Emanuela Haller

Senior Machine Learning Researcher, Bitdefender

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Interests

Domains	Artificial Intelligence, Computer Vision, Deep/Machine Learning
Research	Unsupervised/Self-Supervised Learning, Anomaly Detection, Robustness to Distribution Shifts, DeepFake Detection
Personal	teddy bears, baking, logic puzzles, travelling, reading

Education

2016-2022 **PhD**, University Politehnica of Bucharest, Romania
- *Summa cum laude*
- Specialization: *Computer Science and Information Technology*
- Thesis: *Unsupervised Visual Learning by Exploiting the Spatio-Temporal Consistency of Highly Probably Positive Features*
- Advisors: Marius Leordeanu and Adina Magda Florea
- PhD Defense Committee: Rahul Sukthankar - Google Research, Josef Sivic - CIIRC CTU, Marius Leordeanu - UPB, Adina Magda Florea - UPB, Irina Mocanu - UPB, Florin Pop - UPB

2013-2015 **MSc**, University Politehnica of Bucharest, Romania
- GPA: *9.90/10*
- Specialization: *Artificial Intelligence*
- Thesis: *Intelligent Object Tracking*

2009-2013 **BSc** - Engineer's Degree, University Politehnica of Bucharest, Romania
- GPA: *9.62/10* (ranked 8th out of 164 students)
- Specialization: *Computer Science and Information Technology*
- Thesis: *Human Activity Recognition Base on Multiple Kinects*

Professional experience - Fundamental Research

2018-present **Machine Learning Researcher**, Bitdefender
- Part of the AI and Crypto Unit at Bitdefender
- Working on various projects regarding: anomaly detection, robustness to distribution shifts, deep fake detection, applying machine learning algorithms over encrypted data and the problem of unsupervised learning from visual data

2016-2018 **Machine Learning Researcher**, Institute of Mathematics of the Romanian Academy
- Working on the problem of unsupervised learning from visual data

2019-present **Conference and Journal Reviewer**
- International Conference on Computer Vision - **ICCV** - 2019, 2021
- Conference on Computer Vision and Pattern Recognition - **CVPR** - 2020, 2021, 2022
- Conference on Artificial Intelligence - **AAAI** - 2020, 2021
- European Conference on Computer Vision - **ECCV** - 2020
- Winter Conference on Applications of Computer Vision - **WACV** - 2021
- IEEE Transactions on Pattern Analysis and Machine Intelligence - **TPAMI**

Professional experience - Industry

2014-2018 **Research and Development Engineer**, FotoNation, Xperi Corporation

- Part of the team working on the Driver Monitoring System, developing Computer Vision systems on the infrared spectrum, for tracking drivers' head and facial movements to raise alerts and take actions in potentially dangerous situations when the driver is not paying attention to the road

Professional experience - Teaching

2021-2022   **Curriculum development/Lecturer**, (pyML.ro)
- Involved in developing materials for a high school course on machine learning that was introduced in the national curriculum. I've also held trainings and presentations for both high school teachers and students.

2020-present   **Lecturer/Tutor**, University of Bucharest
- Course: *Deep Learning - BSc*

2020-2021   **Lecturer**, University of Bucharest
- Course: *Special topics in Security and Applied Logic - Deep Learning - MSc*

2020   **Lecturer**, Bitdefender
- Course: *DeepBit4PM Training* - internal deep learning course for product managers

2019   **Tutor**, Bitdefender
- Course: *DeepBit Training* - internal deep learning course for engineers

2019   **Teaching Assistant**, EEML Summer School

2014-2016   **Teaching Assistant**, University Politehnica of Bucharest
- Course: *Data Structures - BSc*

Publications

ICCV 2023   Alina Marcu, Mihai Pirvu, Dragos Costea, **Emanuela Haller**, Emil Slusanschi, Nabil Belbachir, Rahul Sukthankar, Marius Leordeanu. *Self-supervised Hypergraphs for Learning Multiple World Representations*. IEEE International Conference on Computer Vision - ICCV 2023 Workshop on Representation Learning with Very Limited Images

NeurIPS 2022   Marius Dragoi*, Elena Burceanu*, **Emanuela Haller***, Andrei Manolache, Florin Brad. "*AnoShift:A Distribution Shift Benchmark for Unsupervised Anomaly Detection*". The thirty-sixth Conference on Neural Information Processing - NeurIPS 2022 Datasets and Benchmarks Track (* equal contribution)

NeurIPS 2022   Stefan Smeu*, Elena Burceanu*, Andrei Nicolicioiu, **Emanuela Haller**. "*Env-Aware Anomaly Detection: Ignore Style Changes, Stay True to Content!*". The thirty-sixth Conference on Neural Information Processing - NeurIPS 2022 Workshop on Distribution Shifts (DistShift) (*equal contribution)

