

AI4CSM

Automotive Intelligence for Connected Shared Mobility

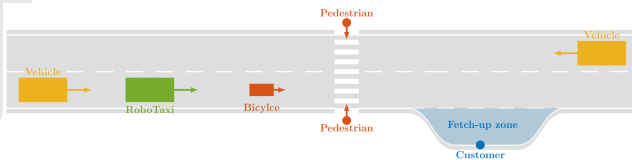
Demonstrator SCD1.2:

Robo Taxi automated operation in challenging urban use cases



Project overview

- The mission of the EU project **AI4CSM** is to develop the functional architectures for next generation ECAS vehicles based on ECS, embedded intelligence and functional virtualization for connected and shared mobility using trustworthy AI.
- 41 partner in 10 countries contribute to 8 supply chains to the project goals, project period: 2021 – 2024
- Virtual vehicle** leads supply chain 1 (SC1): “*Smart Connected Shared Mobility for Urban Area*”. As technology enabler we develop and apply perception and intelligence algorithms and test its performance in a demonstrator vehicle (Ford Mondeo) in three defined scenarios:
 - A)** (Bicycle) overtaking with on-coming traffic
 - B)** Handling of crosswalk
 - C)** Customer pick-up at fetching zone



Perception

- The perception module processes LIDAR data in real time to fill an occupancy grid with information about the degree of occupancy and its uncertainty to provide reliable information about free space
- A point cloud segmentation based on sparse convolutional neural networks provides semantics as basis for creating an object list, including estimated velocities of recognized vehicles and passengers

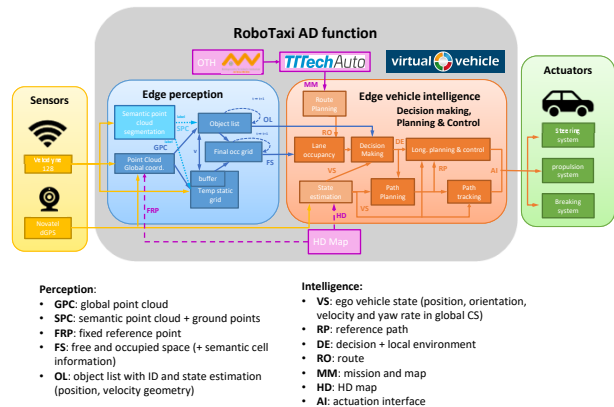
Intelligence

- The intelligence module consists of
 - A **state machine** to handle the predefined scenarios
 - Path planning** to adopt to different traffic situations and the environment
 - Long / Lat controller** to realize the planned paths with the car

Edge-Cloud connectivity

- A real-time cloud-edge communication is realized via TTTAuto as proof of concept for bi-directional communication to connect to demonstrator SCD1.3 – a digital twin of a city to simulate energy efficient routing (OTH Amberg)

Demonstrator overview



Three stage demonstration platforms

- The perception and intelligence module are developed and validated on three demonstration platforms (DP):
 - DP A1, DP A2: Separate open and closed loop simulations to test basic functionality, (1st year)
 - DP B: A joint simulation of perception and intelligence in a virtual Carla environment, (2nd year)
 - DP C: Integration of both modules into demonstrator vehicle Ford Mondeo, (3rd year)

