Composing and Ensuring Time-Bounded Agent Services

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Abstract. There are situations where an agent needs to compose several services together to achieve its goals. Moreover, if these goals should be fulfilled before a deadline, the problem of service composition becomes even more complex. In this paper, we establish a framework that allows to deal with service composition considering service execution times taking into account the availability and the workload of the agents that offer the service.

1 Introduction

Multi-Agent Systems technology makes it possible to cover a broad area of problems. Typical problems are systems in which there are entities (agents) which, by requiring one or more services from different platforms (Providers). As an example, in the area of manufacturing systems, Reaytions would be clients who require new work orders and Faulters would be factories or factory clusters which provide the needed resources to obtain the required product. Obviously, the development of these type of systems is complex and, therefore, it is necessary to analyze in detail the intrinsic characteristics of these application environments.

One of the main problems in this kind of systems is how to create add-value services dynamically by composing elemental services. Services can be seen as elemental components and are commonly used by human developers to create larger systems. Semantic associations help machines to deal with services, but service-discovery and composition are complex tasks that need extra intelligence and tools to achieve proper results, specially in open and dynamic environments where services are not always available.

Another important problem to solve in this kind of systems is to attend rigorous requirements when they ask for having the answer available in a limited time. If the fulfillment of some service could reduce the quality of the composite offered by the multi-agent system. Therefore, before performing a complex service, some time must be estimated if the service can be provided on time.

The paper presents a multi-agent framework which allows to compose time-bound services and to ensure their fulfillment. The multi-agent framework addresses the current workload and the availability of the provider agents of

References

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