Universität Karlsruhe (TH)
Institut für Mess- und Regelungstechnik
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Master Thesis

Square Root Unscented Kalman Filter SLAM for Stereo Cameras

A prominent problem in robotics resarch is the "Simultaneous Localization and Mapping (SLAM)" problem. A robot is traversing a previously unknown terrain and is learning a 3D representation of its vicinity (the map). While doing so it is localizing itself within this map. In this Master Thesis a special case of the **Unscented Kalman Filter** shall be implemented as the estimator. To this end the department of measurement and control uses its autonomous vehicle equiped with a stereo camera rig.
First, the Square Root Unscented Kalman Filter shall be implemented and taken under operation. A modular SLAM framework already exists. Second, the developed algorithm shall be combined with an existing submapping method. As a result an efficient SLAM algorithm with excellent linearization and complexity properties can be expected.

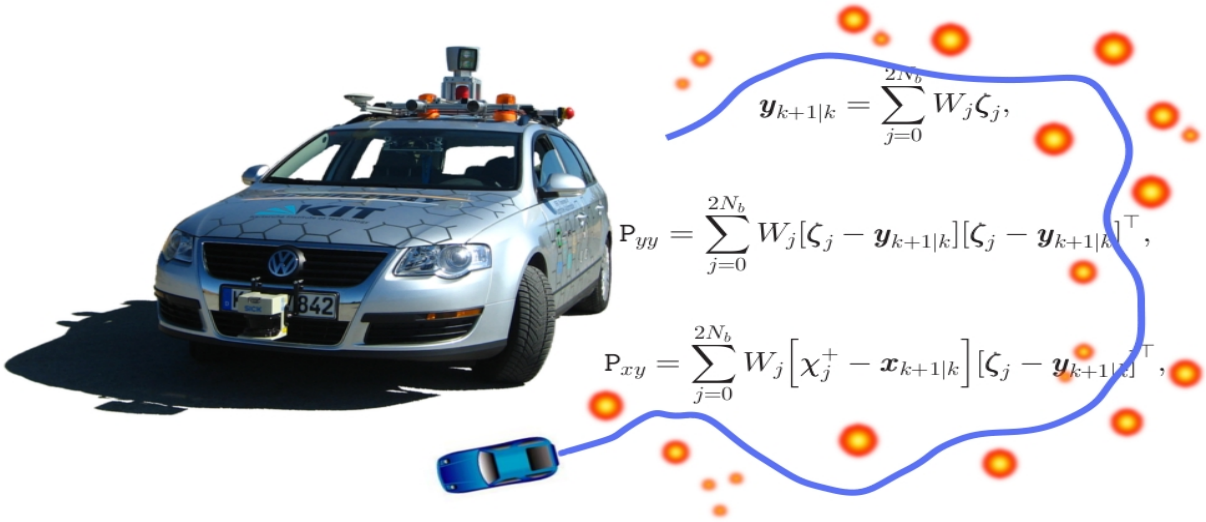

Figure 1: Our test vehicle and one possible landmark configuration with estimated trajectory

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Your qualification:	Bachelor/Grundstudium in e.g. engineering, computer science,
	math, physics etc.
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	Knowledge in estimation procedures (Kalman filters etc.)
Head of Institute:	Prof. Dr.-Ing. C. Stiller
Assistant:	Dipl.-Inform. Henning Lategahn (henning.lategahn@kit.edu)
Start date:	as soon as possible

Please don't hesitate to contact me if you have further questions: henning.lategahn@kit.edu