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A web DSS approach to building an intelligent internet shopping mall by integrating virtual reality and avatar

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Abstract

This paper is concerned with designing and implementing the Internet shopping mall by using a virtual reality-driven avatar and web decision support system (Web DSS). Traditionally, the Internet shopping mall has been designed based on the combination of several hyperlinks, images, and texts. However, this sort of approach results in a lower performance because possible customers cannot make accurate shopping decisions. To overcome these kinds of pitfalls facing the current Internet shopping malls, we propose using a combination of virtual reality and Web DSS. The main virtues of our proposed approach to designing the Internet shopping mall are as follows: First, the virtual reality technique is emerging as one of the alternatives that guarantee a sense of reality for the customers' part and facilitating the complex process of shopping decision makings. Especially, the avatar, which is an artificially designed man working on the Internet, can make the Internet shopping-related decision making processes easier. Second, the Web DSS approach can provide an effective decision support mechanism for customers. Especially, we design a set of intelligent agents for the proposed Web DSS. Experimental results with an illustrative example showed that our proposed approach can yield a new Internet shopping mall paradigm with which customers can benefit from a high level of decision support functions.

Keywords: Avatar; Intelligent agent; Virtual reality; Internet shopping mall; Web DSS

1. Introduction

More and more people are using Internet shopping malls, just as e-commerce continues to become a vital part of people's lives. This is why there is an increased interest in studying the efficient management of online malls, and how to induce more interest in online shopping (Bakos, 1991; Baty & Lee, 1995; Jarvenpaa & Todd, 1997; Lederer, Mirchandani, & Sims, 1997; Lohse & Spiller, 1998a,b; Spiller & Lohse, 1998).

Based on a study conducted by Yahoo Korea (1998), more books, CDs, software and video tapes are being sold online. This must mean that products that are easy to deliver, 'are cheaper, and easier to choose' are the products that are being demanded by online shoppers. This study must consider the fact, too, that there continues to be high traffic on such shopping portals as Adhound, Amazon, AmEC, BargainFinder, Bargainbot, Jango, Kasbah, Personalogic and FIDO. The real problem is developing an online mall concept that is different from the usual, one that narrows the gap between online customers and traditional market customers (Albayrak, Meyer, Bamberg, & Fricke, 1996; Chavez & Maes, 1996; Guttman, Moukas, & Maes, 1998; Kwon & Lee, 2002; Schrooten, 1996; Takahashi, Nishibe, Morihara, & Hattori, 1996; Turpeinen, Sarela, Korkea-aho, Puskala, & Sulonen, 1996).

In this study, we will propose a Virtual Reality drIven Shopping Agent (VRISA) that promotes the customer's interest by using a virtual reality (VR)-driven avatar and a web decision support system (Web DSS). With an avatar system, VRISA offers customers a far more interesting way to shop effectively. By definition, VRISA is not merely a web page but a Web DSS. VRISA also retains two sub agents for efficient decision support. It offers online users an interface that prioritizes VR techniques. With this in mind, this study proposes the following objectives.

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First, this study is a highly disciplinary thing, so most of it is already in progress. We have to point out that a study on the inter-model between the VR avatar and Web DSS is a first. Much of the content is based from existing studies as well as our own case studies and observations. Second, we will mark out the Internet shopping mall as a VR avatar and Web DSS, and technically give it more body. By Section 2 of this paper, we will introduce an established study in the pipeline. Section 3 explains Web DSS, its mechanism, VRISA's character, and general structure. By Section 4, we will be implementing VRISA and the action plan. And Section 5, we will empirically test the VRISA's performance compare to ordinary shopping mall. The conclusion will entail planning for VRISA's future.

2. Literature review

2.1. Internet shopping mall

Case studies on IT are rare. Parts of this research, however, mention a shopping mall design that promotes customer interest (Dennis, 1998; Jarvenpaa & Todd, 1997; Lohse & Spiller, 1998a,b; O'Keefe & Mceachern, 1998; Spiller & Lohse, 1998). Spiller and Lohse (1998) grouped 137 online malls into five classes: super stores, promotional stores, product lists, plain sales stores, and a one-page store. These stores meet the following requirements: merchandise, service, promotions, convenience, interface, checkout and store navigation (Lohse & Spiller, 1998a,b).

