Maurice Frank
Machine learning scientist

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EXPERIENCE

Machine learning scientist
Hummingbird Diagnostics, Heidelberg   📅 **11/2020 –**

Development of deep learning based approaches to cancer and disease detection from liquid biopsy (blood samples). Working with sequence embedding models and graph networks on microRNA biomarkers. Focus on unsupervised representation learning and explainability.

`Python / PyTorch / sklearn / Biostatistics`

Freelance software engineer
Morris-Frank, Amsterdam   📅 **11/2020 –**

Ongoing work for various clients. Projects including standard web design projects as well as cloud service infrastructure for an educational institution and residential energy tracking. (References available).

`Web design / API design / Cloud app design`

Research Intern
AMLab, University of Amsterdam, Amsterdam   📅 **11/2019 – 06/2020**

Intern at Max Welling's Machine Learning Lab at the University of Amsterdam. Working on research ideas surrounding the final thesis research question (see left column).

`Python / PyTorch / Slurm`

Machine learning engineer – Intern
BMW Group, Munich   📅 **06/2019 – 08/2019**

Worked within the engine development department. Building statistical models to analyze engine part quality and live fleet monitoring. Building a production-ready data visualization app.
Official corporate testimony: "Significantly exceeds requirements at all times in all criteria, engineering, analytical skills and teamwork."

`Python / PySpark / Palantir Foundry / Dash / Agile development`

Full-stack web developer
Bürgerwerke eG, Heidelberg   📅 **01/2018 – 12/2018**

Ground-up development of a team communication and organization web portal in Ruby on Rails. Backend and Frontend work. Software engineering from planning the project until complete delivery.

`Rails / Ruby / Software Engineering`

System administrator / Software engineer
Alfred-Weber-Institute, Heidelberg   📅 **06/2016 – 06/2017**

Administrator in a computer lab for Behavioral Economics experiments. Development new features of an experiment administration software.

`Rails / Ruby / Python / Windows server`

SKILLS

- Excellent skills in machine learning engineering with Python: PyTorch, TensorFlow, Caffe, Pandas, SciPy, OpenCV
- DevOps engineering experience with: Scikit-learn, Skorch, Ray, wandb, PyTorch Lightning, DASK
- Excellent skills in using GNU/Linux systems: System administration, BASH, Perl, Git, Slurm
- Strong academic and technical writing skills as well as enthusiasm for writing useful tutorials (see blog)
- Strong skills in data visualization: pyplot, Dash (plotly), web tech
- Engineering experience in working with: MATLAB, Java, C++, JavaScript
- *Spoken languages*: German native, English fluent (TOEFL 112/120), Persian and Dutch beginner level

EDUCATION

M.Sc. Artificial Intelligence
awarded cum laude GPA 4/4
University of Amsterdam   📅 **2018 – 2020**

Research degree with most contemporary topics in AI/ML

- Theory and practical implementation of the concepts of machine and deep learning: CNNs, RNNs/LSTMs, VAEs/Flows, GANs, MCMC/sampling, Gaussian process/Bayesian modelling, ICA
- Specialization in topics: Theoretical machine learning, Computer Vision, Reinforcement Learning, NLP, Information theory

Thesis: Investigating Bayesian methods for unsupervised music source separation. Do generative models know what they don't know? 🔗 **Read**
Supervisor: Maximilian Ilse (AMLab), Dr Efstratios Gavves

B.Sc. Applied Computer Science
GPA 3.58/4
University Heidelberg   📅 **2014 – 2017**

General degree on all topics of Computer Science

- Specialization on image processing and pattern recognition: Deep Learning, 3D Computer vision, medical image analysis, fairness in AI
- Courses on Practical CS, Algorithms, DBMS, Theoretical informatics, Numerical methods and software engineering

Thesis: Using a FCN-ResNet based detector the thesis provides a reverse image search tool here in particular to retrieve art historic images containing an object given by a reference image. 🔗 **Read**
Supervisor: Dr Miguel Bautista Martin, Prof. Dr Björn Ommer

B.Sc. Physics
University Heidelberg   📅 **2013 – 2014**

Change of degree after the first year, kept as minor studies.

PUBLICATIONS

[1] **Dec. 2020** (with Maximilian Ilse). "Problems Using Deep Generative Models for Audio Source Separation". In: *PMLR, NeurIPS2020 ICBINB Workshop (Spotlight)*. URL: `http://proceedings.mlr.press/v137/frank20a/frank20a.pdf`.

VOLUNTARY WORK

CO-Founder / Member
Collegium Academicum, Heidelberg   📅 **06/2015 –**

Student-founded non-profit company building sustainable student housing. We are building an innovative living space for 200 young people. Creating an educational center for holistic self-learning.

`team building / lead generation / design work`