

# KEVIN EPPACHER

## Robotics Software Engineer

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## EXPERIENCE

### Research Assistant – Tutorial Author

#### UAS Technikum Vienna

📅 Aug 2025 – Sep 2025    📍 Vienna, Austria

- Authored student tutorials on ROS 2, nonlinear optimization with PyTorch, and end-to-end deep reinforcement learning using Stable-Baselines and Gymnasium.

### Industrial Robotics Software Engineer

#### Blue Danube Robotics GmbH (AIRSKIN)

📅 Aug 2023 – Jul 2025    📍 Vienna, Austria

- Developed and deployed low-level robot programs (MoveIt C++/ KRL / RAPID) involving kinematics, tool calibration, coordinate-frame transformations, and precise motion execution for AIRSKIN-equipped robots.
- Built an automated sensitivity measurement system, including depth-based visualization of contact points and geometric evaluation of measurement data.
- Created integration concepts for customer-specific AIRSKIN solutions, including cell layout design, workspace modeling, and feasibility analysis.
- Supported quality inspection workflows and robotic handling tasks with geometry-aware motion planning and cycle-time optimization.

### Bachelor Thesis Intern

#### Automation and Control Institute (ACIN), TU Vienna

📅 Feb 2023 – Jul 2023    📍 Vienna, Austria

- Developed a control system for high-speed drone tracking using a pan-tilt camera and cascaded PID controller.
- Implemented Kalman-filter-based sensor fusion for camera-based tracking and trajectory prediction in ROS / OpenCV.

### Prototype Engineer

#### GKN Driveline

📅 Jun 2019 – Sep 2019    📍 Bruneck, Italy

- Assembled and tested prototype transmissions and optimized assembly processes for pilot production.

## EDUCATION

### M.Sc. Robotics

#### UAS Technikum Vienna

📅 2023 – ongoing    📍 Vienna, Austria

- Focus on computer vision, probabilistic robotics, and nonlinear optimization.
- Thesis: “SAGE – Semantic-Aware Guided Exploration with Persistent Memory” (in progress).

## PROFILE

Robotic software engineer with experience in computer vision, 3D perception, and real-time system design. Develops high-performance algorithms across perception, localization, and action for camera-based robotic platforms.

## SKILLS

### Programming Languages

C/C++    Python

### Frameworks & Libraries

ROS 2    PyTorch / CUDA    OpenCV  
BehaviorTree.CPP    Gymnasium (RL)  
Matlab / Simulink

### Tools & Environment

Git / GitHub    Docker    VS Code  
CMake    Linux (Ubuntu)  
Isaac Sim/Gym

### Computer Vision & AI

Tracking & 3D Geometry  
Visual-Language Models (VLM)  
Object Detection & Segmentation

### Robotics & Control

Model Predictive Control (MPC)  
Nonlinear Optimization  
Kinematics & Dynamics  
Real-Time Systems

## LANGUAGES

English    ● ● ● ● ●  
German    ● ● ● ● ●  
Italian    ● ● ● ● ●

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## B.Sc. Mechatronics & Robotics

### UAS Technikum Vienna

📅 2020 – 2023

📍 Vienna, Austria

- Focus on dynamics, control theory, and mobile and articulated robotics.
- Thesis: “Design of a Cascaded Position and Velocity Controller for a Pan-Tilt Camera Tracking UAVs.”

## Higher Technical College (HTL) – Mechatronics

### HTL Mödling

📅 2015 – 2020

📍 Mödling, Austria

- Specialized in control theory, mechanical design, and electrical engineering.
- Graduated with a diploma in Mechatronics Engineering.

## PROJECTS

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Selected projects focusing on control, semantic mapping, and autonomous exploration.

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### SAGE – Semantic-Aware Guided Exploration with Persistent Memory

#### Master's Thesis

📅 2025 – ongoing

- Developed a real-time semantic exploration system using calibrated RGB-D camera streams (intrinsic/extrinsic parameters) for depth fusion, point cloud generation, and spatial perception.
- Leveraged 2D navigation SLAM and 3D semantic point cloud maps, combined through geometry-aware fusion pipelines to enhance spatial understanding.
- Integrated image preprocessing, object detection (YOLO-E), and 3D semantic fusion (OpenFusion) to create persistent scene representations for open-vocabulary reasoning.
- Combined multi-source sensor fusion and behavior tree decision modules to enable autonomous object search and exploration under real-time constraints.

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### Nonlinear Model Predictive Controller (nMPC) for Differential Drive Mobile Robot (DDMR)

**Frameworks: ROS 1 & 2 / CasADi / Python / PyTorch / Docker**

📅 2024 – 2025

- Designed an nMPC local planner predicting future robot states via kinematic modeling and online optimization.
- Benchmarked against DWA and TEB planners in Gazebo, demonstrating smoother, constraint-compliant trajectories.

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### Automated Sensitivity Measurement System (AIRSKIN)

**Frameworks: ROS Noetic / MoveIt / C++ / Docker**

📅 2024

- Built an automated robotic test bench for AIRSKIN pads, reducing measurement time from hours to minutes.
- Integrated UR10, force-torque sensing, and 3D camera point cloud visualization via MoveIt and RViz; GUI developed in ImGui C++.

**Full portfolio:** [KevinEppacher.github.io](https://kevinEppacher.github.io)

## REFEREES

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**Dr. Michael Zillich**

@ CTO, Blue Danube Robotics (AIRSKIN)

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Supervised industrial robotics projects