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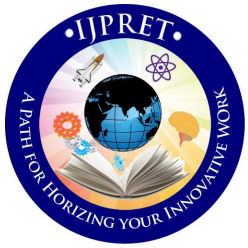

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A PATH FOR HORIZING YOUR INNOVATIVE WORK

DATA MINING & ITS APPLICATION IN SUPPLY CHAIN MANAGEMENT

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Abstract

Data mining is an emerging and interdisciplinary field. These include foundations and principles of data mining; OLAP, and data mining. A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

OVERVIEW

Data mining, *the extraction of hidden predictive information from large databases*, is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Its tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. The automated, prospective analyses offered by data mining move beyond the analyses of past events provided by retrospective tools typical of decision support systems. It is commonly used in a wide range of applications, such as marketing, fraud detection and scientific discovery. Data mining can be applied to data sets of any size, and while it can be used to uncover hidden patterns, it cannot uncover patterns which are not already present in the data set. Captured data needs to be converted into information and knowledge to become useful. The term data mining is often used to apply to the two separate processes of knowledge discovery and prediction predictions of future events and may be transparent and readable in some approaches (e.g., rule-based systems). Today, organizations are accumulating vast and growing amounts of data in different formats and different databases. This includes:

1) operational or transactional data

2) nonoperational data

3) meta data

THE FOUNDATIONS OF DATA MINING

Data mining techniques are the result of a long process of research and product development. Its evolution began when business data was first stored on computers, continued with improvements in data access, and more recently, generated technologies that allow users to navigate through their data in real time

In the evolution from business data to business information, each new step has built upon the previous one. The core components of data mining technology have been under development for decades, in research areas such as statistics, AI, and machine learning.

WHAT CAN DATA MINING DO?

Data mining is primarily used today by companies with a strong consumer focus - retail, financial, communication, and marketing organizations. It enables these companies to determine relationships among "internal" factors such as price, product positioning, or staff skills, and "external" factors such as economic indicators, competition, and customer demographics. And, it enables them to determine the impact on sales, customer satisfaction, and corporate profits. Finally, it enables them to "drill down" into summary information to view detail transactional data.

Example

1) Data mining can be helpful to human-resources departments in identifying the characteristics of their most successful employees. Information obtained, such as universities attended by highly successful employees, can help HR focus recruiting efforts accordingly of data mining, often called the market based analysis , relates to its use in retail sales. Data mining tools can identify patterns among customers and help identify the most likely customers to respond to upcoming mailing campaigns.

2) Most companies already collect and refine massive quantities of data.When implemented on high performance client/server or parallel processing computers, data mining tools can analyze massive databases to deliver answers to questions such as, "Which clients are most likely to respond to my next promotional mailing, and why?"

HOW DOES DATA MINING WORK?

While large-scale information technology has been evolving separate transaction and analytical systems, data mining provides the link between the two. Data mining software analyzes relationships and patterns in stored transaction data based on open-ended user queries.

data mining consists of 5 major elements

1) Extract, transform, and load transaction data onto the data warehouse system.

2) Store and manage the data in a multidimensional database system.

3) Provide data access to business analysts.

4) Analyze the data by application software.

5) Present the data in a useful format

WHAT TECHNOLOGICAL INFRASTRUCTURE IS REQUIRED?

Today, data mining applications are available on all size systems for mainframe, client/server, and PC platforms. System prices range from several thousand dollars for the smallest applications up to $1 million a terabyte for the largest. Enterprise-wide applications generally range in size from 10 gigabytes to over 11 terabytes.There are two critical technological drivers:

1)Size of the database: the more data being processed and maintained, the more powerful the system required.

2)Query complexity: the more complex the queries and the greater the number of queries being processed, the more powerful the system required.

AN ARCHITECTURE FOR DATA MINING

To best apply these advanced techniques, they must be fully integrated with a data warehouse as well as flexible interactive business analysis tools. Many data mining tools currently operate outside of the warehouse, requiring extra steps for extracting, importing, and analyzing the data. Furthermore, when new insights require operational implementation, integration with the warehouse simplifies the application of results from data mining. The resulting analytic data warehouse can be applied to improve business processes throughout the organization, in areas such as promotional campaign management, fraud detection, new product rollout, and so on. Figure 1 illustrates an architecture for advanced analysis in a large data warehouse.

