Chapter XIV

Comparing Expert Systems and Agent Technology for KM*

Abstract

Agent technology offers a new means of effectively managing knowledge and addresses complex decision processes which heretofore appeared intractable. This chapter presents an overview and comparison of expert system and agent technologies, and shows the latter as a powerful extension in artificial intelligence for systems development. To illustrate, a system developed first using an expert system approach and then an agent-based approach are used to identify the strengths and weaknesses of the agent-based approach. Last, the practical implications of a company adoption of agent-based technology for systems development are addressed.

Introduction

Agent technology (AT) or expert systems (ES) can be useful tools for the emerging field of knowledge management (KM). KM is the process of creating value from

an organization's intangible assets. It deals with how best to leverage knowledge internally in the organization and externally to the customers and stakeholders. The focus is on how to best share knowledge to create value-added benefits to the organization. Simply put, KM is the process of capturing collective expertise and distributing it in a manner that produces a payoff (Liebowitz, 1999a, b, 2000; Liebowitz & Beckman, 1998). The expert system, which provides a software representation of organizational expertise dealing with specific problems, is a useful mechanism to accomplish the knowledge-sharing task. However, as presented in Table 1, traditional ES development techniques have several shortcomings. These ES shortcomings are exactly what agent technology (AT) was developed to address. Today, as the system developer chooses between tools and techniques in addressing

Table 1. Comparing ES and AT advantages

Expert Systems	Agent Technology
Expert systems (ES) became the most important artificial intelligence technology since the early 1980s. Today, ES applications are found widely in business and government as ES development techniques and tool kits have multiplied. ES technology provides powerful tools to manage knowledge/expertise within specific domains	Operates without the direct intervention of humans and has some control over its own actions and internal state. It is capable of independent action. Agents share information, knowledge, and tasks among themselves and cooperate with each other to achieve common goals. The capability of an agent system is not only reflected by the intelligence of individual agents but also by the emergent behavior of the entire agent community. An agent learns from experience to improve its performance in a dynamic environment. Agents, as autonomous, cooperating entities, represent a more powerful and flexible alternative for conceptualizing complex problems. For problems characterized by *dynamic* knowledge, it is infeasible to predict and analyze all possible interactions among modules at design time. Flexible interaction among agents at run-time enables an agent-based system to effectively handle dynamic, unpredictable knowledge. Agents cannot only react to specific events but can also be proactive, polling the environment for events to determine the proper action in a given circumstance. An intelligent distributed agent architecture that allows flexible interactions among participating agents maps well to applications, like expert systems, that require seamless integration with humans.

Related Content

Interpretive Structural Modeling of GIoT enablers

Pooja Guptaand Vijay Kumar Jain (2020). *Journal of Information Technology Research (pp. 129-140).*

www.irma-international.org/article/interpretive-structural-modeling-of-giot-enablers/249221

Determining User Satisfaction from the Gaps in Skill Expectations Between IS Employees and their Managers

James Jiang, Gary Kleinand Eric T.G. Wang (2009). *Best Practices and Conceptual Innovations in Information Resources Management: Utilizing Technologies to Enable Global Progressions (pp. 276-287).*

www.irma-international.org/chapter/determining-user-satisfaction-gaps-skill/5523

Public Sector Data Management in a Developing Economy

Wai K. Law (2004). *Annals of Cases on Information Technology: Volume 6 (pp. 584-591).*

www.irma-international.org/article/public-sector-data-management-developing/44600

Selecting a Systems Development Methodology: A Contingency Framework

Mohamed El Louadi, Yannis A. Pollalisand James T.C. Teng (1991). *Information Resources Management Journal (pp. 11-20).*

www.irma-international.org/article/selecting-systems-development-methodology/50941

Audio Analysis Applications for Music

Simon Dixon (2005). *Encyclopedia of Information Science and Technology, First Edition (pp. 188-196).*

www.irma-international.org/chapter/audio-analysis-applications-music/14235