
Preface

Over the past decade, there has been a strong revival of interest in agent-based technology, with a recognition that it impacts many areas such as artificial intelligence, distributed computing, and software engineering. Agent-based technology can be used to solve a variety of business and technology problems. Examples of such applications include electronic commerce, grid computing, social networks, and adaptive virtual environment. In an agent-based system, software agents with sufficient intelligence and autonomy are adopted to perform tasks such as sensing, planning, scheduling, reasoning and decision-making. An agent can either work independently or coordinate with other agents to accomplish tasks and missions. In the former case, an agent typically generates a set of goals based on its motivation, and also a list of plans for achieving its goals. In the later case, a collection of agents are structured as a multi-agent system (MAS), where a coordination model based on message passing among agents is defined to provide a uniform interface for their interactions. In this book, we provide a collection of practical applications of agent-based technology. Chapter 1 demonstrates how agent-based technology can be applied to smart distribution grid operation. It presents an agent-based architecture which can be developed to support the smooth modernization of the power distribution grids. Chapter 2 discusses how to resolve conflicts in resource federation with agent negotiation. A scenario of resource federation in grid computing is illustrated to show the adoption of creative negotiation for conflict resolution. Chapter 3 and 4 provide two application examples of agent-based technology in electronic commerce, where homogeneous and heterogeneous agents are defined and adopted for electronic auctions (Chapter 3), and a multi-issue e-negotiation system is developed for electronic commerce (Chapter 4). Chapter 5 presents an innovative application of intelligent agents in adaptive virtual environments. By using intelligent agents, a three-dimensional (3D) virtual environment can be tuned into an adaptive system, which improves the quality of human-computer interface. Chapter 6 provides another example of using intelligent agent to find the shortest path between two points in a changing drawing environment.

Although we present quite a few practical application examples of using agent-based technology in this book, the collection of such application areas is far from completion. The purpose of this book is to provide examples of recent advances in agent-based

systems and demonstrate how agent-based technology can be used to solve practical problems. It is our hope that this book will not only help the researchers and practitioners to understand the practical usage of agent-based technology, but also provides them hints of using agent-based technology in innovative ways.

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