Das Institut für Mess- und Regelungstechnik der Universität Karlsruhe (TH) möchte Sie herzlich zu folgendem Vortrag einladen:

„Place Recognition using Regional Point Descriptors for 2D and 3D Mapping"
and
„Continuous 3D Scan-Matching with a Spinning 2D Laser"
with Michael Bosse

„Place Recognition using Regional Point Descriptors for 2D and 3D Mapping":

In order to operate in unstructured outdoor environments, globally consistent 2D or 3D maps are often required. In the absence of a absolute position sensor such as GPS or modifications to the environment, the ability to recognize previously observed locations is necessary to identify loop closures. Regional point or keypoint descriptors are a way to encode the structure within a small local region as a fixed-sized vector, though individually do not include enough context to fully identify a previously seen place. Multiple queries to a database of descriptor vectors can quickly identify similar features, and places can be recognized from a consistent set of descriptor matches. We investigate the problem of designing informative keypoint descriptors for 2D and 3D laser maps. Several models are considered and evaluated, with a particular focus on the optimal descriptor scale and keypoint sampling density. The approach is evaluated on 3D laser point cloud data collected from a vehicle driving in unstructured off-road environments. Consistent 3D maps constructed from this data without assistance from any other sensor (such as wheel encoders, GPS, or IMU) demonstrate the effectiveness of our approach.

„Continuous 3D Scan-Matching with a Spinning 2D Laser":

Scan-matching is a technique that can be used for building accurate maps and estimating vehicle motion by comparing a sequence of point cloud measurements of the environment taken from a moving sensor. One challenge that arises in mapping applications where the sensor motion is fast relative to the measurement time is that scans become locally distorted and difficult to align. This problem is common when using 3D laser range sensors, which typically require more scanning time than their 2D counterparts. Existing 3D mapping solutions either eliminate sensor motion by taking a "stop-and-scan" approach, or attempt to correct the motion in an open-loop fashion using odometric or inertial sensors. We propose a solution to 3D scan-matching in which a continuous 6DOF sensor trajectory is recovered to correct the point cloud alignments, producing locally accurate maps and allowing for a reliable estimate of the vehicle motion. Our method is applied to data collected from a 3D spinning lidar sensor mounted on a skid-steer loader vehicle to produce quality maps of outdoor scenes and estimates of the vehicle trajectory during the mapping sequences.

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Michael Bosse is a Senior Research Scientist with CSIRO's Autonomous Systems Laboratory in Brisbane, Australia. Currently he is working as a Visiting Scientist for the ASLab of ETH Zürich. His research interests include SLAM, image processing, and robot control. Mike is originally from Los Angeles, California. He received a PhD in EECS from MIT in 2004, where for his thesis he developed the Atlas Framework for large scale simultaneous localization and mapping.

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Rudolf-Planck-Hörsaal auf dem interaktiven Campusplan
Zeit: 13:00-14:00 Uhr

gez. Prof. Dr.-Ing. Christoph Stiller

Institut für Mess- und Regelungstechnik