



## **Chapter 5**

# **Data Mining: New Arsenal for Strategic Decision-making**

Sufi M. Nazem and Bongsik Shin  
University of Nebraska – Omaha

During the early years of database management the contemporary wisdom was to store only ‘useful data.’ In large part, this philosophy was encouraged because of the then-limited storage capacity offered by the prevailing technology. Then along came the microprocessor revolution, enormously expanding the scope of data storage. Subsequent advancement in information technology and recognition of potential business opportunities thereof, resulted in enormous expansion of data storage. Although the future is unknown and unpredictable, it often provides new business opportunities. Thus, new management strategies emerged which encouraged the massive accumulation of data and thus the advent of data warehousing. These massive data depositories are now providing both challenges and opportunities for strategic decision-making concerned with improving existing businesses and exploring new business opportunities. Data mining is an essential part of the process involved in locating relevant information from data warehouses for use in making such strategic decisions. Naturally, business leaders everywhere are willing to make investments in corporate data warehouses to enhance their access to information. The return on such investment is by no means guaranteed but all business activities include a certain amount of risk.

The value of information is created through mining of database in two different ways. First, this is achieved through careful exploitation of the intrinsic value of information. In such a situation, the information itself becomes the source of income through a process of conversion to a valuable

Previously Published in the *Journal of Database Management*, vol.10, no.1, Copyright © 1999, Idea Group Publishing.

This chapter appears in the book, *Data Warehousing and Web Engineering* by Shirley Becker  
Copyright © 2002, Idea Group Publishing.

commodity, leading to new businesses. Secondly, information often becomes an effective instigator for improved organizational performance. In this case, information acts as a vehicle for effective organizational reengineering that achieves better customer service, permits more flexible business approaches, integrates value chains, speeds up decision processes and expedites responses to customer needs. In the business environment where “time” is becoming a key success factor, maintenance of efficient systems for information processing and organizational learning is critical. As the volume of database itself grows at an exponential pace, technological innovation is becoming especially instrumental in offering a golden opportunity for organizations to arm themselves with more business intelligence and knowledge-making capabilities.

In this paper we intend to provide an overview of this emerging technology and related trends in the application of data mining. Given the confidential and highly proprietary nature of data mining activities critical organizational issues have rarely enjoyed an open discussion. The paper addresses issues of data mining from the organizational strategy perspective.

## OVERVIEW OF DATA MINING

Data mining requires the understanding of types of knowledge and search algorithms used to explore them, each of these has two aspects been expanded in this section.

### Type of Knowledge

Data-mining makes possible the intelligent discovery and application of various types of knowledge from large-scale databases. Such advanced knowledge is difficult to recover from conventional query processing or on-line analytical processing (OLAP). It is also different from traditional forms of data analysis in that the process itself is dealing with a massive amount of data and more innovative intelligence is incorporated in the knowledge discovery process. Data-mining enables the discovery of various types of knowledge, including, but not limited to:

- Dependency and association relationships among attributes
- Deviation (or anomaly) detection
- Sequential and temporal patterns among inter-transactions.
- Classification of knowledge
- Clustering of records that have similar characteristics
- Summarization of data.

8 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/data-mining-new-arsenal-strategic/7864](http://www.igi-global.com/chapter/data-mining-new-arsenal-strategic/7864)

## Related Content

---

### Ensemble Data Mining Methods

Nikunj C. Oza (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications* (pp. 356-363).

[www.irma-international.org/chapter/ensemble-data-mining-methods/7650](http://www.irma-international.org/chapter/ensemble-data-mining-methods/7650)

### Visualization Techniques for Data Mining

Herna L. Viktorand Eric Paquet (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications* (pp. 1623-1630).

[www.irma-international.org/chapter/visualization-techniques-data-mining/7719](http://www.irma-international.org/chapter/visualization-techniques-data-mining/7719)

### Synthesis with Data Warehouse Applications and Utilities

Hakikur Rahman (2005). *Encyclopedia of Data Warehousing and Mining* (pp. 1092-1097).

[www.irma-international.org/chapter/synthesis-data-warehouse-applications-utilities/10759](http://www.irma-international.org/chapter/synthesis-data-warehouse-applications-utilities/10759)

### A Java Technology Based Distributed Software Architecture for Web Usage Mining

Juan M. Hernansaez, Juan A. Botiaand Antonio F.G. Skarmeta (2008). *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications* (pp. 642-658).

[www.irma-international.org/chapter/java-technology-based-distributed-software/7667](http://www.irma-international.org/chapter/java-technology-based-distributed-software/7667)

### Materialized Hypertext View Maintenance

Giuseppe Sindoni (2005). *Encyclopedia of Data Warehousing and Mining* (pp. 710-713).

[www.irma-international.org/chapter/materialized-hypertext-view-maintenance/10689](http://www.irma-international.org/chapter/materialized-hypertext-view-maintenance/10689)