Adrián Sager La Ganga

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- Artificial Intelligence
- Software Engineering
- Applied Mathematics

Experience

IBM Master Thesis **Sep. 2022 — Jan. 2023**
IBM Research Zürich Zürich, Switzerland

- Proposed and validated novel AI-based metrics employing uncertainty quantification (UQ) techniques
- Applied BERT and XGBoost to predict sustainable properties in chemical reactions
- Integrated AI-based metrics in Monte Carlo tree search algorithm to find sustainable chemical synthesis paths
- Created toolkit with visualization and explainable AI utilities to interpret the predictions

System Engineer (Full-time Intern) **Mar. 2022 — Sep. 2022**
Beyond Gravity Zürich, Switzerland

- Improved rover simulation software for ExoMars ESA contract (C++):
  - Created novel outlier detector and Gaussian process regression interpolation algorithm of high-resolution Martian terrain images
  - Created pseudo-3D engine for fast visualization
  - Developed realistic visualization in a game engine (C#)
  - Achieved $> \times 3.0$ speedup with SIMD matrix operations, better code structure, and concurrency

Data Scientist (Full-time Intern) **Mar. 2020 — May. 2020**
Dynatrace Hagenberg campus (Linz), Austria

- Created guidelines to speedup Machine Learning algorithms from Python to Java, benchmarking NumPy, EJML, and ND4J
- Presented Python-to-Java pipeline to translate the 7-person team's research into production

Education

Master of Science, Computational Science & Engineering, EPFL, Final GPA: 5.57/6.00 **Sep. 2020 — Feb. 2023**

Bachelor of Science, Computer Engineering, Polytechnic University of Turin, Final grade: 110/110 **Oct. 2017 — Jul. 2020**

Awards & Interests

2022 Young Talents Fellowship from the Swiss *National Centres of Competence in Research – Catalysis* to fund thesis on sustainability
IEEE Member after participating in *IEEEXtreme* 24h programming competition
Participated in *LauzHack* 24h hackathon on a sustainable federated learning project

2021 Member of the EPFL Spacecraft team in the system software pole
Participated in EPFL's Quantum Computing hackathon

2019 *European Innovation Academy*, 3-week startup competition (∼200 participants):
- **Awards** : *U.S. Provisional Patent* from Nixon Peabody; *Top Team*; *HAG Venture Accelerator award*; *10-day Project and People Management Summer School*
- Selected as CTO in a team of 5 ideating and presenting a prototype for safer space travel, including an investor pitch

Member of Eta Kappa Nu (electrical engineering and computer science honor society)

2018 Awarded *Like@Home* hackathon *Reply* prize: Innovate in 24h in a team of 5 using Google's Voice Kit

2017 Scholarship *ToPolito* (**top 17** best performing international engineering students)
Young Talents Project (**top 5%** best performing engineering students)

Projects & Research

Analyze Performance Improvements of Asynchronous Cloud Microservices, **Oct. 2021 — Jan. 2022**
Advanced Multiprocessor Architecture course (EPFL)
github.com/cs471-MAA/grpc

Computer Vision to stabilize video of a fly's neural activity, Ramdya Lab (EPFL) **Sep. 2021 — Jan. 2022**
- Created $\times 770\%$ faster and $\times 186\%$ lower MSE transform than baseline
- Trained UNet and hypernetwork SOTA on big dataset exploiting dynamic memory allocation
- Achieved and analyzed $\times 1.4$ asymptotic speedup on non-linear optimal transport baseline using GPU

github.com/Sager611/stabilize2p

Develop Minimal Deep Learning Framework with Backprop, Deep Learning course (mandatory project; EPFL) **Apr. 2021 — Jun. 2021**

Distributed Learning: Study of the most Efficient Topologies, Optimization for ML course (EPFL) **Apr. 2021 — Jun. 2021**
github.com/eelismie/OptForML-Project

Deep Learning to predict star properties, Laboratory of Astrophysics (EPFL) **Mar. 2021 — Jul. 2021**
- Trained a Denoising Autoencoder for interpolation of stellar spectra with secondary MLP head for multi-task regression
- Augmented and cross-validated small 888-sample traning set
- $+20\%$ performance over literature by employing a Locally Connected Network with uncertainty estimation
- Formulated a well-documented and structured framework and entry script for research usage at the Lab
- Accepted contract to continue documenting framework in July 2021

Machine Learning to predict protein pair interactions, Machine Learning course (EPFL) **Nov. 2020 — Dec. 2020**
- Researched performance differences of Siamese CNN, XGboost with bayesian optimization, and an MLP

github.com/maximocrv/ml_protein_interactions

FPGA, CNN inference, Computer Architecture course (Polytechnic University of Turin) **Mar. 2019 — Jul. 2019**
- Programmed 6 CNN layers for inference in an FPGA: 2D Convolution, Max/Mean Pooling, and Sigmoid/ReLu/Tanh activations
- Engineered block design leveraging DMA for CPU-FPGA transmission

gitlab.com/adriansagerlaganga/pynq-cnn-caffe

Skills

Python • Tensorflow/Keras • PyTorch • JupyterLab • Scikit-learn • SciPy • Pandas • OpenCV (cv2) • Sphinx • JAX (basic)

Programming • C/C++ • CMake • Assembly for GDB • Java • C# (basic) • JavaScript • HTML/CSS • React & Redux (basic) • Docker • SQL • MatLab • CUDA • OpenMP • VHDL (basic)

Teamwork • Agile Scrum • JIRA • Git • CI/CD

Academic knowledge

Multiprocessing Architectures • Distributed Memory • Datacenters • GPU architecture • ML Accelerators • Cache Coherence • Memory Consistency

Advanced Algorithms • Linear Programming • Greedy • Streaming algos. • Randomized algos. • Spectral Graph Theory

Information Security • Binary exploits • Web App Vulnerabilities • TLS • Applied Cryptography • Database Security • Machine Learning and Privacy • Blockchain and Decentralization

Languages

• English (fluent) • Spanish (native) • Italian (fluent) • French (intermediate) • German (beginner)