

# Chapter 3.1

## Intelligent Software Agents in E-Commerce

**Mahesh S. Raisinghani**

*University of Dallas, USA*

**Christopher Klassen**

*University of Dallas, USA*

**Lawrence L. Schkade**

*University of Texas at Arlington, USA*

### INTRODUCTION

Agent technology is one of the most widely discussed topics in information systems and computer science literature. New software products are being introduced each day. A growing number of computer information professionals recognize that there are definite issues surrounding intelligent agent terminology. These must be resolved if agent technology is to continue to develop and establish.

Current research on intelligent agent software technology can be categorized as two main areas: technological and social. In the excitement of emergent technology, people often forget to scrutinize how new technology may impact their lives. The social dimension of technological progress is the driving force and most central concern of

technology. Technology is not created for its own sake as a technological imperative. This article critiques the current state of software intelligent agents by examining technological issues and the social implications of intelligent agent software technology.

### TECHNOLOGICAL ISSUES

An attempt to arrive at a generally accepted definition is the first hurdle. In order for this term to have any effectiveness, there must first be a universal definition that can be agreed upon and used consistently. Unfortunately, there is none. Many proposals for defining an “intelligent agent” have been put forth, but none has received

wide acceptance. Some of these proposals are the following:

- “An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through effectors.” Russell and Norvig (1995)
- “Let us define an agent as a persistent software entity dedicated to a specific purpose. ‘Persistent’ distinguishes agents from sub-routines; agents have their own ideas about how to accomplish tasks, their own agendas. ‘Special purpose’ distinguishes them from other entire multifunction applications; agents are typically much smaller.”
- “An autonomous agent is a system situated within and a part of an environment that senses that environment and acts on it, over time, in pursuit of its own agenda and so as to effect what it senses in the future.” Franklin and Graesser (1996)

While these terms attempt to describe characteristics of intelligent agents, no comprehensive and generic description for these agents has gained wide recognition as the definitive description of a software agent. A consensus definition has not yet been achieved. As Franklin and Graesser (1996) indicate, most of the definitions proposed are derived from conceptualizations peculiar to the subjective views of the individuals. It is important to note that it is this intuitive aspect of an “intelligent agent” which makes it difficult to establish a broadly accepted formal definition. Ironically, it facilitates marketing of intelligent agent software technology.

A second reason for a lack of a consensus definition is that much of the agent research is proprietary. Companies that make investments to sponsor such research do not wish to reveal their competitive edge nor give away the value of their work. Standardization of new technology is difficult. Uncertainty will continue until the companies and individuals with the proprietary

information recognize that sharing knowledge benefits everyone.

A third reason for the difficulty for the lack of a generally approved definition of an intelligent software agent, and probably the most important reason of the three outlined in this article, is that intelligent agent software does not seem to be qualitatively different from other software. “Is it an agent, or just a program?” Franklin and Graesser (1996) ask and observe, correctly, that all software agents are programs. The authors also state that not all programs are agents. The implication is that some programs are, in fact, agents. If an “intelligent agent” were just an added complex program, the term “intelligent agent” would simply mean that a software program was simply extended, made more composite and possibly more useful than other typical programs. An intelligent agent differs from a procedural program in two ways. First, it is an agent and broadly speaking, it is defined as someone or something that acts. To be able to act, the entity must have a purpose or a goal. A computer program can only perform a prescribed set of instructions. An intelligent software agent has the same capability and is similar to a computer program in this respect.

Computer programs act utilizing a relatively low level of logic. These programs cannot act autonomously. For any entity to act with autonomy there must be concomitant independence and freedom. Procedural computer programs do not have volition, because whatever is written into the program is executed. The key factor is logic bound and a closed program. The term “react” is an inherent limitation of closed computer programs. An agent, in the true sense of the word, initiates action. The several reasons illustrate why some time is required for an acceptable definition of software agent. This process is likely to be somewhat similar to the emergence of the distinction between artificial intelligence, expert systems and decision support systems, which became clear gradually with more widespread usage of this distinctive software.

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