Syllabus

Lecture 1 - Hierarchical architecture in autonomous driving

- General architecture for autonomous driving
- Hierarchy of decision-making modules
- Alternative architectures

Lecture 2 – Decision making in autonomous driving

- Route planner
- Path planner
- Behavior selector
- Motion planner
- Obstacle avoider
- Controller

Lecture 3 – Motion planning in autonomous driving - introduction

- Scope of motion planning
- Hierarchy of requirements
- Classification of algorithms based on outputs, space-time properties and mathematical domain

Lecture 4 – Motion planning in autonomous driving - algorithms

- Space configuration
- Pathfinding algorithms
- Attractive and repulsive forces
- Parametric and semi-parametric curves
- Artificial intelligence

- Numerical optimization

Lecture 5 – Model Predictive Control – FAQs

- Feedback control

- Optimal control

- Relationship between LQR, LQG and MPC

- Relationship with DP and RL

Lecture 6 – Motion planning advanced methods

- Path planning and tracking as a single problem

- A nonlinear MPC formulation

Lecture 7 – Autoware parking planner

- What the parking planner does

- Where to find it in the repository

- How to call it

- How to inspect the results