

Temporal Planning in Dynamic Environments for CLAIM Agents

Mots clés :

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Résumé du projet de recherche (Langue 1)

In this thesis we propose a theoretical and practical framework for temporal planning in agent oriented programming languages, more specifically for the language CLAIM. Most of the agent oriented programming languages in the current literature use a PRS like approach to achieve the goals of agent. But these languages lack the ability to incorporate planning. Sometimes the execution of the actions without planning results in the inability to achieve the goals. There has been some work to incorporate planning within such programming languages but those systems do not take into account the duration of agent actions, neither do they consider the uncertainty of the environment. These systems assume that the agents' actions are instantaneous and that the effects produced on the environment are only those which are produced by the agent's actions. But these assumptions are unrealistic for the development of real world applications. There are some systems like ZENO, TGP, SAPA which give the ability to plan with durative tasks and even there are systems which give this ability in the dynamic environments like IxTeT. But these systems are separate planning solutions. They are not programming languages, so they lack the flexibility and control that a programming language offers to its programmers. Moreover, these systems are built on a proactive approach but in the real world applications it is necessary to create a balance between proactivity and reactivity because it is a dynamic world and the goals of agents are not necessarily given to him at the start, new goals arrive and some old goals are dropped during the life cycle of the agent and some goals require immediate achievement. In this thesis, we try to fill these gaps by incorporating a temporal planner, an executor, an execution monitor and a plan repairing component to a CLAIM agent. We call this extension of the language as P-CLAIM. The main problems dealt with in this thesis are 1) Modifications and extensions to the CLAIM agent's architecture to include a temporal planning component. 2) Execution monitoring and plan repairing. 3) Creating a balance between deliberation and reactivity. 4) Inserting the plan to achieve the high priority goal at the beginning of the plan to achieve the low priority goal. 5) Coordination of temporal plans of multiple agents working in the same environment.