SEBASTIAN KOCH

PhD Student (3rd year)

University of Ulm & Bosch Center for Artificial Intelligence (BCAI)

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EDUCATION

PhD **Computer Science,** *University of Ulm. Advisor: Prof. Timo Ropinski.*

Apr 2022 – Apr 2025* PhD topic: 'Understanding 3D scenes using Scene Graphs', collaboration with BCAI.
The goal of my PhD is to develop 3D scene representations such as 3D Scene Graphs of the real world that enable robots to navigate and complete tasks in real-world environments.[1],[2],[3]

M. Sc. **Computer Science**, *University of Tübingen.*

Apr 2020 – Mar 2022 Computer Science major with focus on machine learning, computer vision and robotics.
Thesis: 'Multi-View RGB-D Fusion for 6D Pose Estimation'
supervised by *Gerhard Neumann* & *Andreas Geiger*. GPA: *1.4 (1.0 is the best)*

B. Eng. **Computer Science**, *Baden-Württemberg Cooperative State University.*

Oct 2016 - Mar 2020 Computer Science major with additional automotive orientated courses. GPA: *1.8 (1.0 is the best)*
Bachelor-Thesis: 'Improvement of the robustness of a SLAM system with Computer Vision'

EXPERIENCE

BCAI **Master-Thesis (6D Pose Estimation)**

Oct 2021 – Mar 2022
- Designed a multi-view RGB-D fusion method for 6D Pose Estimation achieving SOTA results.
- Proposed a symmetry-aware keypoint voting approach for improved estimation of object poses. [4]

University of Tübingen **Research Assistant (Embedded Object Detection)**

Sep 2020 – Oct 2021
- Conducted research on optimizing deep learning models for real-time object detection in high-resolution images using optimized *CUDA* and *TensorRT* implementations on embedded GPUs.
- Studied the effect of on-device image processing for remote sensing object detection accuracy.

Bosch Research **Working Student (Simulation & Integration for SLAM)**

Apr 2020 - Oct 2020
- Integrated object detection pipeline directly into a *ROS* system for improved localization & mapping.
- Responsible for synthetic data generation with *Unreal Engine* for reproducible mapping evaluation.

Bachelor-Thesis (Semantic Features for SLAM)

Oct 2019 - Jan 2020
- Demonstrated the benefit of object detection and semantic aware features for a *SLAM* pipeline.
- Evaluated different deep learning models based on accuracy and speed in a systematic manner.

Bosch Group **Cooperative Study Program**

Oct 2016 - Mar 2020 The Cooperative Study Program at Bosch provides the possibility to work on scientific projects in different departments at Bosch while I pursued my Bachelor's degree. I contributed in many projects in the software development using *C/C++* and *Python* in different automotive and robotics areas.

SERVICE

Reviewing NeurIPS 2024, IROS 2024, CVPR 2024 Workshops, ICCV 2023 Workshops

Volunteering I work as a volunteer and referee at RoboCup Junior events on a national and international level.

PUBLICATIONS

For a complete list of all publications see kochsebastian.com/publications.

2024 [1] **S Koch**, N Vaskevicius, M Colosi, P Hermosilla, T Ropinski: *Open3DSG: Open-Vocabulary 3D Scene Graphs from Point Clouds with Queryable Objects and Open-Set Relationships*. **CVPR 2024**

2024 [2] **S Koch**, P Hermosilla, N Vaskevicius, M Colosi, T Ropinski: *Lang3DSG: Language-based contrastive pre-training for 3D scene graph prediction*. **3DV 2024**

2024 [3] **S Koch**, P Hermosilla, N Vaskevicius, M Colosi, T Ropinski: *SGRec3D: Self-Supervised 3D Scene Graph Learning via Object-Level Scene Reconstruction*. **WACV 2024**

2023 [4] F Duffhauss, **S Koch**, H Ziesche, NA Vien, G Neumann: *SyMFM6D: Symmetry-aware Multi-directional Fusion for Multi-View 6D Object Pose Estimation*. **RA-L 2023 / ICRA 2024**

HONORS & AWARDS

2024 Accepted to International Computer Vision Summer School (ICVSS) 2024 for excellent PhDs in CV.

2021 1st place in the AI Chess Variant Competition conducted by the Cognitive Systems Lab of Prof. Zell.

2021 3rd place in the RL Hockey Competition of the MPI Autonomous Learning Group of Georg Martius.

2020 Accepted into the Students@Bosch program for students who excelled at Bosch internships.

2013/2014 1st & 4th place respectively at the RoboCup World Cup 2013/2014 in the *Rescue Junior* competition.

SKILLS

Languages English: fluent — German: native

Technical Computer Vision · Deep Learning · 3D Scene Representation · Embodied Vision · Robotics · Python · Numpy · PyTorch · Lightning · GNU/Linux · ROS · Git · LaTeX