Technische Hochschule Ingolstadt

Institut für Innovative Mobilität (IIMo)

Fraunhofer
IVI

Continental

Applied Research Master Project

„Realization of enhanced environmental perception by low level fusion of solid state Automotive LiDAR and RGB camera sensors"

Summary

The thesis focuses on the low level fusion of Automotive Solid State LiDAR sensors and wide-angle RGB camera sensors. It builds up on an existing, calibrated hardware setup which includes additionally a Linux-based high performance edge computer with a ROS-based software stack for sensor data acquisition and transformation.

The goal is is to expand on prior works and investigate and implement novel deep learning architectures for object detection and classification based on fused LiDAR and camera raw data in order to enable a more robust environmental perception, i.e. with respect to weather conditions.

A fundamental part of the thesis is the appropriate preprocessing of the individual sensor data, which might include very currently emerging techniques for camera-backed depth completion of sparse point cloud data.

The thesis takes place in a publicly funded research project in close cooperation with the Fraunhofer Institute for Transportation and Infrastructure Systems (IVI) and Continental as a leading manufacturer of Advanced Driver Assistance Systems (ADAS).

Task description

- Training and test measurements with the sensor setup and introduction to the current software state including data acquisition and transformation
- Literature research on deep learning-based depth completion and object detection based on camera and LiDAR data
- Implementation of pretrained models for depth completion
- Execution of measurement campaigns for data acquisition
- Design and training of deep learning models for object detection based on camera and LiDAR raw data

Profile

- Strong programming skills in languages such as Python or C++
- Experience and interest in Computer Vision and Machine Learning
- Experience with git and ROS is a plus
- The ability to work independently in a scientific environment
- Fluent German and/or English

Are you interested? Do you have questions? – Contact us!

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