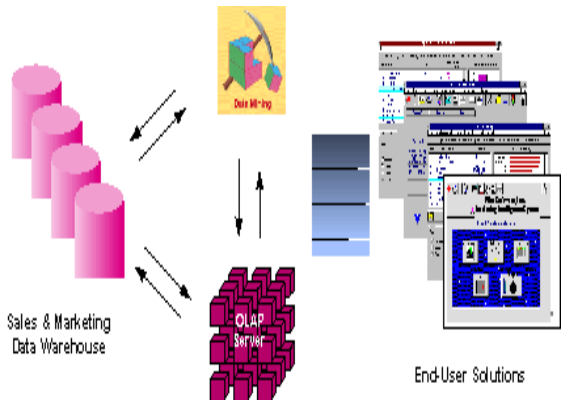

Figure 1 - Integrated Data Mining Architecture

The ideal starting point is a data warehouse containing a combination of internal data tracking all customer contact coupled with external market data about competitor activity. Background information on potential customers also provides an excellent basis for prospecting. An OLAP (On-Line Analytical Processing) server enables a more sophisticated end-user business model to be applied when navigating the data warehouse. The multidimensional structures allow the user to analyze the data as they want to view their business – summarizing by product line, region, and other key perspectives of their business. Integration with the data warehouse enables operational decisions to be directly implemented and tracked. As the warehouse grows with new decisions and results, the organization can continually mine the best practices and apply them to future decisions.

This design represents a fundamental shift from conventional decision support systems. Rather than simply delivering data to the end user through query and reporting software, the Advanced Analysis Server applies users' business models directly to the warehouse and returns a proactive analysis of the most relevant information. These results enhance the metadata in the OLAP Server by providing a dynamic metadata layer that represents a distilled view of the data.

AN INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

A *supply chain* is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

Supply Chain Management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point-of-origin to point-of-consumption (supply chain)

Supply Chain Management Problems

Supply chain management must address the following problems:

1) Distribution Network Configuration:

2) Distribution Strategy: Including questions of operating control

3) Inventory Management: Quantity and location of inventory including raw materials, work-in-progress (WIP) and finished goods.

4) Cash-Flow: Arranging the payment terms and the methodologies for exchanging funds across entities within the supply chain.

Supply chain business process integration

Supply chain business process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information.

The key supply chain processes combining processes stated by Lambert such as:

a) Customer service management process

Concerns the relationship between the organization and its customers.

b) Product development and commercialization

Here, customers and suppliers must be united into the product development process, thus to reduce time to market.

c) Manufacturing flow management process

Manufacturing processes must be flexibe to respond to market changes, and must accommodate mass customization. Orders are processes operating on a just-in-time (JIT) basis in minimum lot sizes

d) Outsourcing/partnerships

The logic of this trend is that the company will increasingly focus on those activities in the value chain where it has a distinctive advantage and everything else it will outsource.

g) Performance measurement

Experts found a strong relationship from the largest arcs of supplier and customer integration to market share and profitability. According to experts internal measures are generally collected and

analyzed by the firm including Cost, Customer Service Productivity measures, Asset measurement and Quality.

The Supply Chain Management System

Providing Quality Medicines for People Living with and Affected by HIV/AIDS Funded by the President's Emergency Plan for AIDS Relief (PEPFAR) and established in fiscal year 2005, the Supply Chain Management System (SCMS) project is helping host nations increase their capacity for delivering essential lifesaving HIV/AIDS medicines and supplies to people in need of treatment and care. Operating in some of the country's most severely impacted by HIV/AIDS, SCMS works in collaboration with host-country governments and local and global partners; procures essential medicines and supplies at affordable prices; helps strengthen and build reliable, secure and sustainable supply chains systems; and fosters coordination of key stakeholders.

By working closely with partners to plan future procurement, pooling orders to buy in bulk, establishing long-term contracts with manufacturers, and purchasing generic alternatives whenever possible, SCMS helps to reduce the price of essential medicines to treat HIV/AIDS.

CONCLUSION

Competition requires timely and sophisticated analysis on an integrated view of the data. However, there is a growing gap between more powerful storage and retrieval systems and the users' ability to effectively analyze and act on the information they contain. Both relational and OLAP technologies have tremendous capabilities for navigating massive data warehouses. A new technological leap is needed to structure .and prioritize information for specific end-user problems. The data mining tools can make this leap. Quantifiable business benefits have been proven through the integration of data mining with current information systems, and new products are on the horizon that will bring this integration to an even wider audience of users.

REFERENCES

1. From Wikipedia, the free encyclopedia

2. Data Mining Page White Papers Data Mining Tutorial

3. www.icmrindia.org/casestudies/catalogue/Operations/WalMart%20Supply%20Chain%20Management-Operations%20Case%20Study.htm
4. www.ieee.org