

Evaluating Complexity of Task Knowledge Patterns through Reusability Assessment

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ABSTRACT

Reusability assessment of patterns is needed to help pattern designers and pattern developers to check whether a pattern is well-designed. Hence, the outcome from the assessment can be used to improve the current patterns and also to reveal the potential of reusing the patterns in software development. This paper presents the reusability assessment of task knowledge patterns through the proposed metrics. This is a continuous effort to evaluate the potential reuse of the proposed task knowledge patterns for multi agent system development. The reusability assessment proposed in this paper further elaborates reusable of pattern by synthesizing how to evaluate the genericity and complexity of a task knowledge pattern (aka. agent patterns) and its similarity to other patterns in tackling a particular problem. The hypothesis is that a pattern is reusable when it is descriptive and expressive. A case study is presented to showcase that the outcome of the assessment can help to improve the effort to design the task knowledge patterns for reuse purposes. Furthermore, the outcome of the assessment allows the pattern developer to communicate their patterns in quantitative manner. The two main contributions of this paper are first, to determine the design quality of agent patterns and secondly, the introduction of a novel designs metrics for agent patterns and the process to assess the potential reuse of task knowledge patterns.

KEYWORDS

Patterns, complexity analysis, agent, metrics, validation.

1 INTRODUCTION

Agent patterns record the experience in engineering agent oriented systems. Agent patterns have aimed to promote an agent based approach to the outside of the agent community [1]. The use of patterns in agent development can reduce the development cost and time [2], promote reuse and reduce the complexity when developing applications [3]. In addition, it allows the novices to rely on expert knowledge and solve the problem in a more systematic and structured way [4] [5].

To support the adoption of agent patterns for agent development, researchers are working on pattern classification and pattern template. The pattern classification supports the ease of accessibility of agent patterns by arranging the collection of agent patterns in a structured manner. The template structure is used to record the agent development experience in a structured manner.

While various patterns have been introduced, the potential usage of agent patterns does not pay much attention in the current literature. One possible reason is that researchers are working on various template forms and introducing

