



# Dr. Andreas Roth

## AI & MACHINE LEARNING ENGINEER

### About me

AI Engineer with a PhD in Machine Learning, specializing in advanced methods for complex, structured data. Combines deep algorithmic expertise with strong software engineering skills. Experienced in developing custom deep learning models and working with GenAI technologies, with a focus on clean, reproducible ML engineering. Motivated to bridge the gap between research and impactful industrial AI applications.

### Contact

Dortmund, Germany

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### Relevant Skills

#### Machine Learning & AI

ML modeling and evaluation • Deep learning (PyTorch, TensorFlow) • Model comparison and selection • Embeddings

#### ML Engineering & GenAI

Experiment tracking • Reproducible training and evaluation workflows • Data preprocessing • Prototypical GenAI and RAG applications (LLMs with vector databases and tool usage)

#### Software Development

Python • JavaScript • Modular, maintainable implementations • Docker-based applications

#### Tools & Platforms

Docker • Git • GitHub • Kafka • Weights & Biases • Microsoft Azure (fundamentals) • Hugging Face

#### Languages

German (native)

English (fluent)

### Professional Experience

#### Research Associate

Since Jul. 2021

Chair of Artificial Intelligence

Department of Computer Science, TU Dortmund

- Designed, implemented, and analyzed machine learning models for graph-structured data (e.g., relational databases, recommendation systems)
- Developed and benchmarked modern ML models in PyTorch, executing large-scale training runs on GPU clusters
- Designed and delivered Computational Intelligence tutorials for over 130 students
- Supervised five Bachelor's and Master's theses and mentored one student research assistant, peer-reviewed 25+ papers in top-tier AI venues

#### Student Software Developer

Sep. 2018 – May 2021

Fraunhofer ISST, Dortmund

- Implemented software solutions for various applied research projects
- Developed and maintained frontend, backend, and embedded software components
- Containerized and deployed microservice-based applications using Docker
- Built end-to-end data pipelines with Kafka
- Implemented basic CI workflows using Git and Microsoft Azure

#### Student Software Developer

Mar. 2017 – Aug. 2018

DRIGUS Systeme GmbH, Dortmund

- Designed and implemented new features for a time management product
- Conceptualization and development of a new mobile app for their product

### Education

#### PhD in Computer Science (Dr. rer. nat.)

Jul. 2021 – Nov. 2025

Chair of Artificial Intelligence, TU Dortmund

- Dissertation Project: Development and enhancement of AI methods for the efficient processing of large-scale, irregularly structured data
- Final grade: With Distinction (summa cum laude)
- Honors: Best Paper Award (leading European ML conference, ECML 2022), Top Reviewer Award (leading international ML conference, NeurIPS 2024)

#### M.Sc. in Computer Science

Sep. 2018 – May 2021

TU Dortmund

- Master's Thesis Project: Identification of viral nanoparticles in video sequences to enable rapid diagnostic testing (Grade: 1.0)

#### B.Sc. in Computer Science

Apr. 2015 – Aug. 2018

TU Dortmund

- Bachelor's Thesis Project: Automatic detection of suitable areas for solar panel installation in aerial imagery (Grade: 1.7)