Bachelor's Thesis

LIDAR Based Driving

This work can be done in German or English

LIDAR is one important sensor type for autonomous vehicles' perception. Human perception is mainly based on RGB data, in case of teleoperation captured by RGB cameras and transmitted to the remote operator through a communication network. As mobile networks have a variable and limited transmission rate, sending RGB video data is not always possible. Transmitting processed, high level data of the vehicle's Environment Model (bounding boxes, lane boundaries, traffic lights, etc.) results in a very low bitrate that is required for the transmission, but can be erroneously as the data are already processed. LIDAR data might be an alternative raw data type for operator's situation awareness.

The objective of this project is to develop a simulation setup within the Carla Simulator [2] for LIDAR based driving and to analyze the operator's performance, driving solely on Point Cloud information.

Tasks

- Develop point cloud visualization for manual control using the CARLA simulator
- Integrate map information from open drive map
- Analyze drivers performance for different LIDAR resolutions/layers compared to RGB
- (Optional) Evaluate raw and compressed data rate of LIDAR compared to camera

References

[1] https://en.wikipedia.org/wiki/Lidar
[2] http://carla.org

Prerequisites

- Experience Python and Linux
- Basic knowledge in ROS and C++
- General understanding of LIDAR and Point Clouds

Advisors

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