Finn Köhler

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Education

University of California, Berkeley — Berkeley, California, USA
Graduate Student - Computer Science (Visiting Student) — *Aug. 2026 – Jan. 2027*

- Coursework (subject to availability): Vehicle Dynamics & Control (ME 236C), Advanced Robotics (CS 287), Algorithmic Human-Robot Interaction (CS 287H), Introduction to Embedded Systems (CS C249A), Dynamics and Control of Autonomous Flight (ME 236U).
- Focus Areas: Robotics, autonomous vehicles and real-time control systems.

University of Münster — Münster, Germany
Master of Science in Information Systems (Major in Data Science) — *Oct. 2025 – Sept. 2027*

- Coursework: Unsupervised Learning, Optimization and Decision Making, Mining Massive Datasets, Computer Vision
- Focus Areas: Machine Learning for autonomous systems.

Bielefeld University of Applied Sciences (HSBI) — Bielefeld, Germany
Bachelor of Engineering in Digital Technologies (Dual-Study Program) — *Aug. 2020 – Feb. 2024*

- GPA: 1,8 (US equivalent ≈ 3.5); Thesis: 1,3 (US equivalent ≈ 3.8)
- Thesis: Automated integration of TwinCAT Analytics Dashboard into existing industrial visualizations.
- Selected Coursework: Algorithms & Data Structures, Machine Learning, Cluster Computing, Big Data, Data Mining, Operations Research, Speech & Image Recognition, Quality Assurance for AI Systems.

Experience

Software Engineer (Working Student) — Oct. 2025 – Present
Beckhoff Automation GmbH & Co. KG (TwinCAT Analytics) — *Münster, Germany*

- Engineering the TwinCAT Global Watchlist, a high-performance monitoring interface for real-time PLCs with millisecond-level data synchronization and visualization.
- Implemented snapshot capture and restore, bidirectional write-back to live PLC runtimes, and flexible multi-format value rendering (hex, octal, binary, decimal).
- Developed a Visual Studio service enabling PLC self-registration and automated variable integration with project handling.
- Contributing to the TwinCAT Scope Server for scalable real-time data analysis and diagnostics.

Software Engineer (Full-time) — Feb. 2024 – Oct. 2025
Beckhoff Automation GmbH & Co. KG (TwinCAT Analytics) — *Verl, Germany*

- Built a high-performance, generic filtering framework in C# with a custom query language for large-scale tree views.
- Leveraged reflection, Interop interfaces, and attribute-driven design to enable plug-and-play extensibility across modules.
- Optimized execution via aggressive caching and constraint-based evaluation, achieving real-time UI filtering with millisecond latency.
- Initiated the development of the TwinCAT Global Watchlist for real-time PLC diagnostics and visualization.

Dual-Study Software Engineer — Aug. 2020 – Feb. 2024
Beckhoff Automation GmbH & Co. KG (TwinCAT Analytics) — *Verl, Germany*

- Bachelor Thesis (Grade 1.3): *Automated integration of the TwinCAT Analytics Dashboard into existing industrial visualizations.*
- Architected a **synchronization framework** unifying legacy visualization concepts with modern analytics dashboards.
- Designed and implemented automated User Management configuration generation for secure server-side data access in TwinCAT HMI.
- Developed Windows kernel-mode drivers and industrial IoT data acquisition pipelines.

Selected Projects

Dartz - Multiplayer Darts Scoring Platform | *React, PostgreSQL, Firebase* 2024 – Present

- Architected a multiplayer scorekeeping platform utilizing Firebase for real-time state synchronization across remote clients.
- Implemented game logic for "501" rules, featuring live matches with remote and local players, 3D-Models and (soon) player performance analytics.
- **Live demo**

Handwritten Math Symbol Recognition + Grad-CAM | *Python, TensorFlow, CNN* 2023 – 2024

- Trained and evaluated a CNN to classify handwritten mathematical symbols (80+ classes) using a Kaggle dataset with 100k+ images.
- Achieved ∼93.6% test accuracy and analyzed failure modes via confusion matrices and misclassification clustering.
- Implemented Grad-CAM visualizations to explain model decisions and highlight salient regions used for classification.

Robotics club & Automated Pathfinding 2018 – 2020

- Engineered an autonomous robot capable of real-time pathfinding and object targeting using remote control and onboard logic.
- Organized STEM hands-ons for interested students in local schools.

Technical Skills & Leadership

Programming: C#/.NET (Advanced), Python (PyTorch, scikit-learn, pandas. NumPy, matplotlib), C/C++, TypeScript (React), SQL
AI & Data: Machine Learning, LLM pipelines, Data Mining, Hadoop, Spark
Automation & Real-Time Systems: TwinCAT PLC (IEC 61131-3), TwinCAT Analytics, TwinCAT HMI, TwinCAT ADS, Industrial IoT pipelines, Windows kernel-mode development, MQTT
Technologies: Git, Docker, Firebase
Methodologies: Agile/Scrum
Languages: German (Native), English (TOEFL iBT: 117/120), Spanish (Basic)
Leadership: Handball Team Captain; Elected Member of Computer Science Student Council