Jochen Görtler

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> Profile

I am a freelance senior software engineer and research scientist. I design and develop hand-tailored data exploration systems that help users better understand machine learning algorithms and steer their performance through interactive visualizations. Typically, these systems leverage the full web stack: I have more than five years of experience in *Rust*, writing efficient and performant systems code that can also compile to *WASM*, while I use *TypeScript* together with frontend frameworks such as *Svelte*, *React*, and *Vue* to provide robust and rich user interactions that are intuitive to grasp for all stakeholders. I love working closely with clients to fully understand the requirements of their business domain—and helping them integrate my work by refactoring or modernizing legacy systems.

> Experience

Apple (Video Engineering, Seattle — Remote) 02/2023–now

Freelance — Machine Learning Research Engineer

Researching interactive visualizations to improve the on-device inference efficiency of deployed machine learning models. Implemented a system that uses genetic algorithms to automatically find and explore Pareto-optimal improvements to neural network architectures in *Rust*, *WASM*, and *TypeScript*. Design and implementation of an interactive graph viewer in *TypeScript* using *Svelte*, which is used by multiple internal teams to visualize deep neural networks and Transformer architectures. Refactor and modernization of a large frontend research prototype written in *JavaScript* and *Vue* using *TypeScript*.

IOTA Foundation (Berlin — Remote) 04/2022–02/2023

Team Lead — Senior Software Engineer (Rust) ~11 months

Leading the development of the IOTA's permanode and indexation solutions. Using *gRPC* and *MongoDB* to store and efficiently query large amounts of block and transaction data. Design and implementation of microservices and REST APIs based on *Tokio* and *Axum*. Providing advanced DLT analytics using *InfluxDB* and *Grafana*. Orchestration and deployment using *Docker* and *GitHub Actions*.

IOTA Foundation (Berlin — Remote) 11/2021–03/2022

Senior Software Engineer (Rust) 5 months

Writing open-source *Rust* code for the backend of the decentralized *Bee* node software. My work encompasses developing a robust, modular, and performant implementation of IOTA's core Layer-1 distributed ledger protocol using *Tokio*'s asynchronous runtime. Improving CI workflows in *GitHub Actions*.

Apple (AIML, Seattle — Remote) 06/2020–09/2020

Human Computer Interaction + Machine Learning Intern 3+ months

I developed a domain-specific language together with a query-based visualization system for exploring the performance of machine learning methods on hierarchical and multi-output predictions *(Received Best Paper Award at ACM CHI '22)*. The implementation is based on *TypeScript*, *Svelte*, and *D3* to enable rich user interactions.

Visualization Design Lab (SCI, University of Utah) – Prof. Lex 06/2019–08/2019

Visiting Researcher 3 months

I co-developed a system that predicts the user's intent when interacting with visualization systems by comparing the user's selection to the output of various machine learning methods. For this, I designed a client-server architecture using *Python* and *Flask* to decouple the frontend visualization from the ML backend based on *SciKit-Learn* and *Numpy*.

KUKA Laboratories GmbH 02/2014–07/2014
Voluntary Internship 6 months

I implemented an efficient RANSAC-based algorithm for object recognition and pose estimation in point clouds from a *Kinect* camera using *PCL* and *OpenCV*. I also automated the entire build process for external libraries of a large codebase in a cross-platform environment using *CMake*.

> Skills and Qualifications

Languages German (native), English (C2), French (B1), Spanish (A1)
Programming Rust (5+ years), TypeScript (3+ years), WebAssembly, C++, OpenGL/WGPU, GLSL
Frameworks Tokio, Axum, D3.js, Svelte, React, NextJS, Vue 2 + 3, Qt, OpenCV

> Education

Ph.D. in Computer Science (Dr. rer. nat) 2016–2021
Visual Computing Group – Prof. Deussen, University of Konstanz
Quantitative methods for uncertainty visualization

M.Sc. in Computer Science (Awarded with distinction) 2012–2015
Karlsruhe Institute of Technology
Superpixels for identifying structures in laparoscopic surgery

B.Sc. in Computer Science 2008–2012
Karlsruhe Institute of Technology
Visualization concept for laparoscopy using augmented reality

> Publications

The following are my research highlights—you can find all of my publications on Google Scholar.

Talaria: Interactively Optimizing Machine Learning Models for Efficient Inference
ACM Conference on Human Factors in Computing Systems — CHI (2024)
F Hohman, C Wang, J Lee, J Görtler, D Moritz, J P Bigham, Z Ren, C Foret, Q Shan, X Zhang

Neo: Generalizing Confusion Matrix Visualization to Hierarchical and Multi-Output Labels
ACM Conference on Human Factors in Computing Systems — CHI (2022)
J Görtler, F Hohman, D Moritz, K Wongsuphasawat, D Ren, R Nair, M Kirchner, K Patel
ACM CHI 2022 Best Paper

A visual exploration of Gaussian processes
Distill.pub (2019)
J Görtler, R Kehlbeck, O Deussen
VISxAI 2018 Best Submission

Uncertainty-aware principal component analysis
IEEE Transactions on Visualization and Computer Graphics (2020)
J Görtler, T Spinner, D Streeb, D Weiskopf, O Deussen

Stippling of 2D scalar fields
IEEE Transactions on Visualization and Computer Graphics (2019)
J Görtler, M Spicker, C Schulz, D Weiskopf, O Deussen
PacificVis 2019 Best Paper