# Marcel Bruckner

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marcel-bruckner • MarcelBruckner


*Robotics engineer with deep expertise in vision-based reinforcement learning and system reliability. Driven by the mission to build general-purpose robots that operate safely in the real world. I create robust, elegant solutions that perform reliably in practice.*

## Skills

**Computer Vision**: Visual SLAM, 6D Pose Estimation, Object Detection, Segmentation, Sensor Fusion
**Deep Learning**: Vision Transformers, Hypernets, Reinforcement Learning, Continual Learning, Diffusion Models
**Frameworks & Languages**: PyTorch, TensorFlow, CUDA, OpenCV, Python, C++, Java
**Robotics Tools**: ROS2, MuJoCo, OpenAI Gym, Real-Time Video Processing, Visual Grasping Pipelines

## Education

**TUM School of Computation, Information and Technology** **TU Munich**
*Informatics: Games Engineering – M.Sc., Final grade: 1.6* *Apr. 2019 – Mar. 2022*
My specialization is in computer vision, machine learning, deep learning, and robotics. I conducted practicals and research projects on autonomous driving and robotic applications, applying my knowledge and skills.

**TUM School of Computation, Information and Technology** **TU Munich**
*Informatics: Games Engineering – B.Sc., Final grade: 2.1* *Oct. 2015 – Mar. 2019*
Covered core CS topics and specialized in graphics, simulation, AI, and autonomous systems.

## Master thesis

**TUM: Chair of Robotics, Artificial Intelligence, and Real-time Systems** **TU Munich**
*Vision-Based Continual Reinforcement Learning for Robotic Manipulation Tasks [1]* *Oct. 2021 – Mar. 2022*
I developed a novel hypernetwork-based approach for vision-based continual reinforcement learning in robotic manipulation tasks, addressing the challenge of catastrophic forgetting in sequential learning. Key achievements:
- Designed a continual learning framework enabling robots to learn multiple tasks without forgetting.
- Developed a state representation model that extracts meaningful features from images, allowing vision-only learning.
- Showed that hypernetwork-based RL significantly outperforms traditional methods in retaining learned skills.
- Matched or exceeded hand-crafted numeric states, proving the effectiveness of learned visual features.

## Experience

**CQSE GmbH** **Munich**
*Software Consultant* *Mar. 2022 – Today*
Responsible for driving software quality initiatives and long-term maintainability at scale for clients in public and private sectors. My contributions led to enhanced software reliability and strengthened client relationships. Key achievements:
- Established and maintained long-term client relationships, driving significant revenue growth.
- Inedpendently led major private and government sector clients in improving software quality and maintainability.
- Analyzed and evaluated software architectures, development processes, and technology stacks for future-proofing.
- Designed and implemented quality assurance processes tailord towards long-term maintainability.
- Improved our analysis platform Teamscale, leading product development and improving our analysis.

**TUM: Chair of Robotics, Artificial Intelligence and Real-time Systems** **Munich**
*Student Assistant with a Degree* *Apr. 2021 – Sep. 2021*
I implemented the Online Self-Correcting Calibration Architecture for Multi-Camera Traffic Localization Infrastructure for the Providentia++ project on the A9 highway. We documented our work in the following publication [2].

## Publications

**An Online Self-Correcting Calibration Architecture for Multi-Camera Traffic Localization Infra. [2]** **IEEE**
*IEEE Symposium on Intelligent Vehicle* *2024*
I developed a robust camera calibration architecture that enhances 3D localization accuracy in vision-based sensing systems, integrating high-definition maps with an adaptive stabilization mechanism to counteract vibrations and orientation drifts:
- Designed a self-correcting calibration method that maintains precision during continuous operation.
- Enhanced the reliability of deep-learning-based traffic monitoring by reducing localization errors.
- Improved localization accuracy by 50% on a real test site.

## Interests

**Selfhosting**: Homelab for personal services, smart home and home surveillance system
**Sports**: Gym, Disc Golf, Biking, Running
**Volunteering**: Passionate Blood–Donor, Volunteer foster home for rescued dogs from Greece

## Languages

**German**: Native

**English**: Fluent

## Publications

[1] Marcel Bruckner. Vision-based continual reinforcement learning for robotic manipulation tasks. `https://github.com/MarcelBruckner/Master-Thesis/blob/main/master-thesis.pdf`, 15.02.2022.

[2] Leah Strand, Marcel Bruckner, Venkatnarayanan Lakshminarasimhan, and Alois Knoll. An online self-correcting calibration architecture for multi-camera traffic localization infrastructure. In *2024 IEEE Intelligent Vehicles Symposium (IV)*, pages 1666–1671, 2024.