Situation-aware Smarter Commerce

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Theme: Smart Interactions

Integrated Solution: Smarter Commerce

Abstract:

Situation awareness (SA) has long been recognized as a key to success in military command and control, in emergency situations, air traffic control, and medicine. While there are many definitions of SA, Endsley's definition is widely accepted [1]: The perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. Recently SA has also gained prominence in online shopping. Shopping sites apply user context, such as "likes" and wish lists, to personalize product offers. With the involvement of smart personal devices in the shopping experience, customers provide time and space points of referential information. Businesses can expand a user's data point to a volume of time and space of information to understand and anticipate a customer's situation and relevant buying options. The user's current GPS location can also be expanded to a close proximity circle and used to provide, for example, relevant offers in the neighborhood. The moment in time can be expanded to a period in time to provide, for example, seasonal offers. By combining location and time, we compute situation volumes of time and space to understand the customer's motivation in time and space.

Smarter Commerce is an IBM initiative that places the customer in the centre of the commerce business processes [2]. Its most important capability, from a customer's perspective, is an effective and user-centric shopping experience. Today, customers are empowered by technology, transparency, and an abundance of information. According to a recent report by International Data Corporation, smarter commerce exploits emerging technologies and social media to profoundly change in the way consumers research, shop for, and purchase goods and services [3]. Particularly in online shopping, businesses are continuously looking for innovative ways to exploit customer information gathered from Web 2.0 applications such as social networks. However, current online shopping solutions still require innovations to offer smart recommendations on products. Moreover, for businesses to deliver effective and pleasant shopping experiences, it is necessary to improve their knowledge about buyers' changing situations and preferences, and to increase the flexibility of their commerce processes and infrastructures to address changes in these situations and preferences expeditiously.

The current online shopping platforms lack knowledge about users and their matters of concern. We have identified three main reasons for this lack of awareness about buyers' situations in e-commerce. First, users have no control over the personal information they provide to e-commerce applications; therefore, they avoid sharing information that could be useful to understand their shopping concerns. Second, the information gathered about users by a particular retailer remains within the boundaries of its e-commerce application. Third, e-commerce implementations are still ineffective in identifying the context entities that are relevant to the buyer, keeping track of the interactions of the buyer with these entities to gather meaningful context information, and managing the lifecycle of these context data.

Situation awareness is recognized as a critical, and often elusive, foundation for good decision making in dynamic systems. Context information about buyers' situations is a major source for value creation and revenue generation in smarter commerce. Today, there is an abundance of information available to online

shoppers, but that does not mean that online shopping experiences are more situation-aware. What truly matters is not how much data sellers can provide through the many channels, but how relevant this information is for users to make purchase decisions effectively. Suppliers greatly benefit from continuous interaction with customers by anticipating customer behaviours and keeping them loyal. Customers provide information about their situations in the form of space and time volumes, as well as personal context spheres to enable suppliers to exploit this information and making inferences on it.

One approach to exploit this information is through SMARTERCONTEXT, the context management engine developed by Villegas [4]. SMARTERCONTEXT gathers meaningful information through the interaction between users and web entities to understand users' intents and situations, thus leveraging the value of personal context information in online shopping. In other words, SMARTERCONTEXT enables situation-awareness. First, it tracks past and present web interactions to provide sellers with relevant information about the users. In contrast to existing solutions, the information gathered from the interactions with a seller's platform is exploited not only by this seller, but also by any other seller authorized by the user. Second, access to personal information is controlled by the user. SMARTERCONTEXT provides shoppers with privacy and security guarantees for sharing context information which the sellers can use to improve the relevance of product and service offers [5]. Therefore, in contrast to existing e-commerce applications, the user is the one who decides what information will be shared and the third parties authorized to access this information.

Business analytics (BA) helps businesses identify and analyze trends and patterns, and anticipate upcoming events. This information is crucial for making good decisions and optimizing business goals. In retailing, and particularly in online shopping, BA provides useful information to improve the relevance of product and service offers with respect to customers' preferences. The goal is to satisfy customers' expectations while maximizing business revenue. Despite a range of products available for BA in e-commerce, existing approaches only take advantage of the information gathered through the interaction between the shopper and the particular retailer's shopping infrastructure. User-centric BA takes advantage of relevant context about the customer and his/her behaviour gathered throughout the shopping experience, including other relevant shopping sites. Instead of analyzing customer preferences using traditional BA dimensions, the integration of personal context information as a new set of dimensions is a promising approach for understand customers' expectations in situation-aware commerce scenarios.

On the one hand, dynamic self-adaptive software systems are able to reason about their own behaviour to adapt themselves in response to changes in their execution environments, either to ensure the continuous satisfaction of their requirements, or to provide ubiquitous and context-dependent smart services [6]. On the other hand, permanent analysis, dynamic requirements negotiation and incomplete requirements specification are inherent in the engineering of e-commerce solutions as envisioned by smarter commerce. Therefore, self-adaptive software is necessary to ensure the continuous satisfaction of functional requirements for situation-aware commerce, while preserving the agreed conditions on quality of service levels [7]. The need for self-adaptation in online commerce platforms arises because of the dynamic nature of shoppers' preferences and situations, and the dependency of e-commerce infrastructures on context situations, such as shopping seasons and the popularity of online product and service offers.

This CASCON 2012 workshop concentrated on user-centric context management, user-centric business analytics and self-adaptive software as foundational technologies to support situation awareness in smarter commerce applications. User-centric context management concerns the management of dynamic context information, where shoppers act as the main controller of the context information lifecycle. User-centric business analytics exploits the value of personal context information to improve marketing and operational decisions. Self-adaptive software techniques enable commerce infrastructures with the dynamic capabilities required to generate value for businesses and customers, by adapting their computational infrastructures according to changes in buyers' situations, execution environments, and business strategies.

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