O'Keefe and Mceachern (1998) on the other hand, note that a Web DSS is essential to improving customer interest and introducing the Customer Decision Support System. Jarvenpaa and Todd (1997) stress the need of product perception, shopping experience, customer service and customer risk in considering shopping mall design. Dennis (1998) stands on his opinion in making shopping malls and supporting customer decision, by not only using a web page, but an information system.

Contrary to these views, this study presents a new way of opening up online malls. This new approach is largely a development shopping agent of an intelligent agent, having comparison shopping as its strong point (Albayrak et al., 1996; Chavez & Maes, 1996; Guttman et al., 1998; Lee, Lee, & Lee, 1996; Lee & Lee, 1998; Schrooten, 1996; Takahashi et al., 1996; Turpeinen et al., 1996).

Anderson Consulting's 'Bargain Finder' presents a character comparison of buying CDs on the Internet (Guttman et al., 1998). Bargain Finder has a parallel search system that makes it quick and cheap, though search options are only based on price. Suppliers are not happy about putting price over quality. Besides, the product has the same price, no matter what the customer's preference is.

With the Bargain Bot (used for buying books), one can search multi-channels, using a multi-agent. It is possible to search an omnifarious web store within minutes for a Bargain Bot. Consumer information is taken from a low-ranking shopping agent. Cooperative information is gathered from agents that operate independently, with far-reaching effects. This agent is called Fido (the Shopping Doggie), which connects customers with suppliers, and then connects them again to buyers on the web.

Fido assists a customer with information, and introduces items from various suppliers. Fido uses another technique: Machine Learning (abstract product information, category, price from the supplier's web page in HTML). This means that there is no need to use a database for a supply list or as a substitute for when the supplier tips the high ranking URL (Uniform Resource Locator) to Fido. Fido separates information through Machine Learning. The UNIK-SES (Salesman Expert System) can recommend audio conditions that are inimical to one's interests (Lee et al., 1996). This paper proposes an inquiry on performing search for goods under a given condition. This search function should also to be capable of repetitive learning and making recommendations. Throughout this study, we have shown that the online search has established that it is far superior to the existing system.

2.2. VR and avatar

VR has been extensively used on various industry fields during the past 20 years (Cruz-Neira, Sandin, Defanti, Kenyon, & Hart, 1992; Feiner, Maclntyne, & Sellgmann, 1993; Karwowski, Chase, Gaddie, Lee, & Jang, 1997; Ressler & Trefzger, 1997; Stickland, Hodges, North, & Weghorst, 1997). At the time, it was essential to have high-tech equipment and a speedy computer system to create exceptional VR. But, this VR was not only made using big scale equipment, but also with user interface, like three-dimensional computer graphics for example (Pratt, Zyda, & Kelleher, 1995).

Later, VR applications were able to search in three-dimensional conditions. Such a system had process exchange materials using three basic points: interaction, 3D graphics and immersion. People can see VR through a 3D print-out of computer graphics. The user can feel 'a presence' within the world of virtual reality. Thus, the user is convinced of a replicated environment. But then, such an environment has a wide scope: from e-mails to immersion in movies.

Furthermore, it is easy to place a database in 3D graphics. But, this VR is different in that these three factors are simultaneously organized. Changing graphics help users feel virtual reality. Case in point: the VRflow (vrflow.oulu.fi) project of Oulu University in Finland (Oinas-Kukkonen, Perttunen, Simila, & Svento, 1998) aims to increase customer interest and get greater mileage out of VR and hypertext. In performing the search, people get to rapidly experience VR rapidly through VR surroundings. Many other companies, however, provide VR environments, but these are inaccessible due to problems with speed, and disagreement in styles of expression.

On the one hand, this project makes it possible to study avatars, which performs all functions in VR.