

Magnus Petersen

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Frankfurt am Main, Germany



Professional Experience

- **Data Scientist (full time) - Ernst & Young**
 - Money laundering detection using machine learning from time series transaction data.
 - Anomaly detection in bank lending and predicting loan defaults.*01.09.2021–Now*
- **Research Intern - FIAS**

Implementing machine learning models like VAEs, AEs, and LOca in PyTorch for the extraction of collective variables of molecular dynamics.

01.04.2020–01.08.2020

Research & Projects

- **MS Thesis: Visualizing and comparing standardized Neural Network Encodings using Manifold Learning**

The thesis describes a method to visualize the representation of a system that a neural network has learned in a standardized and comparable way using manifold learning in the form of Diffusion Maps with the Mahalanobis metric and Autoencoders.

Manifold Learning, Unsupervised Learning, Explainable AI, PyTorch
- **Deep Neural Cellular Automata (NCA) for semantic image transformation and style transfer** 🌐

Developed a novel method using NCAs to transform images iteratively for style transfer and text-guided image transformations using a CLIP-based loss function. The method application yields good results and is applicable in real-time applications and due to the nature of NCAs is robust to overfitting.

Self Organization, Cellular Automata, CNNs
- **Forum Recommendation Website for "Reddit"** 🌐 🌐

A transformer embedding-based search engine for around 100.000 forums on "Reddit". This service was made to address the lack of a good recommendation service offered by Reddit itself.

NLP, Web Development, Transformers, APIs, AWS

Education

- **M.S. & B.S. Biophysics**

Goethe University Frankfurt
Grade USA: **3.8**
Grade GER: **1.4**
Thesis: "Visualizing and comparing standardized Neural Network Encodings using Manifold Learning"
2015–2021
- **St Leonards boarding School**

St Andrews Scotland
2011–2014
- **Relevant Courses**

Machine Learning for Physicists, Machine Learning II, Reinforcement Learning, Complex Dynamical Systems, Numerical Methods, Bioinformatics, Molecular Dynamics Simulations, Theoretical Neuroscience II

Skills

- **Technologies**

Python (PyTorch, Scikit-learn, NumPy, Pandas), SQL, Git, Azure (Dev Ops) and AWS (EC2, Route 53)

Miscellaneous

- **Machine Learning Journal Club**

Participated in weekly discussions and presentations of new ML publications.
- **Physics for Refugees**

Organizing a weekly science tutoring and experimentation session for refugee children.
- **Hobbies**

Creating ML "art" and developing tool for artistic uses of ML 🐦 (CNN, GAN, VAQE, NCA), reading (Murakami, Egan, Vonnegut ect.), going to the gym, bouldering and learning Mandarin.
- **Other Projects**
 - Local Conformal Autoencoder Implementation 🌐
 - Reinforcement Learning based Recommender 🌐
 - Company ESG Score Prediction 🌐