Lukas Judith

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SUMMARY

Data scientist with an MSc in computational physics and three years of experience in statistical data analysis, machine learning, and developing software in Python. Also experienced in data wrangling in an industrial setting and in working with SQL and relational databases. Working knowledge of AWS and Docker. Quick learner and highly motivated to take on projects in AI, data science, and data engineering.

PROFESSIONAL EXPERIENCE

Mannheim Central Institute for Mental Health **Mannheim, Germany**
Graduate Researcher in Machine Learning *Jan 2022 – Jan 2023*

- Developed and fine-tuned a recurrent neural network architecture with time-dependent parameters for non-stationary time series forecasting and dynamical systems reconstruction.
- Implemented the network in Python (PyTorch) and used version control with Git.
- Wrote Python scripts for generating benchmark time series data based on mathematical models used in climate science and neuroscience.
- Evaluated the performance of the model on the simulated benchmarks and real-world datasets, such as electroencephalogram (EEG) recordings.

Heidelberg Collaboratory for Image Processing **Heidelberg, Germany**
Research Assistant in Statistical Image Analysis *Apr 2021 – Dec 2021*

- Designed an image analysis pipeline for an ongoing research project in cell biology and implemented the entire pipeline from scratch in Python (NumPy, SciPy, scikit-image, PIL).
- Implemented automatic denoising and single-cell segmentation for the images.
- Developed an approximation of "Ripley's K-function" for point pattern analysis in images.
- Quantified the aggregation of different fluorescent proteins in cell images, using the above method and two-sample testing, which yielded key results for the research project.

German Electron Synchrotron (DESY) **Hamburg, Germany**
Student Researcher in Deep Learning for Particle Physics *Apr 2020 – Sep 2020*

- Implemented a novel deep learning architecture for density estimation in Python (PyTorch) to facilitate the discovery of new physics in the CMS experiment at CERN.
- Evaluated the performance of the algorithm on simulated benchmark datasets.
- Collaborated with scientists from CERN in weekly meetings to improve the data quality and model performance.

Zeppelin Power Systems GmbH & Co. KG **Hamburg, Germany**
Data Engineer *Oct 2019 – Mar 2020*

- Analysed and visualised time series data from ships and engines using Python (NumPy, Pandas, scikit-learn, Jupyter Notebook), drawing data from a relational database (PostgreSQL) using SQL queries.
- Implemented pre-processing scripts for the raw data using Python (NumPy, Pandas), including unit testing, version control with git, and containerising the application with Docker.
- Produced several reports (Word, Excel, PowerPoint) and provided the responsible engineers with a better understanding of the occurrence and treatment of anomalous values in the data.
- Evaluated the performance of machine learning models (random forest) for anomaly detection.

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EDUCATION & QUALIFICATIONS

University of Heidelberg **Heidelberg, Germany**
M.Sc. in Physics: Specialisation in Computational Physics *Oct 2020 – Feb 2023*

- Final grade: 1.1 (high distinction), Thesis grade: 1.0 (high distinction)
- Modules included: Advanced Machine Learning, Time Series Analysis and Recurrent Neural Networks, Dynamical Systems Theory for Machine Learning, Computational Statistics, Introduction to GPU Accelerated Computing, Seminar on Quantum Information Theory
- Thesis**:** *Non-Stationary Recurrent Neural Networks for Dynamical Systems Reconstruction*
- All modules taught in English.

University of Hamburg **Hamburg, Germany**
B.Sc. in Physics *Oct 2016 – Sep 2020*

- Final grade: 1.2 (high distinction), Thesis grade: 1.0 (high distinction)
- Modules included: Linear Algebra and Analysis, Calculus, Probability Theory, Software Development (Java), Seminars on Quantum Computing and Quantum Cryptography
- Thesis**:** *Anomaly Detection using Density Estimation for the CMS Experiment*

Durham University **Durham, United Kingdom**
Erasmus Exchange Program *Oct 2018 – Jun 2019*

- Modules included: Statistics, Computer Systems (hardware, OS, databases), Software Methodologies (search algorithms, cryptography, image processing, 3D graphics)
- Relevant projects: image analysis (Python, OpenCV), 3D graphics (OpenGL, JavaScript), data compression and search algorithms (Python, NumPy); all graded with high distinction.

OTHER EXPERIENCE

CANDLE Institut Yerevan **Yerevan, Armenia**
Internship in Accelerator Physics *Oct 2019*

- Took part in a one-week exchange supported by the German Federal Foreign Office.
- Conducted an experiment on vacuum technology as used in modern particle accelerators in cooperation with students of Yerevan State University.
- Evaluated and visualised the recorded data in Python (NumPy, Pandas).

Hakahana Kindergarten **Omaruru, Namibia**
Volunteer *Feb 2016 – Apr 2016*

- Served as a volunteer in a kindergarten sponsored by a German charity.
- Distributed weekly food packages and supervised children during their play time and study time.
- Joined an ongoing sponsorship program, providing financial aid for one of the children.

SKILLS AND INTERESTS

- **Skills:** Programming languages: Python (PyTorch, NumPy, Scikit-learn, SciPy, Pandas, Matplotlib, Jupyter Notebooks), Java, R; Databases: SQL, PostgreSQL; MS Office: Excel, PowerPoint, Word; Cloud: AWS; Web dev.: Flask/Django, CSS, HTML; Other technologies: Git, Linux/Bash, Docker, basic GPU computing with CUDA in C, Visual Studio Code, Tableau, Power BI, SAS
- **Completed online courses:** *Machine Learning*, (Coursera certificate), *AWS Cloud Technical Essentials* (Coursera certificate)
- **Languages**: English (IELTS: 8.0); German (Native); Mandarin Chinese (completed a class at level A2), Spanish (elementary proficiency)