Brian Pulfer

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Technical Skills

Programming Languages: Python, Java, C/C++ HTML/CSS/JavaScript, C#
Frameworks: Pytorch, Pytorch-Lightning, Tensorflow, Keras, React, Bootstrap, Unity
Developer Tools: Git, Linux, OpenSSH, Slurm, HPC clusters, PIP, Anaconda, Docker, VSCode, Jetbrains IDEs
Libraries: Albumentations, Einops, Scikit-Learn, OpenCV2, NumPy, Matplotlib, Pandas, Seaborn, timm, transformers, torchvision

Experience

Ph.D. student in Machine Learning November 2021 – November 2025
University of Geneva *Geneva, GE, CH*

- Implemented ViTs, Normalizing Flows, DDPMs, and Masked Image Modelling models.
- Trained models with multi-node multi-gpus SLURM cluster.
- Assisted teaching for: Algorithms, Data structures, Image processing.

Machine Learning Intern July 2020 – August 2020
University of Southern Switzerland *Lugano, TI, CH*

- Developed a tool for automatic collection and cleaning of a dataset through web crawling and heuristics such as feature extraction, clustering and outlier identification.
- Applied transfer learning of various image-classification models such as VGG, GoogLeNet and DenseNET.
- Applied transfer learning of image segmentation and object detection models such as SSD and YOLO.

Hackathons & Competitions Nov. 2019 – Present
Switzerland, Germany

- HackZürich 2022
- START Hack 2021
- USI Hackathon 2019

Broadcast soldier Mar. 2015 – January 2016
Swiss Army (service completed) *Wangen an der Aare, BE, CH* *Bremgarten, AG, CH* *Lenzerheide, GR, CH*

Publications

- Solving the Weather4cast Challenge via Visual Transformers for 3D Images[1]
- Anomaly localization for copy detection patterns through print estimations[2]
- Authentication of copy detection patterns under machine learning attacks: A supervised approach[3]
- Mind the gap! a study on the transferability of virtual vs physical-world testing of autonomous driving systems[4]

Leadership & Awards

Formula USI organizer Nov. 2020 – Today
Lugano, TI, CH

- Organizer of the first edition of the Formula USI competition (hackathon) by the University of Southern Switzerland.

Winner of the SODESKA scholarship April 2021
Lugano, TI, CH

- I won a scholarship awarded to the 5 swiss students which obtained he highest GPA at USI (University of Southern Switzerland) during their previous year of studies (minimum 54 ECTS).

Education

UNIGE - University of Geneva Geneva, GE, CH
Ph.D. in Machine Learning for anti-counterfeiting and anomaly detection *Nov. 2021 – Nov. 2025*

USI - University of Southern Switzerland Lugano, TI, CH
Master Degree in Artificial Intelligence (GPA: 9.1/10) *Aug. 2019 – Jun 2021*

SUPSI - University of Applied Sciences of Southern Switzerland Manno, TI, CH
Bachelor Degree in Computer Science (GPA: 4.9/6) *Aug. 2016 – Jun 2019*

Projects

Master Thesis | *Python3, C#, Keras, pandas, Unity, Git, Conda, cv2* September 2020 – June 2021

- Assembled a physical DonkeyCar using a JetsonNano computer and an RC car.
- Created a simulated scene of a real-world lab room in Unity. Improved the Unity simulator to log testing metrics.
- Collected data, trained and tested different DL models for self-driving in the simulated and real world tracks.
- Adapted CycleGAN to translate simulated images to real ones and train a real-world Cross-track-error predictor.

Bachelor Thesis | *Python3, Git, Unittest, Gensim, PyJNIus, Keras, SkLearn* May 2019 – Sep 2019

- Developed a binary classifier machine learning model that can tell if two scientific articles from the PUBMED database were published by the same author. Work commissioned by La Roche AG.
- Implemented feature extraction code, also using a Java library inpython through the PyJNIus library. Used the Gensim library to apply doc2vec techniques, a novelty in the literature of AND.
- Trained and tested different models: KNN, SVM, Random Forest and Feed-Forward Neural Networks.
- Studied ambiguity level in the PubMed dataset by counting the cardinality of the namespaces.

References

[1] Yury Belousov, Sergey Polezhaev, and Brian Pulfer. Solving the weather4cast challenge via visual transformers for 3d images, 2022.

[2] Brian Pulfer, Yury Belousov, Joakim Tutt, Roman Chaban, Olga Taran, Taras Holotyak, and Slava Voloshynovskiy. Anomaly localization for copy detection patterns through print estimations, 2022.

[3] Brian Pulfer, Roman Chaban, Yury Belousov, Joakim Tutt, Olga Taran, Taras Holotyak, and Slava Voloshynovskiy. Authentication of copy detection patterns under machine learning attacks: A supervised approach, 2022.

[4] Andrea Stocco, Brian Pulfer, and Paolo Tonella. Mind the gap! a study on the transferability of virtual vs physical-world testing of autonomous driving systems. *IEEE Transactions on Software Engineering*, pages 1–13, 2022.