Marcel Bruckner

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Skills

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

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

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*
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 tailord 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

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

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

German: Native

English: Fluent

Literatur

[1] Marcel Bruckner. Vision-based continual reinforcement learning for robotic manipulation tasks. `https://github.com/MarcelBruckner/CDN/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.