Chapter XVIII
Data Mining in Public Administration

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INTRODUCTION

Data mining involves searching through databases for potentially useful information such as knowledge rules, patterns, regularities, and other trends hidden in the data. In order to complete these tasks, the contemporary data mining packages offer techniques such as neural networks, inductive learning decision trees, cluster analysis, link analysis, genetic algorithms, visualization, and so forth (Hand, Mannila, & Smyth, 2001; Wang, 2006). In general, data mining is a data analytical technique that assists businesses in learning and understanding their customers so that decisions and strategies can be implemented most accurately and effectively to maximize profitability.

Data mining is not general data analysis, but a comprehensive technique that requires analytical skills, information construction, and professional knowledge.

Businesses are now facing globalized competition and are being forced to deal with an enormous amount of data. The vast amounts of data and the increasing technological ability to store them also facilitated data mining. In order to gain a certain level of competitive advantage, businesses now commonly adopt a data analytical technology called data mining. Nowadays, data mining is more widely used than ever before, not only by businesses who seek profits, but also by nonprofit organizations, government agencies, private groups, and other institutions in the public

sector. Organizations use data mining as a tool to forecast customer behavior, reduce fraud and waste, and assist in medical research.

BACKGROUND

Data mining uses statistical analysis, artificial intelligence, and machine-learning technologies to identify patterns that cannot be found by manual analysis alone. The primary function of data mining has already amazed many people and is now considered one of the most critical issues toward a business's success. However, data mining was not born all of a sudden. The earliest usage of data mining can be traced back to the World War II years. Data analytical methods such as model prediction, database segmentation, link analysis, and deviation detection were used for military affairs and demographic purposes by the U.S. government, but data mining had not been seriously promoted until the 1990s.

Gramatikov (2006) compares statistical methods to data mining, differentiating them by the ultimate focus of these two tools. Statistical methods use data that are collected with a pre-defined set of questions. Statisticians are either looking for describing parameters of data or making inferences through statistics within intervals. With data mining, knowledge is generated from hidden relations, rules, trends, and patterns that emerge as the data are mined.

The reason that data mining has been developed enormously again in the last few years is that a huge amount of information was demanded by modern enterprises due to globalization. Important information regarding markets, customers, competitors, and future opportunities were collected in the form of data to be put in databases, and businesses needed data mining to unearth useful information and knowledge. Otherwise, a huge, overloaded, and unstructured database could just make it very difficult for companies to utilize it, and it would in turn mislead the database users.

Public administration is, broadly speaking, the study and implementation of policy. The term may apply to government, private-sector organizations and groups, and individuals. The adjective *public* often denotes government at federal, state, and local levels, though it increasingly encompasses nonprofit organizations such as those of civil society or any not specifically acting in self-interest. Then, a long list exists, including colleges and universities, health care organizations, and charities, as well as postal offices, libraries, prisons, and so forth.

In the public sector, data mining initially was used as a means to detect fraud and waste, but has since grown for purposes such as measuring and improving program performance. Data mining has been increasingly cited as an important tool for homeland security efforts, crime prevention, and medical and educational applications to increase efficiency, reduce costs, and enhance research.

BENEFITS OF DATA MINING IN PUBLIC ADMINISTRATION

Data mining techniques offer public-sector opportunities to optimize decisions based on general trends extracted from historical data. With the knowledge that can be extracted from the data, public organizations can level up its knowledge accumulation strategies and steps. The knowledge that can be derived with the data mining could serve first as a tool for better governance and second as a means for sustaining the organizational knowledge. Data mining technology is applied in different aspects of public administration such as health care, immigration, law enforcement, and other public sectors to solve specific business or research problems. Examples of application areas follow.

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