

Bachelor's Thesis

Teleoperated Driving based on a fused Multi-Sensor Representation

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. Raw or compressed LIDAR data provide the operator with a good 3D scene representation. However, perception of objects is difficult for the human operator. Using available RGB information and adding their texture in the 3D point cloud representation could improve the operator situation awareness

The objective of this project is to extend an existing LIDAR based driving and simulation setup in the Carla Simulator[2] by adding RGB texture information into the 3D scene representation.

Tasks

- Extend existing point cloud based scene representation with RGB texture information (this could be done using CARLA's RGB and depth camera sensors)
- Evaluate drivers performance for different operator representations
- Compare the results in terms of required transmission resources

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 Point Clouds

Advisors

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