Dr. Peet Cremer

* 27/01/1988
Bjørnegårdsvingen 13, 1338 Sandvika, Norway | +47 917 42 339
peet.cremer@gmail.com | Peet Cremer | @PeetCremer | Publication list

Enthusiastic Engineering Manager with a can-do attitude and experience in leading teams of up to 20 people. My technical background is in Statistical Physics and Machine Learning. I combine advanced software engineering skills (Python, C++, Rust) with the knowledge of creating Machine Learning pipelines and of building up scalable cloud data platforms. I have an outgoing personality, build trust through honesty, employ strategic thinking, and base decisions on facts and data.

WORK EXPERIENCE

Director of Engineering — COGNITE (Oslo, Norway) — 02/2023 - today

Engineering manager of 18 developers in 3 teams, focusing on:

- contextualization of industrial data
- data-driven troubleshooting apps
- Parsing of engineering diagrams for industrial sites

Senior Machine Learning Engineer and Tech Lead — COGNITE (Oslo, Norway) — 08/2021 - 02/2023

- Leading a cross-functional team of 5 software / ML engineers
- Implementing intelligent algorithms to find context in otherwise unstructured industrial data
- Scaling and maintaining microservices to deploy those algorithms in an SaaS setting
- Creating data infrastructure capabilities to build up an industrial knowledge graph

AI Lead Developer — APTIV (Wuppertal, Germany) — 12/2020 - 07/2021

- Planning and execution of Machine Learning and Data Infrastructure projects in the automotive industry
- Design of AI solutions for automotive perception tasks. Guiding the software and hardware integration into the test vehicle
- Participated in a lot of innovation, leading to 7 patents and 1 publication (see publication list)

Software Development Expert — APTIV (Wuppertal, Germany) — 07/2017 - 12/2020

- Leading development of a data platform for storage and retrieval of automotive sensor data as a product owner
- Development of infrastructure solutions for artifical intelligence in automotive applications
- Established a microservice architecture to automate AI workflows
- Supervision of a Master Thesis on using GANs for automotive data style transfer

EDUCATION

Doctor (Ph.D.), Theoretical Soft Matter Physics — University of Düsseldorf — 2013 - 2017

- Topic: Mesoscale modeling of magnetic elastomers and gels – theory and simulations
- Solving magneto-elastic coupling models using numerical simulations, the finite element method, and density functional theory
- Resulted in 7 publications in recognized peer-reviewed journals (see publication list)

Master of Science (M. Sc.), Physics — University of Düsseldorf — 2012 - 2013

- **Gpa: 1.1** (grades at german university range from 1.0 (best) to 4.0 (worst)). Minor: Mathematics
- Focus on Soft Matter, Plasma Physics, Solid-State and Nanophysics
- Master thesis: ”Emergent states in active systems” was published as a journal article

Bachelor of Science (B. Sc.), Physics — University of Düsseldorf — 2008 - 2012

- **Gpa: 1.2** (grades at german university range from 1.0 (best) to 4.0 (worst)). Minor: Mathematics
- Bachelor thesis: ”Orientational fields in Plastic Crystals” was published as a journal article.

SKILLS

Programming languages	Python, C++, C, Rust, Typescript
IT working knowledge	Docker, GitLab, GitHub, VS Code, MongoDB, PostgreSQL, flask, fastAPI, Kubernetes, Grafana, REST, Linux, Node.js, Azure, GCP, LaTeX, MS Office
Libraries and frameworks	TensorFlow, PyTorch, scikit-learn, fastAPI, flask, numpy, scipy, Qt, pandas, OpenMP

Machine Learning techniques	SVMs · Gradient Boosting · Population Strategies · Decision Trees · CNNs
Agile software development	Scrum · Kanban · Jira · Confluence
Languages	German (native) · English (C1) · Norwegian (B2) · French (A2)

ACHIEVEMENTS, HONOURS, AND AWARDS

- Best Poster presentation at the 15th German Ferrofluid Workshop in Rostock (2015).
- DAAD scholarship "RISE in North America" for a three month research internship at Yale University, CT (2010)

PROJECTS I CONTRIBUTED IN AS AN INDIVIDUAL CONTRIBUTOR

Vectorstore for retrieval augmented generation — COGNITE, Oslo, Norway — 04/2023 - 08/2023

- Vector similarity lookup service build on top of the Weaviate vector database
- Enables to retrieve relevant context for LLM queries to enable an industrial chatbot and code completion experience

Data backend to store an industrial knowledge graph — COGNITE, Oslo, Norway — 06/2022 - 08/2022

- Creating a backend to store symbols and process lines extracted from engineering diagrams in an industrial knowledge graph
- Implemented in Python and Typescript and interfaces to COGNITE's internal flexible data modeling service
- Allows for advanced graph queries on the knowledge graph and, thereby, enables advanced interactions with the industrial reality

Annotation API to store auxiliary label data on files — COGNITE, Oslo, Norway — 08/2021 - 06/2022

- Implemented a REST API to store label information on files within COGNITE's data warehouse
- Went from design to fully productive usage with SLAs in less than a year
- Implemented in Python on top of *PostgreSQL* using *SQLalchemy* and *flask*. Flexible annotation type system enabled by *pydantic*

Intelligent document scanning tool — COGNITE, Oslo, Norway — 03/2021 - 06/2022

- Contributed to a document scannnig tool that detects relevant fields in scanned forms and automatically extracts their values, significantly reducing the human effort required
- Using Azure OCR to detect text instances together with a line detection algorithm to extract tables and fields. Combined with hand-crafted rules to make the field extraction more robust

Live execution of detection network in test vehicle — APTIV, Wuppertal, Germany — 11/2020 - 12/2020

