3.8M budget (**SAUBER**): including an ML API, a real-time messaging protocol, and automating the ML back-end pipeline resulting in a 24x reduction in response time.
- Create the first synthetic dataset for **automatic** quantitative evaluation of model interpretability methods on visual question answering (VQA) [[Dataset/Code](#)].
- Develop self-supervised attention mechanisms to improve state-of-the-art text VQA models by up to 22%.
- Implement compression methods for MobileNet reducing parameters by 51% without performance loss and winning the MPEG call for neural network compression standard.
- Conduct pilot ML experiments on the VVC MPEG video coding standard.
- Co-manage a 13-server multi-GPU cluster used by the entire ML group.

Fraunhofer HHI | Machine Learning Research Assistant

Feb. 2017 - Oct. 2017

- Developed a novel attention mechanism for multi-modal tasks (VQA) performing 9.7% better than traditional attention mechanisms .
- **Demo** exhibited at **CEBIT18, Tagesspiegel 2018, LNDW 2018, LNDW 2019, MS Wissenschaft 2019 & ScienceStation 2019**.

SRTA City - Informatics Institute | Research Assistant

Oct. 2014 - Mar. 2015

- Designed and coded a novel GPU FFT-based convolutional neural network framework, resulting in superior performance compared to other frameworks (Caffe, Torch7, Theano) for large filters.
- Developed a custom GPU-accelerated real-time object tracking & navigation system performing 13x faster than an equivalent OpenCV implementation.

IRON Labs | Full Stack Software Engineer

Sep. 2012, Nov. 2013

- Co-designed and developed a clinic management software from the ground up, including requirement analysis, software design, implementation, and testing.
- Created and executed software test units for ERP software.

Publications

Published/Accepted

- **Osman** & Samek, 2019: "Dual Recurrent Attention Units for Visual Question Answering" *CVIU Journal*
- Arras, **Osman**, Müller, & Samek, 2019: "Evaluating Recurrent Neural Network Explanations" *ACL Blackbox-NLP workshop*
- Wiedemann, Kirchhoffer, Matlage, Haase, Marban, Marinc, Neumann, **Osman**, Marpe, Schwarz, Wiegand, & Samek, 2019: "DeepCABAC: Context-adaptive binary arithmetic coding for deep neural network compression" *ICML ODML-CDNNR Workshop*

Preprints

- **Osman***, Arras* & Samek, 2020: "Towards Ground Truth Evaluation of Visual Explanations" [[code](#)]

Posters

- **Osman** & Samek, 2018: "Dual Recurrent Attention Units for Visual Question Answering" *CVPR VQA Workshop*