SIMONA GUGLIERMO received her M.Sc. in Systems, Control, and Robotics from the Royal Institute of Technology (KTH), Stockholm, in 2019. Afterward, she joined Scania as a software developer in the Autonomous Transport Systems department and, in 2020, started an industrial Ph.D. in Computer Science jointly with Scania and the Centre for Applied Autonomous Sensor Systems (AASS) at Örebro University. Her research focuses on AI planning for fleets of autonomous vehicles, with an emphasis on integrating and evaluating learning techniques to synthesize interpretable behavior representations. She is currently employed by TRATON, where she works on agentic workflows.

AI planning is a field of artificial intelligence that computes sequence of actions (i.e., a plan) needed to reach a given goal. Most AI planners rely on human-written descriptions of each action, specifying when it can happen and how it changes the world. These action representations are difficult to create and hard to keep up to date as systems evolve. This thesis addresses the central question of how to learn reliable, interpretable action models directly from records of past operations. The primary application context is generating plans for fleets of autonomous vehicles, where scale and continual change demand maintainable acion models.

We investigate Behavior Trees and Planning Domains as complementary action representations. Behavior Trees provide hierarchical structure and modularity that match how engineers design and reason about complex tasks. We introduce a method for learning Behavior Trees from previously executed plans, and present an evaluation framework for Behavior Trees with a primary focus on interpretability to support principled comparison and improvement. Planning Domains offer a compact, declarative account of actions in terms of preconditions and effects. We present a method that learns Planning Domains from noisy historical plans, accompanied by a practical evaluation toolbox to assess the quality of learned Domains.

Together, these components provide both the learning procedures and the assessment instruments needed to build a unified approach in which Behavior Trees and Planning Domains coexist. The resulting approach not only enables automated planning but also enhances human understanding and oversight, capabilities essential for accountable autonomy.

ISSN 1650-8580
ISBN 978-91-7529-706-4

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Doctoral Dissertation

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SIMONA GUGLIERMO
Computer Science

2025

Örebro Studies in Technology 108 | ÖREBRO 2025

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