TPAMI 2022   **Emanuela Haller**, Adina Magda Florea, Marius Leordeanu."*Iterative Knowledge Exchange Between Deep Learning and Space-Time Spectral Clustering for Unsupervised Segmentation in Videos*". IEEE Transactions on Pattern Analysis and Machine Intelligence, Volume 44, Issue 11, 2022

BMVC 2021   **Emanuela Haller***, Elena Burceanu*, Marius Leordeanu."*Self-Supervised Learning in Multi-Task Graphs through Iterative Consensus Shift*". BMVA British Machine Vision Conference - BMVC 2021 (* equal contribution)

ICCV 2017   **Emanuela Haller** and Marius Leordeanu."*Unsupervised object segmentation in video by efficient selection of highly probable positive features*". IEEE International Conference on Computer Vision - ICCV 2017

EvAAL 2013   **Emanuela Haller**, Georgiana Scarlat, Irina Mocanu and Mihai Trascau. "*Human Activity Recognition Based on Multiple Kinects*". Springer Evaluating AAL Systems Through Competitive Benchmarking - EvAAL 2013

CSCS 2013 **Emanuela Haller** and Traian Rebedea. "*Designing a Chat-bot that Simulates an Historical Figure*". IEEE International Conference on Control Systems and Computer Science - CSCS 2013

Patents

2021 Elena Burceanu, Madalina Bolboceanu, **Emanuela Haller**, Georgiana Miruna Rosca, Bogdan Constantin Cebere, Radu Titiu. "*Privacy-Preserving Image Distribution*". US11604893B2, Filed: 07.05.2021, Granted: 14.03.2023

2021 Elena Burceanu, Madalina Bolboceanu, **Emanuela Haller**, Georgiana Miruna Rosca, Bogdan Constantin Cebere, Radu Titiu."*Image Distribution Using Composite Re-Encrypted Images*". US11599669B2, Filed: 07.05.2021, Granted: 07.03.2023

2018 Florin Nanu, Stefan Petrescu, Florin Oprea and **Emanuela Haller**. "*Human monitoring system incorporating calibration methodology*". US10740633B2, Filed: 10.02.2018, Granted: 08.11.2020

2018 Mihai Ciuc, Stefan Petrescu, **Emanuela Haller**, Florin Oprea, Alexandru Nicolaescu, Florin Nanu and Iulian Palade."*Facial features tracker with advanced training for natural rendering of human faces in real-time*". US10706577B2, Filed: 03.06.2018, Granted: 07.07.2020

2022 Elena Burceanu, **Emanuela Haller**, Marius Leordeanu, Razvan Prejbeanu, Constantin Cernat. "*Computer Security Systems and Methods Using Self-Supervised Consensus-Building Machine Learning*". US Patent Application No. 17/656,644, Filed: 26.03.2022

2020 Bogdan Constantin Cebere, Elena Burceanu, Madalina Bolboceanu, **Emanuela Haller**, Georgiana Miruna Rosca, Radu Titiu."*Privacy-Preserving Domain Name Service (DNS)*". US Patent Application No. 16/949,587, Filed: 11.04.2020

Skills Overview

Programming Experience in Python and PyTorch framework; Familiar with C

Teaching Psycho-Pedagogical Module

Languages **English** - Fluent; **Romanian** - Native

Honors and Awards

2022 **Best Poster Award** - Romanian AI Days 2022
   ○ Paper: *AnoShift:A Distribution Shift Benchmark for Unsupervised Anomaly Detection*
      ○ *Presenter: Drăgoi Marius*
   ○ Paper: *Env-Aware Anomaly Detection: Ignore Style Changes, Stay True to Content!*
      ○ *Presenter: Smeu Ştefan*

2021 **Best Poster Award** - Romanian AI Days 2021
   ○ Paper: *Iterative Knowledge Exchange Between Deep Learning and Space-Time Spectral Clustering for Unsupervised Segmentation in Videos*
      ○ *Presenter: Haller Emanuela*

2013 **First Prize** - Scientific Communication Session - Artificial Intelligence
   ○ Paper: *Intelligent Object Tracking*

2013 **Second Prize** - Scientific Communications Session - Artificial Intelligence
   ○ Paper: *Human Activity Recognition Base on Multiple Kinects*

2012 **Third Prize** - AI Competition - CASIA
   ○ Paper: *Chat-bot that Simulates an Historical Figure*

2008 **Silver Medal & Honorable Mention** (20th place) - Romanian National Olympiad in Informatics