

Prioritized Planning for Robotic Intra-Logistics in Answer Set Programming: Working Abstract

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Answer Set Programming (ASP; [3]) has come a long way, starting as a semantics for logic programming, over having increasingly performant systems, to a growing number of significant applications in academia and industry. Compared to other solver paradigms, ASP offers an unprecedented degree of versatility and brevity, which is best put in perspective by solving multi-faceted problems. This also makes it an obvious choice for intra-logistics planning, a major subject of interest in the context of the fourth industrial revolution, as witnessed by Amazon Robotics, GrayOrange Butler, Grenzebach Intralogistics, and Swisslog CarryPick systems.¹ However, this opportunity is mitigated by the lack of commonly accepted design patterns for large-scale dynamic problems in ASP. To this end, we are currently investigating the applicability of *prioritized planning*[1, 4], a proven technique for scalable planning in multi-robot environments. In essence, prioritized planning decouples aspects of the overall problem into smaller planning tasks, each with an assigned priority. Afterwards, the sub-tasks are consecutively planned with respect to their priority, resulting in an overall solution to the original problem. To adapt this principle to ASP, we currently explore different approaches while using robotic intra-logistics as a test bed[2]. Eventually, we intend to 1.) detail the underlying concepts, 2.) evaluate the approaches in a benchmark study, and 3.) discuss our findings.

References

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