



Ph.D. in Mathematics and Computer Science

Academic year 2023/2024



ADVANCED METHODS, TOOLS AND APPLICATIONS FOR ARTIFICIAL INTELLIGENCE Modeling and Solving in Answer Set Programming

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Artificial Intelligence (AI) has emerged as a crucial research area in today's world. This course delves into the foundations and applications of Answer Set Programming (ASP) within the broader field of AI. ASP provides innovative methodologies, tools, and applications to effectively tackle the dynamic and heterogeneous nature of data.

The course begins with an exploration of the foundations of ASP. Students will learn about the basic concepts, syntax, and semantics of ASP rules, as well as the distinctions between ASP and other logic programming paradigms. They will understand how ASP enables automated reasoning and problem-solving in various domains, including artificial intelligence applications.

An essential aspect of the course focuses on modeling with ASP. Students will discover techniques for translating real-world problems into ASP models, effectively capturing knowledge and constraints using rules and constraints. They will gain hands-on experience in problem-solving using ASP, learning how to leverage ASP's capabilities in areas such as optimization, planning, and scheduling.

As the course progresses, students will delve into advanced modeling techniques in ASP. They will explore challenges related to grounding bottleneck and program performance and learn advanced techniques to optimize and speed up ASP programs. Additionally, students will study the architecture of an ASP solver, gaining insights into the resolution process and inference mechanisms employed in ASP. They will also delve into conflict handling and non-deterministic choice of answers, essential for effective reasoning with ASP.

Furthermore, the course touches upon extending ASP systems via imperative programming, allowing students to enhance ASP capabilities by integrating imperative programming techniques.

By the end of the course, students will have gained a comprehensive understanding of ASP and its applications in AI. They will be equipped with the skills to model real-world problems, effectively reason and solve complex problems using ASP, and leverage advanced techniques to optimize ASP programs. This course serves as a stepping stone for students to delve deeper into the exciting and active field of ASP and its wide-ranging implications in artificial intelligence and problem-solving.



TUE 04/06 WED 05/06
THU 06/06 FRI 07/06



MT 12 - CUBO 30 B - 2ND FLOOR



15:00 - 18:00