

Feature-based Localization by using Static Objects of the Environment

Master's Thesis

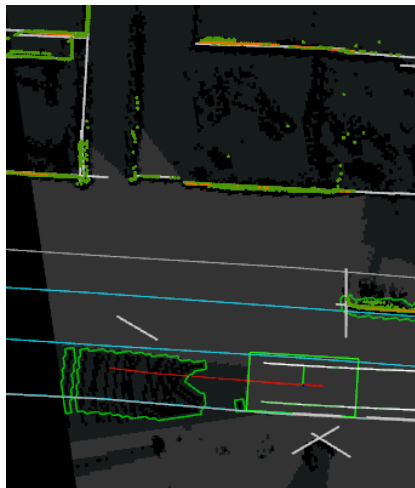
Autonomous Driving

Localization

Safety

Probabilistic Modelling

Autonomous Driving in public traffic is more present than ever. Autonomous public transport shuttles or even self-driving consumer cars are nothing new. An autonomous vehicle must localize itself in order to act safe in its environment. While there are different localization approaches available, like GPS/RTK or SLAM, all of these have their downsides. To safeguard existing localization methods, this thesis aims at developing a further localization technique based on the static objects (like walls) in the environment.



The Topic

- First, you will take part at test drives with our autonomous shuttle busses in Weiherfeld-Dammerstock, Karlsruhe to record sensor data of the vehicle
- With the recorded sensor data you will perform an analysis and develop a data structure to store static objects and features in a map, as well as a method for localization by mapping the current seen features to this map
- You will review existing literature of similar approaches and techniques to extend and improve your method
- For evaluation you will create a concept that includes typical localization problems
- To evaluate your method you will verify your approach's capabilities to cope with localization problems in recordings and during drives in real environment.

Your Skills

- You study Computer Science or a related discipline
- You are deeply interested in topics such as Autonomous Driving, Robotics, Localization, Probabilistics
- You are able to read and write scientific texts in English
- Programming in C++ and working in Linux
- You show an above-average degree of initiative and commitment as well as a thorough way of working

What You Get

- You get exciting insights into our research and gain valuable practical experience
- We use the latest hardware and software. Together with us you work in first-class laboratories (on-site or remotely)
- Regular and extensive support: Weekly 1:1 meetings, short term support if needed and participation at test-drives with our autonomous shuttle busses
- High-quality theses will be published on KITopen, with the code on GitHub
- We plan on publishing the results in an IEEE journal with shared first-authorship

How To Apply

- Start: Immediately
- Write me an email at orf@fzi.de with a short CV, your grades and a few sentences why you are interested and why you think this topic should be yours
- On acceptance, we will have a face-to-face or remote meeting to discuss details and to form the topic to your needs