

Registering LiDAR pointclouds for collaborative perception [1] in autonomous driving

The 6G-EWOC [2] project integrates object detection and classification solutions for multi-modal/multi-sensor/multi-viewpoint exploiting the communication potential of future 6G networks for autonomous driving.

Onboard sensors in multiple vehicles and the infrastructure share their data in intermediate feature fusion schemes using Fiber/Wireless Optical communication (V2I, V2V) towards edge servers that use all these data for a better collaborative detection and send back an object detection map to the participants. This helps improving Average Precision (AP) for all vehicles sharing their sensor data through a crowdsourcing scheme.

One of the tasks in 3D data fusion is registration. We propose to explore solutions in order to optimize this task in static and dynamic conditions.

Objectives:

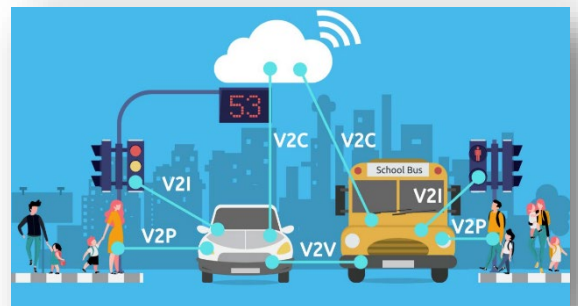
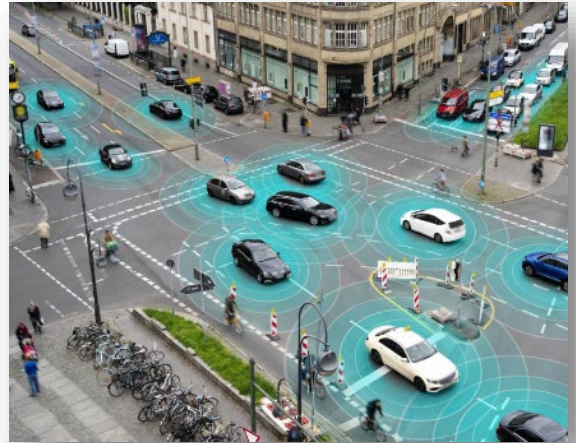
- get familiar with the state of the art in the proposed strategy
- propose a registration solution for the data of two LiDAR at approximately 90°
- extend the result to one of the LiDARs on-board a vehicle (dynamic registration)
- perform analysis with different neural models and architectures to evaluate the influence of registration errors

Requirements:

- Excellent knowledge of 3D computer vision
- Familiarity with programming tools (Python, databases, DL approaches)
- Eager to explore and perform research at an industrial level, in order to find and implement papers with solutions for the problem at hand

[1] T. Huang *et al.* (2025) "Vehicle-to-Everything Cooperative Perception for Autonomous Driving," *Proc. IEEE*, 113 (5) doi: [10.1109/JPROC.2025.3600903](https://doi.org/10.1109/JPROC.2025.3600903)

[2] AI-Enhanced Fiber-Wireless Optical 6G Network in Support for Connected Mobility, HORIZON-JTI-SNS-2023, 6g-ewoc.eu



Vehicle to Vehicle (V2V), Vehicle to Infrastructure (V2I), Vehicle to Everything (V2X): Cloud (V2C), Pedestrian (V2P)

