Rule-Based Specification of Flexible Bidding Strategies in Agent-Based Online Auctions

Master's Project, Fall 2007

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Abstract

With the advent of the internet many different types of electronic commerce systems have been developed to take advantage of its world-wide access. A typical example of such systems is the online auction system that allows users to bid on items from any location with internet access. An online auction usually takes a few days to complete, which makes it difficult for a user to keep track of an auction continuously. To solve this problem, many online auction systems implement a form of automatic bidding mechanism using agent-based technology. An agent-based automatic bidding system can keep placing bids on behalf of users even when they are not logged in to the system. Most of the automatic bidding systems are very limited in providing such services, where they only provide a set of predefined bidding strategies, but do not allow users to specify more advanced bidding strategies due to a lack of such mechanisms. In this project, we explore using rule-based specifications of bidding strategies to provide users with more flexibility in specifying bidding strategies. A prototype agent-based auction system is built to demonstrate how a rule-based system can support real-time reasoning on bidding strategies and provide agents with more autonomy. Two major modules in the prototype are the bidding agent module and the rule-based reasoning module. The bidding agent module provides an interface to the users for specifying bidding strategies, and converts the strategic information into formal rules written in Prolog. It is also responsible for handling communications between the bidding agent and the auction agents in an auction house. The reasoning module written in both Java and Prolog can determine at runtime the most appropriate action that a bidding agent should take according to a user specified bidding strategy. The agents are implemented using JADE, which is a Java based development toolkit for multi-agent systems.