COURSE DETAIL

MOTION PLANNING
Country Germany
Host Institution Technical University Berlin
Program(s) Technical University Berlin
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Mechanical Engineering Electrical Engineering Computer Science
UCEAP Course Number 144
UCEAP Course Suffix
UCEAP Official Title MOTION PLANNING
UCEAP Transcript Title MOTION PLANNING
UCEAP Quarter Units 5.50
UCEAP Semester Units 3.70

Course Description

Motion planning is a fundamental building block for autonomous systems, with applications in robotics, industrial automation, and autonomous driving. After completion of the course, students will have a detailed understanding of: Formalization of geometric, kinodynamic, and optimal motion planning; Sampling-based approaches: Rapidly-exploring random trees (RRT), probabilistic roadmaps (PRM), and variants; Search-based approaches: State-lattice based A* and variants; Optimization-based approaches: Differential Flatness and Sequential convex programming (SCP); The theoretical properties relevant to these algorithms (completeness, optimality, and complexity). Students will be able to: Decide (theoretically and empirically) which algorithm(s) to use for a given problem; Implement (basic versions) of the algorithms themselves; • Use current academic and industrial tools such as the Open Motion Planning Library (OMPL).

It provides a unified perspective on motion planning and includes topics from different research and industry communities. The goal is not only to learn the foundations and theory of currently used approaches, but also to be able to pick and compare the different methods for specific motion planning needs. An important emphasis is the consideration of both geometric and kinodynamic motion planning for the major algorithm types.

Language(s) of Instruction
English

Host Institution Course Number
3151 L001

Host Institution Course Title
MOTION PLANNING

Host Institution Campus
Technische Universität Berlin

Host Institution Faculty

Host Institution Degree

Host Institution Department
Institut für Technische Informatik und Mikroelektronik

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