Chapter 4.8
A Fuzzy Logic–Based Approach for Supporting Decision–Making Process in B2C Electronic Commerce Transaction

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ABSTRACT

The purpose of this article is to present an application of fuzzy logic to human reasoning about electronic commerce (e-commerce) transactions. This article uncovers some of the hidden relationships between critical factors such as security, familiarity, design, and competitiveness. We analyze the effect of these factors on human decision process and how they affect the Business-to-Consumer (B2C) outcome when they are used collectively. This research provides a toolset for B2C vendors to access and evaluate a user's transaction decision process and also an assisted reasoning tool for the online user.

INTRODUCTION

Electronic commerce (e-commerce) is a widely accepted way of doing business, and within a relatively short time, its services have risen to become a core element of the Internet. A leading market analysis firm, Forrester Research, has indicated that online retail sales in the United States exceeded $100 billion in 2003 (Johnson

et al., 2004), representing a 38% increase over the previous year. The growth of e-commerce is not only in the U.S., but signs point toward continued growth globally. To this end, we aimed at identifying major elements that back the acceptance of e-commerce among users. This study established the elements that contribute to the growth of users' trust, leading them to complete online transactions.

Fuzzy logic provides a means for coping with the ambiguity and vagueness that are often present in B2C commerce (Cox, 1994; Turban, 1995). Indeed, it was reported (Dahal et al., 2005) that e-commerce is mainly a social activity featured by interaction among consumers, sellers, brokers, and so forth. MATLAB was used because of the built-in support that assisted in understanding the intrinsic relationships between the driving parameters and their effects on the degree of B2C transactions in e-commerce. In conclusion, this study has provided a deeper insight into the factors affecting consumer perception of B2C commerce.

Nowadays, consumers have many online alternatives to explore and to make a sensible and safe purchase decision. They may find the same items offered by different online retailers with different price options in a matter of a couple of clicks. A consumer's buying decision could be influenced by different factors, such as trustworthiness, brand, reputation, familiarity, third-party seal, security and privacy, fulfillment, presentation, and many more. Consumers have to analyze and compare these factors in order to make a final decision of pursuing online transactions. The purpose of this research is to uncover hidden relationships between the critical factors and their effect on human decision process.

RELATED LITERATURE

Trust is an important factor in social interactions and one of the most dominant factors for the suc-cess of e-commerce. Since e-commerce operates in a more complex environment than traditional business, a higher degree of trust is required between different stakeholders. In e-commerce, a trading party becomes vulnerable to the other party's behavior (Maamar, 2003). In other words, both vendors and consumers assume risks in a transaction, although they do not meet face to face. A consumer can see a picture of the product but not the product itself. Vendors can make promises of quality and delivery easily, but consumers do not know if these promises will be kept. In order to deal with these issues, consumers and vendors must expose a high degree of online trust.

A consumer's lack of trust often has been cited as a major obstacle to the adoption and widespread use of e-commerce (Karake-Shalhoub, 2002; & Tassabehji, 2003). The stability of a business depends on the right balance of trust and distrust. Furthermore, people face information overload, increased uncertainty, and risk when they are engaged in e-commerce. As members of an e-commerce community, people cope with these obstacles and risk by relying on trust, as it is argued in this article.

RATIONALE FOR USING FUZZY LOGIC

This study adopts a fuzzy-logic approach and utilizes a mathematical research toolset known as Matlab fuzzy logic toolbox® in order to achieve its objectives. The rationale of choosing the fuzzy-logic approach is based on the underlying reasoning process behind B2C transactions, which is based on human decision-making (Mohanty & Bhasker, 2005). Although many factors influence the decision process of B2C transactions, the perception of an influencing feature is more important than the actual level of the feature itself. For example, if the perceived security level is higher than its actual implementation, then it will contribute positively to the level of B2C outcome.

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