Chapter V

A Systemic Approach of Electronic Commerce

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ABSTRACT

This chapter applies several concepts from classical Systems Theory to the growing area of E-commerce and agents. The purpose of this chapter is to demonstrate how General Systems Theory principles are widely applicable to the state-of-the-art field of Electronic Commerce. The Systems Approach can be used as a framework to model interaction in the electronic marketplace. Software agents play an important role in this system. The chapter describes the characteristics of an intelligent agent and its applications in Electronic Commerce from a systemic perspective.

INTRODUCTION

General systems theory delineates rules that govern behaviors of a variety of entities, both living and nonliving. These rules can be conceptualized as systems with various interacting components. Laws could theoretically be formulated to describe how any system functioned. Systems theory is closely connected to cybernetics. According to Van Gigch (1991), the systems approach is a method of inquiry, which emphasizes the whole system instead of component systems. The systems approach is a useful framework in which we can analyze the role of intelligent agents and the e-commerce environment. The systems approach embodies the tenets of
systems theory. The systems approach is a common conceptual framework for many disciplines, and it can be applied to the field of electronic commerce and intelligent agents.

We will apply several concepts from classical systems theory to the growing area of e-commerce and agents. Our purpose is to demonstrate how general systems theory principles are widely applicable to the state-of-the-art field of electronic commerce. The systems approach can be used as a framework to model interaction in the electronic marketplace. Software agents play an important role in this system. The next section will describe the characteristics of an intelligent agent.

AGENT CHARACTERISTICS

As stated before, there is not an accord on what precisely constitutes an agent, or on its characteristics. There are dozens of definitions, and each author proposes a different set of characteristics. Franklin and Graesser (1996) propose the following properties: reactivity, autonomy, goal-oriented, temporally continuous, communicative, learning, mobile, flexible, and character. Etzioni and Weld (1994) propose a few other characteristics such as collaborative behavior.

The designer of any agent should keep the user in mind when deciding on the characteristics of an agent. The cognitive style of the user, the intended use of the agent, the user’s perception of the agent, and the user’s expectations play an important role in the successful implementation of an agent. These problems can be analyzed from the viewpoint of related disciplines such as human–computer interaction, cognitive psychology, and ethics. In this section, we will review the main characteristics cited by leading experts in intelligent agent technology. For the purpose of our framework, we will focus on the eight most cited characteristics.

Intelligence

Intelligence can be defined as the degree of reasoning and learned behavior. At a minimum, there can be some statement of preferences; higher levels include reasoning, planning, learning, and adaptation (Gilbert et al., 1995). Allen Newell (1990) defines intelligence as: “the degree to which a system approximates a knowledge-level system.” Truly intelligent agents may use classical AI techniques, such as rule-based systems, knowledge-based systems, or neural networks.

Autonomy

An agent can be considered a system with behavior that is “goal-oriented” toward a certain ideal state. Self-regulated agents are goal-governed agents, which
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