- Deployed a 3d bounding box detection network on Nvidia Jetson Xavier hardware
- Optimizations and tweaks to make an automotive detection network fast enough to run live in the test vehicle

Runtime environment for AI algorithms — APTIV, Wuppertal, Germany — 06/2020 - 10/2020

- Runtime environment written in Rust for live execution of AI algorithms in test vehicles for demo purposes
- Main contributions: Preprocessing from the raw sensor data into the TensorFlow network input, subsequent postprocessing of the network results into bounding boxes for visualization, as well as abstractions to allow for different combinations of sensors and networks

Tooling for neural network training — APTIV, Wuppertal, Germany — 02/2020 - 03/2020

- Python / Rust tooling to download sensor data and ground truth from a data warehouse and refine it for neural network training
- Sophisticated interpolation algorithm for 3d bounding boxes to arbitrary timestamps
- Using HDF5 as final data exchange format

Machine Learning automation using microservices — APTIV, Wuppertal, Germany — 03/2020 - 05/2020

- Established a Python microservice framework for the automatic execution of Machine Learning algorithms
- Automatic triggering of execution pipelines on trigger events, such as the availability of new data

Deploying a facial expression detection system — Affectiva, Boston, MA — 08/2019

- Short-noticed support of cooperation partner Affectiva in Boston to mitigate risk in a customer project
- Made key contributions for deploying a facial expression detection system using TensorFlow and TF-Lite

Product Owner for a data warehouse project — APTIV, Wuppertal, Germany — 02/2019 - 02/2020

- Lead of a SCRUM team of 5 developers to establish a data warehouse for automotive sensor data and algorithm results
- Access to automotive driving scenarios for the development of AI-based driver assistance systems
- Based on MEAN stack, hosted in Azure using BlobStorage for larger binary data. Orchestrated using docker-compose
- Featuring a REST API, a Python access client, a frontend with a video playback tool, and full backend test coverage

3D object detection on automotive radar data — APTIV, Wuppertal, Germany — 12/2018 - 01/2019

- Lead a team of 5 engineers for a Deep Learning proof of concept
- Successfully demonstrated an anchor-based 3D object detection on automotive radar raw data using CNNs

Automotive recording tool — APTIV, Wuppertal, Germany — 07/2018 - 08/2018

- Development of a tool using C++ and Qt for the recording of sensor data in a test vehicle.
- Recording of LiDAR (via UDP), Vehicle host bus and radar detections (via CAN), and radar debug information (via UDP)
- Emphasis on correct timestamping of recorded sensor data, such that it can be replayed after recording

LiDAR labeling tool — APTIV, Wuppertal, Germany — 01/2018 - 12/2018

- Work on a web-based labeling tool for 3D bounding boxes in LiDAR point clouds using TypeScript
- Backend development using MEAN stack (MongoDB, Express, Angular, Node.js)
- Main contributions: User and group management and data upload

Simple raytracer to simulate FMCW Radars — APTIV, Wuppertal, Germany — 11/2017 - 12/2017

- Simulated an automotive FMCW radar by creating a simple raytracer in Python.
- Used this raytracer to simulate artificical training data for neural networks

Automatic code generator for CNNs — APTIV, Wuppertal, Germany — 07/2017 - 10/2017

- Implemented code generator in Matlab to deploy CNNs to a TI embedded chip
- Given a CNN trained in TensorFlow, this generator creates optimized C++ code to execute that CNN on the target platform

TEACHING

Co-Organizer of the NorwAI 2022 hackathon — NTNU Trondheim, Norway — 08/2022 - 10/2022

- Organizing and conducting a Data Science hackathon in Trondheim with Cognite and researchers from NTNU
- Finding a suitable dataset, defining a task, supervising the students during the event, and evaluating the contributions

Lecturer on artificial intelligence in autonomous driving — University of Wuppertal, Germany — 10/2020 - 04/2021

- Lecture "Artificial Intelligence Based Sensor Signal Processing for Autonomous Driving" held in collaboration with colleagues from APTIV
- Prepared and held lectures and exercises about Numerical Optimization in Data Science, Support Vector Machines, and Gradient Boosting

Master thesis supervision — APTIV, Wuppertal, Germany — 03/2019 - 09/2019

- Supervised a master student on using GANs for automotive data style transfer
- Created artificial LiDAR data by modding the video game GTA: V, then trained a GAN on real LiDAR data to do the domain transform
- Tested and benchmarked this approach with a birds-eye-view 2D object detection model

Bachelor thesis supervision — University of Düsseldorf, Germany — 2016

- Supervised a bachelor student on the numerical simulation of magnetic gels

Teaching assistant for theoretical physics lectures — University of Düsseldorf, Germany — 2013-2017

- Lectures: Quantum Mechanics and Statistical Mechanics
- Created homeworks and gave exercise classes
- Answered student questions about the lecture topics
- Designed and held oral and written exams

ABOUT ME

Interests I am enthusiastic about AI, tech and science related topics. To follow the recent developments in machine learning, I like to read papers on arXiv and from the ICLR conference and I follow towardsdatascience and the /r/MachineLearning subreddit. To stay on top of new trends in software engineering and science topics, I regularly browse Hacker News. Additionally I like to improve my leadership and organization skills by reading related books.

Activities Sozializing with friends has always been important to me. I am an enthusiastic Pen & Paper gamemaster since 20 years and often meet with friends to indulge together in this hobby. Keeping myself healthy with a good diet and regular exercise is another priority for me. To achieve this, I like to cook quality food with fresh ingredients, and I go running several times a week. To keep myself in shape and the environment clean, I take my racing bike to reach places whenever possible