

# Marcel Bruckner

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## Skills

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**Tools:** PyTorch, TensorFlow, CUDA, MuJoCo, OpenAI Gym

**Programming:** Java, TypeScript, Python, C++, Clean Code, Software Architectue

**Deep Learning:** CNNs, Reinforcement Learning, Continual Learning, State Representation Learning

**Computer Vision:** OpenCV, YOLO, RGB-D Cameras, Point Clouds, Sensor Fusion

## Education

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### 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*

I gained a comprehensive understanding of computer science fundamentals, including software engineering, algorithms, mathematics, databases, and distributed systems. I specialized in computer graphics, physics simulations, augmented/virtual reality, AI, and autonomous driving.

## Master thesis

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### 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

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### CQSE GmbH

**Munich**

*Software Consultant*

*Mar. 2022 – Today*

I play a key role in ensuring software quality, optimizing processes, and advising clients on long-term improvements. My contributions led to enhanced software reliability and strengthened client relationships. Key achievements:

- Established and maintained long-term client relationships, driving significant revenue growth.
- Supported major private and government sector clients in improving software quality and maintainability.
- Conducted in-depth code reviews and advised development teams on improving software quality.
- Analyzed and evaluated software architectures, development processes, and technology stacks for future-proofing.
- Designed and implemented quality assurance processes tailored towards long-term maintainability.
- Developed software in Java, JavaScript, and TypeScript, 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

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### 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 real-time object localization accuracy by 50% in a real-world test environment.

## Interests

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**Selfhosting:** Homelab for personal services, smart home and home surveillance system

**Sports:** Gym, Disc Golf, Downhill-Biking

**Volunteering:** Passionate Blood-Donor, Foster home for saved stray dogs coming from greece

## Languages

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**German:** Native

**English:** Fluent

## Publications

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[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.