

## Master Thesis

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Figure 1: Mapping and segmentation in an urban environment with LiDAR sensors. [1]

## Contact

📍 E-Bau, Dachauer Str. 98b  
80335 München

☎ 089 1265-3458

✉ intelligent-vehicles@hm.edu

✉ max.buettner@hm.edu

## Rel. Resources

Related Survey: Camera, LiDAR and multi-modal SLAM systems for autonomous ground vehicles: a survey  
 Related Reference [1]: SuMa++: Efficient LiDAR-based semantic slam.  
 Related Reference:

## Simultaneous Localization and Mapping (SLAM) with an autonomous robot

### Description

- The Intelligent Vehicles (IV)-Lab is looking for a **Master Student (m/f/d)** to support research in the field of autonomous driving starting in the coming winter semester.
- Further information you find here: <https://iv.ee.hm.edu/>

### Simultaneous Localization and Mapping (SLAM) with AgileX Autonomous Robot

- Introduction to the fundamental concepts of SLAM and its significance in the realm of robotics and automation.
- Examination of the capabilities and features of the AgileX autonomous robot platform, emphasizing its sensors and motion dynamics.
- In-depth analysis of the challenges and opportunities in implementing SLAM on the AgileX platform, considering the detection capabilities and computational limits (Agile-X setup with sensors and PC is provided by the laboratory).
- **Goal:** Develop a SLAM algorithm tailored for the AgileX robot that can map a medium-sized indoor environment.
- **Optional Extension:** Integration of obstacle avoidance capabilities in the SLAM algorithm to enhance the robot's real-time navigation and safety in dynamic environments.
- **Research Question:** Can the detection of lane structure and road type be improved by the LiDAR sensor modality (due to curb or line markings)?

### Your Profile

- Willingness to learn and interest in the topic of autonomous driving
- Ability to work independently, conscientiously, and accurately
- Previous experience with Python is required
- Previous experiences with Linux, Bash, and git are a plus

### What we offer

- Gaining first experiences in one of the most promising technical fields of modern times
- Access to high-end GPU cluster for training
- Access to workstation with GPU for development
- Supervision and close cooperation with PhD candidate

Does this appeal to you? Are you interested in the field of autonomous driving? Then reach out to us via mail and send a short introduction, your current grade report, and a cv with a photo.