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Advanced seminar

AI Planning for Intelligent Systems

Description

Intelligent systems aim to create adaptive environments that enhance human experiences and decision-making through sophisticated reasoning and autonomous action. These systems must operate effectively across diverse domains, where they encounter complex, dynamic situations that require real-time adaptation. Traditional approaches often rely on predefined rules, heuristics, or reactive behaviours that work well in controlled settings but struggle with complex, uncertain, and evolving scenarios. Such approaches are limited in their ability to reason about changing contexts, prioritise user needs, and align with broader objectives, such as efficiency, sustainability, or safety.

AI Planning offers a powerful framework to address these challenges, providing a computational foundation for automated reasoning about actions, goals, and strategies. It deals with selecting and combining actions into valid plans based on models of the environment, knowledge about available actions, and desired goals. Since its origins in the 1960s, AI Planning has matured into a rich field with significant advances in algorithms, representations, and tools, empowering intelligent systems to plan and act across diverse domains, from robotics and autonomous driving to adaptive software and cyber-physical environments.

This advanced seminar explores the role of AI Planning in enabling intelligent behaviour in real-world systems. Participants will engage with research on planning techniques, formal models, system engineering, and diverse applications. The seminar combines theoretical foundations with practical insights, preparing students to understand, evaluate, and potentially contribute to the development of next-generation intelligent systems driven by AI Planning.

Prerequisites

Previous knowledge of the course "Smart Cities and Internet of Things" is helpful but not necessary.

Procedure

The seminar begins with a kick-off meeting at the beginning of the semester, during which we introduce the organisation and topics of the seminar. Students are asked to select three topics in preference order and inform us about their selection. Every student will receive a topic based on priority while considering the topic preferences. Students are requested to conduct research on their topic, write a paper, and prepare an oral presentation. The seminar ends with a block event at the end of the lecture period of the semester, during which students deliver

their presentations. A presentation schedule will be provided a week before the block event. There are no other mandatory meetings between the kick-off meeting and the block event.

Paper

Students must submit a written paper of maximum 10 pages on their topic. The paper should be prepared using LaTeX. A template and instructions will be provided. The deadline for submission is one week after the block event.

Presentation

Students must give an oral presentation of about 20 minutes on their topic and there will be 5 minutes for Q&A. A slides template will be provided. Students must submit the first draft of the presentation one week before the block event. Students must submit the final presentation on the day of the block event.

Attendance

Attendance is mandatory at both the kick-off meeting and the block event.

Grading

The final grade is composed of the quality of the paper (50 points), the quality of the presentation (40 points), and active participation at the block event (10 points).

Language

Presentations and papers must be in English.

Topics

The seminar covers a range of topics, from planning techniques and planning models to planning systems and applications.