

Chapter 14

Engineering of Experience Based Trust for E-Commerce

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ABSTRACT

Trust is significant for sustainable development of e-commerce and has received increasing attention in e-commerce, multiagent systems (MAS), and artificial intelligence (AI). However, little attention has been given to the theoretical foundation and intelligent techniques for trust in e-commerce from a viewpoint of intelligent systems and engineering. This chapter will fill this gap by examining engineering of experience-based trust in e-commerce from the viewpoint of intelligent systems. It looks at knowledge-based trust, inference-based trust and their interrelationships with experience-based trust. It also examines scalable trust in e-commerce. It proposes a knowledge based model of trust in e-commerce and a system architecture for METSE: a multiagent system for experience-based trust in e-commerce. The proposed approach in this chapter will facilitate research and development of trust, multiagent systems, e-commerce and e-services.

INTRODUCTION

Generally, trust is a positive belief or expectation about the perceived reliability of, dependability of and confidence in a person, an intelligent agent, organization, company, object, process, or system (Schneiderman, 2000). Castelfranchi and Tan (2001) assert that e-commerce can be successful only if the general public trust is established in the virtual environment, because lack of trust in security is one

DOI: 10.4018/978-1-60566-669-3.ch014

of the main reasons for e-consumers and e-vendors not to engage in e-commerce. Therefore, trust has received an increasing attention in e-commerce and information technology (IT). For example, Finnie and Sun (2007) investigate trust in e-supply chains. Olsson (2002) examines trust in e-commerce. Pavlou (2003) integrates trust with the technology acceptance model to explore the customer acceptance of e-commerce. Salam et al. (2005) examine trust in e-commerce and notice that “many customers may still not trust vendors when shopping online”. Wingreen and Baglione (2005) study the customer’s trust in vendors from a business viewpoint. Xiu and Liu (2005) propose a formal definition of trust and discuss the properties of trust relation. Xiong and Liu (2002) propose a formal reputation-based trust model by combining amount of satisfaction, number of interaction and balance factor of trust in a peer-to-peer e-community. However, the majority of studies are on trust in online purchase settings, whereas there is relatively less research on trust in e-commerce from a viewpoint of logic and intelligent systems.

Multiagent systems (MAS) have been successfully applied in many fields such as e-commerce (Sun & Finnie, 2004) and e-supply chain management (SCM) (Finnie, Sun & Barker, 2004; Finnie & Sun, 2007). MAS has also been used as a development methodology in many studies (Henderson-Sellers & Giorgini, 2005). Further, trust has drawn some attention in MAS. For example, Chen et al. (2005) propose a fuzzy trust model for MAS taking into account direct trust, recommendation trust and self-recommendation trust. Xiu and Liu (2005) discuss trust in distributed systems. Tweedale and Cutler (2006) discuss trust in MAS by proposing a trust negotiation and communication model for MAS architecture. Schmidt et al. (2005) apply a fuzzy trust model to an e-commerce platform. However, they have not examined engineering of trust in multiagent e-commerce system (MECS), which is of practical significance for multiagent e-commerce and e-services. This chapter will be devoted to engineering of trust and experience-based trust in MECS.

Experience-based reasoning (EBR) is a reasoning paradigm using prior experiences to solve problems, and could be considered an advanced form of knowledge-based reasoning (Sun & Finnie, 2007). This chapter will apply EBR to trust among intelligent agents within the MECS. In particular, the use of experience in establishing trust in other agents will be explored. Any organization has some history of dealing with problems relating to orders and perturbations in the network and the solutions applied, as well as some formal processes for dealing with these. To respond automatically, software must be capable of reacting as one would expect a human agent to do. The information available to the agent may come from a variety of sources, including analysis of historical information/experience at the information/planning level (Finnie & Sun 2007).

The major contribution of this chapter is the establishment of a basis for understanding the new field of EBR and engineering of experience-based trust in e-commerce and the role it may play in the MECS environment. In addition, the issue of scalable trust and the role of experience in automating trust in e-commerce are appreciated. This chapter will resolve these issues by providing some methodologies, engineering and intelligent techniques for experience-based trust and scalable trust in e-commerce and MECS. These involve the use of EBR to enable agents in e-commerce to learn from prior experience in dealing with brokers and sellers and issues relating to trust and scalable trust in MECS.

There have been no studies that provide a unified treatment of trust and scalable trust in e-commerce, so far. This chapter will fill this gap by examining experience-based trust and case-based trust in e-commerce and their interrelationships from the viewpoint of intelligent systems. It will look at knowledge-based trust, inference-based trust and their interrelationships with experience-based trust and scalable trust in e-commerce respectively. The proposed approach in this chapter will facilitate research and development of trust, scalable trust, MAS, e-commerce and e-services.

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