Kürsat **Petek**

PhD Student in Robotics

Robot Learning Lab, Georges-Köhler-Allee 080, 79110 Freiburg, Germany

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Education

PhD Candidate in Computer Science

Freiburg, Germany

Robot Learning Lab, University of Freiburg — *Aug. 2020 - Aug. 2024*

- In my research I focus on self-supervised learning techniques for scene reconstruction and semantics understanding. The goal of my research is to enable robot perception that achieves competitive results without large scale annotated data.
- Advisor: Prof. Dr. Wolfram Burgard, Co-Advisor: Prof. Dr. Abhinav Valada

M.Sc. in Electrical Engineering and Information Technology

Karlsruhe, Germany

Karlsruhe Institute of Technology — *May 2016 - May 2020*

- Master's Thesis: Monocular Localization in HD Maps by Combining Semantic Segmentation and Distance Transform published in ICRA 2022
- Advisors: Prof. Dr. Christoph Stiller and Prof. Dr. Fernando Puente

B.Sc. in Electrical Engineering and Information Technology

Karlsruhe, Germany

Karlsruhe Institute of Technology — *Sep. 2012 - Apr 2016*

- Bachelor's Thesis: Multi-chip Integration of VCSEL and Silicon Photonics by Photonic Wire Bonding
- Advisor: Prof. Dr. Christian Koos

Experience

Research Assistant

Karlsruhe, Germany

Institute of Measurement and Control Systems, KIT — *Jan. 2019 - Jun. 2019*

- Developed a C++ library for real-time multi-object tracking based on the Labeled Multi-Bernoulli Filter.
- Developed a modular framework with utilities for different tracking approaches, e.g., Unscented Kalman Filter, Graph algorithms (DFS, BFS), Hopcroft-Karp algorithm etc.

Research Intern

Munich, Germany

Airbus Defence & Space — *Jul. 2018 - Dec. 2018*

- Developed the signal processing chain for the latest Chinese satellite navigation system, BeiDou, in C++.
- Developed a novel receiver autonomous integrity monitoring (RAIM) system for erroneous GPS measurements.
- Contributed to the development of a velocity measurement method based on charge induction for trains.

Research Assistant

Karlsruhe, Germany

FZI Research Center for Information Technology — *Apr. 2018 - Oct. 2018*

Developed a learning-based wheel detector for a multi-sensor calibration framework.

Research Assistant

Karlsruhe, Germany

Institute of Control Systems, Karlsruhe Institute of Technology — *Jun. 2017 - Nov. 2017*

Developed a cascade control for a DC motor.

Research Assistant

Karlsruhe, Germany

Fraunhofer Institute of Optronics, System Technologies and Image Exploitation (IOSB) — *Jul. 2016 - Mar. 2017*

Developed a novel multi-object tracking algorithm for satellite images based on the Hungarian algorithm.

Skills

Technical	Python, C++, PyTorch, ROS, Git, CMake, Autotools, Ceres, MATLAB, LaTeX
Languages	English (Proficient), German (Native), Turkish (Native), French (B2), Spanish (B1)
Honors & Awards	Master's Scholarship (funded by Hanns Voith Stiftung), Dorn Bader Award for best student in maths and physics

Publications

LetsMap: Unsupervised Representation Learning for Label-Efficient Semantic Bird's Eye View Mapping

Nikhil Gosala, **Kürsat Petek**, Ravi Kiran, Senthil Yogamani, Paulo L.J. Drews-Jr, Wolfram Burgard, Abhinav Valada — *Nov. 2023*

submitted for publication.

A Good Foundation is Worth Many Labels: Label-Efficient Panoptic Segmentation

Niclas Vödisch*, **Kürsat Petek***, Markus Käppeler*, Abhinav Valada, Wolfram Burgard *Nov. 2023*

submitted for publication.

Panoptic Out-of-Distribution Segmentation

Rohit Mohan, Kiran Kumaraswamy, Juana Valeria Hurtado, **Kürsat Petek**, Abhinav Valada *Oct. 2023*

submitted for publication. [Paper]

SPINO: Few-Shot Panoptic Segmentation With Foundation Models

Markus Käppeler*, **Kürsat Petek***, Niclas Vödisch*, Wolfram Burgard, Abhinav Valada *Sep. 2023*

submitted for publication. [Paper | Video | Website]

CoDEPS: Online Continual Learning for Depth Estimation and Panoptic Segmentation

Niclas Vödisch*, **Kürsat Petek***, Wolfram Burgard, Abhinav Valada *Jul. 2023*

Robotics: Science and Systems (RSS), Daegu, South Korea, 2023. [Paper | Video | Website]

SkyEye: Self-Supervised Bird's-Eye-View Semantic Mapping Using Monocular Frontal View Images

Nikhil Gosala*, **Kürsat Petek***, Paulo L.J. Drews-Jr, Wolfram Burgard, Abhinav Valada *Jun. 2023*

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2023. [Paper | Video | Website]

Robust Monocular Localization in Sparse HD Maps Leveraging Multi-Task Uncertainty Estimation

Kürsat Petek*, Kshitij Sirohi*, Daniel Büscher, Wolfram Burgard *May 2022*

IEEE International Conference on Robotics and Automation (ICRA) 2022, Philadelphia, USA. [Paper]

Monocular Localization in HD Maps by Combining Semantic Segmentation and Distance Transform

Jan-Hendrik Pauls*, **Kürsat Petek***, Fabian Poggenhans, Cristoph Stiller *Oct. 2020*

The International Conference on Intelligent Robots and Systems (IROS) 2020, Las Vegas, USA. [Paper]

*** denotes equal contribution**