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An information delivery model for banking business

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ABSTRACT

Banking is an enterprise consists of different levels of users with the requirement of different levels of information. We propose an information delivery model for banking business which takes information from business analysis and finds the best user for this information with respect to criteria and delivers the multi criteria reporting. There are many multi criteria decision making techniques [MCDM] available to find the best alternative in MCDM problem. We applied fuzzy MCDM technique which resolves inconsistency and uncertainty issues involved in decision making of information delivery for bank users. This model classifies most preferred user to least preferred user for the given information using fuzzy score. This information delivery model and its layers can be applied to other domains to build information delivery model.

1. Introduction

Information delivery with customization is an important part of Business Intelligence (BI) (Martin, Lakshmi, & Venkatesan, 2012). A typical business intelligence model consists of many number of components in which reporting is very important. This research addresses reporting component of business intelligence for customized information delivery (Skriletz, 2003). It is very important to deliver the information to users according to their requirement (Simperl et al., 2010). Our proposed model handles this problem efficiently. The main objective of this information delivery model is customized reporting which finds relevant information based on the criteria and delivers the information as preferred by user (Hayashi, Hsien, & Setio, 2010; Phan & Vogel, 2010). For a case study, we have taken banking business (Nadeem & Jaffri, 2004) and we have applied fuzzy multi criteria decision support (FMCDS) (Chen, Hwang, & Frank Hwang, 1992; Liu, Chen, Kang, Ngai, & Li, 2005) technique to find the best alternate for this customized reporting.

In normal reporting, the information is presented as report to user's independent of their requirements. In most of the cases, users receive information that is not of their interest. Finding the user's current context and providing them information accordingly could be a challenging task. Reporting is very important in the enterprise information processes and it is very much essential in decision making. Presenting to the user, the information of his interest alone will be very efficient. This is delivering the right information to the right user through right channel. It prevents inappropriate usage of information by unauthorized users. This information delivery model is known as personalized information delivery.

Traditional methods are not suitable for information delivery due to the drastic growth in the complexity within an enterprise which leads to a number of new information delivery models (Bin & Zuoquan, 2000; Song, Zhang, & Xu, 2009; Zhao & Wang, 2010). Traditionally, analytic hierarchy process (AHP) was used to identify the right alternative for the right information in the information delivery systems. AHP does not take into account the uncertainty associated with MCDS, a fuzzy multi-criteria decision support (FMCDS) procedure can be applied to resolve the uncertainty (Lau et al., 2003).

This research applies FMCDS to banking enterprise and decides the right information for the right user. In banks, users can get information as they like. Confidentiality of information will always be maintained in banks. what extent the information should be given to the user is not well defined (Anisseh & Yusuff, 2011; Carlsson & Fuller, 1996; Li, 2005). To resolve this fuzziness, FMCDS is applied to banking business to develop a customized report according to the user requirements.

The rest of the paper has been organized as follows: Section 2 describes the prior research on information delivery systems and multi criteria decision making techniques, Section 3 describes the research proposal, Section 4 designs the banking information delivery model and its layers, Section 5 describes multi criteria reporting and addresses the uncertainty and inconsistency in customized reporting, Section 6 explains the working procedure of fuzzy AHP with running example of finding best alternate user for this

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information delivery model, Section 7 discusses the results and Section 8 concludes the paper.

2. Literature survey

Technological innovations provide abundant information in the organization. An organizational process consists of data, technology and users. An organization has different levels of users and the informational need of users differs from one to another. Organizations need appropriate process, technology and tools to find the right information to the right people and to deliver the information at the right time.

This literature survey describes previous work on information delivery systems, its applications and the information delivery systems available for banking business. This section also describes technologies available for the development of information delivery systems.

2.1. Information delivery systems

Information delivery systems (IDS) have been implemented in various domains including tourism (Hinze & Voisard, 2003; Hinze, Voisard, & Buchanan, 2009; Sharma, Singh, & Singh, 2011) education (Garner, Harwood, & Sullivan, 2001; Harrington, Reeves, & Oliver, 2005; Stone, 2009), disaster management (Hasegawa, Sato, Matsunuma, Miyao, & Okamoto, 2005), emergency department (Thompson, Yarnold, Williams, & Adams, 1996) and so on.

