Abstract:
In this paper, we introduce a novel robot programming paradigm. It focuses on reducing the required expertise in robotics to a level that allows shop floor workers to use robots in their application domain without the need of extensive training. Our approach is user-centric and can interpret underspecified robot tasks, enabling communication on an abstract level. Such high-level task descriptions make the system amenable for users that are experts in a particular domain, but have limited knowledge about robotics and are thus not able to specify low-level details and instructions. Semantic models for all involved entities, i.e., processes, workpieces, and workcells, enable automatic reasoning about underspecified tasks and missing pieces of information. We showcase and evaluate this methodology on two industrial use cases from the domains of assembly and woodworking, comparing it to state-of-the-art solutions provided by robot manufacturers.