Dr. Peet Cremer

* 27/01/1988
Weseler Str. 22, 40239 Düsseldorf, Germany | +49 151 64548894
peet.cremer@gmail.com | Peet Cremer | @PeetCremer | Publication list

I am an AI Software Engineer and Data-Scientist with a background in Statistical Physics and Computer Science. I combine a strong mathematical background with advanced programming skills (Python, C++, Rust) and knowledge of Data Science frameworks (TensorFlow, PyTorch, scikit-learn). I have an outgoing, communicative personality, a hands-on attitude, and I am experienced in agile leadership of small teams.

WORK EXPERIENCE

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

- Planning and execution of Machine Learning and Data Infrastructure projects in the automotive industry
- Establishment of new technologies and risk mitigation. Cross-functional role as a technical adviser in various projects
- Design of technical pathways to AI solutions and their efficient implementation
- Participation at conferences to identify new developments in AI Research. Guidance of colleagues to integrate these new trends into the daily work

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

- Development of infrastructure solutions for artifical intelligence in automotive applications
- SCRUM Product Owner for a data warehouse solution to store automotive sensor data
- Setup of a microservice solution for automatizing 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
- Solutions of magneto-elastic coupling models using numerical simulations, the finite element method, as well as density functional theory
- This work has 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**[1]. 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: 1.3**[1]. 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	git, Docker, Gitlab, VS Code, MongoDB, REST, bash, Linux (Ubuntu, Debian), Node.js, MS Azure, Matlab, vim, LaTeX, MS Office
Libraries and frameworks	TensorFlow, PyTorch, scikit-learn, matplotlib, numpy, scipy, Qt, HDF5, pandas, OpenMP
Machine Learning Techniques	SVMs, Gradient Boosting, Population Strategies, Decision Trees, CNNs
Agile software development	Scrum (Product Owner), Kanban, Jira
Languages	German (native), English (full professional proficiency), French (intermediate), Norwegian (basic)

[1] Grades in German universities range from 4.0 (worst) to 1.0 (best).

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)

IT AND DATA SCIENCE PROJECTS

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

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

- Lecture "Artificial Intelligence Based Sensor Signal Processing for Autonomous Driving" held in collaboration with colleagues from APTIV
- Designed and held 3 lectures and corresponding exercises about the topics: 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 tech and science related topics in general. 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 in general, I regularly browse Hacker News

Activities Sozializing with friends has always been important to me. I am an enthusiastic Pen & Paper gamemaster since 19 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