Integrating mobile agent technology with multi-agent systems for distributed traffic detection and management systems

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Abstract

Agent technology is rapidly emerging as a powerful computing paradigm to cope with the complexity in dynamic distributed systems, such as traffic control and management systems. However, while a number of agent-based traffic control and management systems have been proposed and the multi-agent systems have been studied, to the best of our knowledge, the mobile agent technology has not been applied to this field. In this paper, we propose to integrate mobile agent technology with multi-agent systems to enhance the ability of the traffic management systems to deal with the uncertainty in a dynamic environment. In particular, we have developed an IEEE FIPA compliant mobile agent system called Mobile-C and designed an agent-based real-time traffic detection and management system (ABRTTDMS). The system based on Mobile-C takes advantages of both stationary agents and mobile agents. The use of mobile agents allows ABRTTDMS dynamically deploying new control algorithms and operations to respond unforeseen events and conditions. Mobility also reduces incident response time and data transmission over the network. The simulation of using mobile agents for dynamic algorithm and operation deployment demonstrates that mobile agent approach offers great flexibility in managing dynamics in complex systems.

Keywords: Agents; Mobile agents; Agent technology; Distributed intelligent systems; Traffic control and management systems; FIPA