

## **Hybrid Goal Selection and Planning in a Goal Reasoning Agent Using Partially Specified Preferences**

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Goal Reasoning agents are not restricted to pursuing a static set of predefined goals but can instead reason about their goals and, if necessary, dynamically modify the set of goals that they will pursue. For a solitary agent, goal selection is guided by the agent's own internal motivations. However, an agent that is a member of a team also needs to consider its teammates' preferences when selecting goals. In this work, we propose an online approach to estimate the utility of goals based on a teammate's partially specified preferences and use the estimated goal utilities to guide goal selection. Specifically, we consider the situation where an autonomous agent is teamed with a single operator in a supervisor-supervisee relationship. At the start of a mission, the operator will provide an initial set of goals and, optionally, partially defined preferences for how the mission should be performed. After the initial interaction, the agent acts autonomously to pursue the provided goals. While acting autonomously, the agent may encounter situations that present opportunities for new goals and must determine if those goals align with the operator's preferences. Estimated goal utilities are used during a hybrid goal selection and planning process to select a subset of goals for the agent to pursue. We report evidence from an empirical study which demonstrates that our approach outperforms several baselines in scenarios drawn from a simulated human-agent teaming domain.