Tourism information provider (TIP) delivers information accumulated from user location, time, and profile of the user to mobile devices. This system uses hierarchical semantic geospatial model to accumulate knowledge about the users (Hinze & Voisard, 2003). The semantic rich Tourist Information System (TIP) provides semantically rich information instead of static information about sights and places. It addresses issues in personalization of the information delivery to each traveller according to his travel history with his interest (Hinze et al., 2009). A location-based information delivery system for tourism provides information in context to user location, user preferences, time of day, and type of device (Sharma et al., 2011).

In education domain, information delivery is considered as one of the innovative techniques to improve online learning (Harrington et al., 2005). IDS can provide education content according to the student demand (Stone, 2009). To access the scholarly information at reasonable cost with fast access, an information delivery model has been designed which uses e-print servers (Garner et al., 2001).

Information delivery system has been applied in emergency areas such as disaster management and patient emergency management. The multilingual disaster information delivery system delivers information to mobile phones using graphic text (Hasegawa et al., 2005). Information delivery has a different meaning when it is applied to "Patient Satisfaction in Emergency Department". Typically, it is measured from the explanation of procedures and delays when a patient is in an emergency situation (Thompson et al., 1996).

Distributed event-driven continual query system (OpenCQ) is an information delivery system which exhibits push-enabled, event-driven and content-sensitive information delivery capabilities. OpenCQ delivers the information to the relevant users when change occurs by the execution of events. These events are decided by the user interest (Liu, Pu, & Tang, 1999).

To improve the performance of information delivery, filtering methods have been applied in developing personalized information delivery systems (Foltz & Dumais, 1992). A typical information delivery system may contain elements such as data integration (in what context – information from one place to another place), delivery (right user based on user profile), filtering (right information, right user and right time) and intelligence (knowledge about 'must have', 'need to know' and 'nice to know') (Datamonitor, 2003).

From prior researches, it is known that the information delivery system has a wide opening for its development. An efficient information delivery can solve information overload by its customized reporting and IDS can be applied to other domains. The next section describes prior research on IDS in banking business.

2.2. Information delivery in banking

In banking, information delivery systems have been applied to offer various financial services to customers. IDS has been designed for retail banking which considers two factors, such as type of delivery channels and number of delivery channels. The banking services differ according to the technologies available for delivery and type of delivery channels available. A framework has been proposed to find the relationship between service content characteristics and service delivery channels (Huete & Roth, 1988).

A multi-channel service delivery system consists of a physical channel and a virtual channel for a bank. Physical channel is further classified into sub channels, such as self-service channel – Automatic Teller Machine (ATM), and employee service channel – Branch/Teller and Branch/Platform Sales Representative. Likewise, virtual channel is classified into Internet, Voice Response Unit (VRU) and Call Centre. The performance of the firm is influenced by utilization of self-service channels in a multi-channel service delivery system (Xue, Lorin Hitt, & Harker, 2007).

Literature on prior research indicates non availability of information delivery model for banking business. Designing of information delivery model involves many factors such as banking users, banking information, delivery channels, information security and so on. Multi choice decision problems can be solved using multi criteria decision making techniques including analytic hierarchy process (AHP), fuzzy AHP (FAHP), TOPSIS, ELECTRE, Grey Theory, etc. The next section discusses various multi criteria decision making techniques and their applications.

2.3. Multi criteria decision making techniques and their applications

Multiple-criteria decision-making is a sub-discipline of operations research that explicitly considers multiple criteria in decision-making. In our daily and professional lives, there are multiple conflicting criteria to be considered in decision making. For example, in purchasing a car, cost or price is usually one of the main criteria. Quality is typically another criterion that is in conflict with the cost. Some of the criteria we consider while purchasing a car are cost, comfort, safety, and fuel economy. It is unusual to have the cheapest car to be the most comfortable and the safest. Different situations have different criteria to be considered and these criteria differ according to the users (Jin & Zhang, 2009; Kavitha & Vijayalakshmi, 2010; Ölçer & Odabaşi, 2005; Özcan, Çelebi, & Esnaf, 2011).

Many techniques are available to solve multi criteria decision making problems, which find the best alternatives by considering criteria and alternatives (Mateo, 2012; Zeleny, 1982). Table 1 describes various applications of MCDS in finding the best alternative.

In Table 1, it is known that fuzzy occurs very often in various business organizations when multiple choices are available. ELECTRE is used to reach close to the positive and move off from the negative points (Saeed Zaeri, Sadeghi, & Naderi, 2011). In some applications, uncertainty in decision making arises. Hence, fuzzy multi criteria decision making is chosen to solve this issue. The