Karlsruhe Institute of Technology (KIT)
Institute of Measurement and Control Systems
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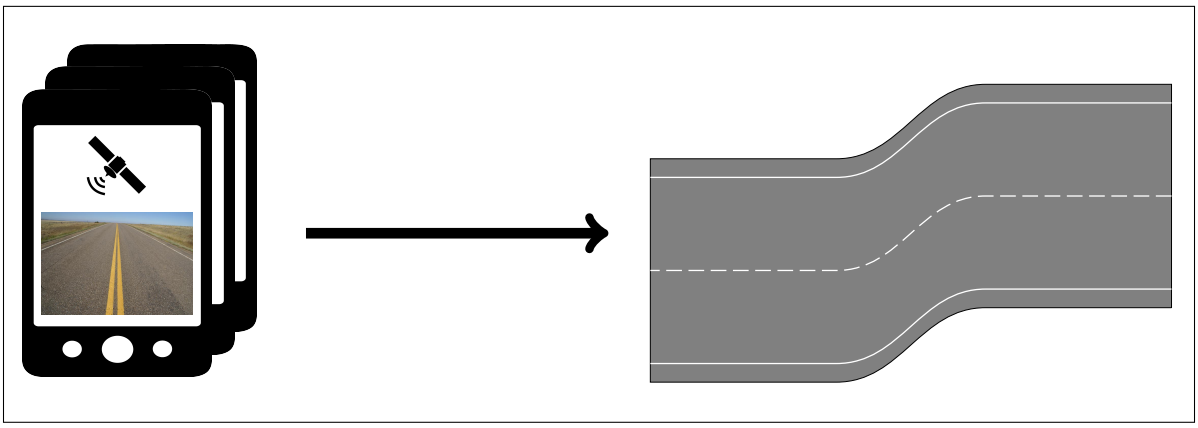
Large-Scale Multi-Drive Road Map Generation with Low-Cost Sensors

Master Thesis / Bachelor Thesis / Research Assistant



Current driver assistant systems and future autonomously driving vehicles require a thorough understanding of the local environment of the ego-vehicle. Recent research work has set the focus to enhance the on-board perception and planning systems with world knowledge in form of highly accurate digital maps that model the driving environment, e.g. location and types of lane markings or the number of available lanes in each driving direction.

Current approaches mostly deploy high-cost sensors, like LIDAR, DGPS-RTK or high-resolution stereo camera systems, to achieve a high accuracy of the generated maps. The focus of this work is to deploy low-cost vision and global positioning (GPS) sensors, e.g. from a smartphone, to generate a highly accurate, semantic road map. To achieve a high absolute and relative accuracy of the resulting map, multiple drives of the same track fused in an off-line fashion. To cover larger areas, e.g. on highways, a hierarchical map structure, that supports incremental updates, is required.

Prerequisites:	Computer Vision, C++
Covered Topics:	Lane Feature Detection, SLAM, Visual Odometry, Sub-Mapping, Road Map Representations
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Start Date:	Anytime