

Chapter 2

The Role of Data Mining for Business Intelligence in Knowledge Management

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ABSTRACT

This chapter introduces the role of Data Mining (DM) for Business Intelligence (BI) in Knowledge Management (KM), thus explaining the concept of KM, BI, and DM; the relationships among KM, BI, and DM; the practical applications of KM, BI, and DM; and the emerging trends toward practical results in KM, BI, and DM. In order to solve existing BI problems, this chapter also describes practical applications of KM, BI, and DM (in the fields of marketing, business, manufacturing, and human resources) and the emerging trends in KM, BI, and DM (in terms of larger databases, high dimensionality, over-fitting, evaluation of statistical significance, change of data and knowledge, missing data, relationships among DM fields, understandability of patterns, integration of other DM systems, and users' knowledge and interaction). Applying DM for BI in the KM environments will enhance organizational performance and achieve business goals in the digital age.

INTRODUCTION

Data is being collected and compiled in the global business environments. There is an urgent requirement for a new generation of computational theories and tools to assist humans in extracting useful information from the promptly growing volumes of digital data. DM is the process of applying these computational methods in showing unknown data formats in large data sets. The manual extraction of schemes in large data sets

has been developed for centuries. The generation, pervasiveness and increasing power of computer technology has greatly increased data collection, data visualization, data storage, and data manipulation potentiality. As data sets have grown in size and involvement, direct data analysis has progressively been reinforced with indirect, automated data processing regarding computer science in terms of neural networks, cluster analysis, genetic algorithms, decision trees, and support vector machines. DM bridges the gap from applied sta-

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tistics and artificial intelligence (which commonly provide the mathematical background) to database management by utilizing the process that data is stored and indexed in databases to manipulate the actual learning and discovery algorithms more competently, allowing such DM methods to be utilized in larger data sets.

With changes and improvements every day, organizations must be prepared and informed with the possible directions and applications in order to achieve competitive advantage (Elragal & Gendy, 2013). DM can help the organizations by providing profitable information to decision makers (Elragal & Gendy, 2013), handling decision-making techniques (Ranjan & Malik, 2007), segmenting customers across varied industries (Hoontrakul & Sahadev, 2008), helping the decision maker to better group customers (Hoontrakul & Sahadev, 2008), solving many business problems to achieve competitive advantage (Folorunso & Ogunde, 2005) and finding unknown information from the operational customer database (Ranjan & Bhatnagar, 2011). DM has been an established field (Chen & Liu, 2005; Wang, 2005) as knowledge discovery in databases (Wang & Wang, 2008; Premalatha & Baskar, 2012). The extraction of unknown predictive information from large databases, is a powerful new technology with great ability to help companies focus on the most important information in their data warehouses (Folorunso & Ogunde, 2005). DM is a powerful BI tool only when business insiders are complicated and organizational knowledge sharing is implemented (Wang & Wang, 2008).

The business environment is constantly evolving into a more complex system and with global competition, decision making in organizations has become increasingly complex (Kapoor & Sherif, 2012). Organizations that have successfully implemented BI are able to make decisions quickly and with more accuracy and to meet their goals and objectives (Kapoor & Sherif, 2012). BI encompasses people skills, technologies, applications, and business processes to make better

strategic and tactical business decisions, thus playing a crucial role in achieving competitive edge over competitors in the challenging economy (Kapoor, 2010; Kapoor & Sherif, 2012). As the popularity of the Internet grows, it is widely recognized that information is a greatly important external resource (Hua, Huang, & Yen, 2012). The Internet is absolutely a rich data repository for the information resources that enable people to solve problems by applying the results obtained from selective searches (Hua et al., 2012). BI is an important activity for gaining improved organizational performance (Sharma & Djiaw, 2011). BI consists of an energetic and continual set of processes and practices concerning organizational individuals, as well as in groups and organizational structures (Sharma & Djiaw, 2011).

Kasemsap (2014a) stated that KM, strategic orientation, and organizational innovation have a strong impact on organizational performance in modern business. KM has become one of the most important management trends across the globe (Pandey & Dutta, 2013). Knowledge is considered as the most significant resource in organizations (Choe, 2004). KM is an influential ingredient for organizational success (Davenport & Prusak, 1998; Desouza & Awazu, 2006). KM is a systematic and integrative process of coordinating organization-wide activities of acquiring, creating, storing, sharing, diffusing, developing, and deploying knowledge by individuals and groups in the pursuit of major organizational goals (Rastogi, 2000). KM is aimed at getting people to innovate, collaborate, and make correct decisions efficiently (Plessis, 2005).

The novelties of this chapter indicate the integration of DM, BI, and KM; and the significance of DM and BI in the KM environments. This chapter contributes to the theoretical and practical insights of DM, BI, and KM; and the chances for a consideration on these meaningful issues to increase the understanding of utilizing DM in the context of BI in KM environments systematically suitable for scholars, researchers, technology de-

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