



## 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

IDEs

Vim • Jupyter • VSCode

Web

JavaScript • Jekyll • PHP

### Languages

Fluent

English • Arabic

Basic

German • French

## Related Activities

### Reviews

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

### Fun

I run 40+ services on a bare-metal 6-node multi-architecture Kubernetes cluster at home.

## Experience

### Fraunhofer HHI | Machine Learning Researcher

Nov. 2017 - Present

- Develop self-supervised attention mechanisms to improve state-of-the-art visual question answering models (VQA).
- Create a synthetic dataset for automatic quantitative evaluation of model interpretability methods on VQA.
- Develop adversarial attacks using Autoencoders and GANs for multi-modal & NLP tasks.
- Implement compression methods for the winning MPEG call for neural network compression.
- Investigate methods for medical VQA & model interpretability.
- Conduct pilot ML experiments on the upcoming 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).
- Exhibited at CEBIT18, Tagesspiegel 2018, LNDW 2018, LNDW 2019, MS Wissenschaft 2019 & ScienceStation 2019.
- Demo: <https://lrpserver.hhi.fraunhofer.de/visual-question-answering>.

### 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 an enterprise resource planning software (ERP).

### Alexandria Uni. Computer Vision Lab | Student Researcher

Aug. 2013 - Oct. 2013

### AI Manbat Computer Inc. | Software Developer intern

Jun. 2012 - Aug. 2012

## 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*

Posters

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