

Data Mining for Improving Customer Relationship Management in Intelligent Business

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Abstract

Retailing has been planned to address spatial and transient gaps between the manufacturer and the end customer. The difficulty of monitoring retail sales however is exacerbated by the variety of consumers' geographical areas and the frequency of retail visits. In reality, this is a crucial knowledge for designing marketing relationships (CRM) strategies for consumers. Data mining is typically a way of extracting data from different backgrounds (also called data or knowledge discovery) and summing it up in valuable data information that could be used for the highest gain, minimization of expense, or both. Data mining is technically the practice of finding correlations or patterns in thousands of fields in large linked database networks. Data mining is conducted using proprietary software to convert and distinguish the relationships between data from various measures or perspectives. Although data extraction is a relatively new idea, it is not a science. Constant advancement in computer processing, computing and computer systems substantially improves the accuracy of the analysis and reduces costs. Transaction information in a retail data warehouse can be examined in a "customer-centric" or "visit-centric" retailing approach, which explores briefly the design and the growth of the sector and best practices. It analyzes the different aspects and problems that also need to be tackled by using data mining in retail transactions.

Keywords: (CRM) strategies, Data mining, Challenges, Retailing, Retail transactions

Introduction

Retailing is a delivery format for the reduction of geographical and temporal variations between the seller and the final user, Supply chain instability. The retail world is rapidly shifting and expanding due to increased recognition and customer demand [1-3]. For retailers that are able to consider and respond to evolving customer demands, the prospect of retailing will be advantageous. This includes an accurate, agile and efficient method for reading consumer response, interpreting behavior trends and driving intelligently and quickly replicated buying behavior. The difficulty of monitoring retail sales however is exacerbated by the variety of consumers' geographical areas and the frequency of retail visits [4-5].

Retailers gather terabytes from purchase data, demographics, seasonal merchandise transactions on the basis of terabytes of daily data. But how do you translate it into knowledge that will promote clever

decision-making? At this juncture, the role of data mining is accomplished. Although data mining is a relatively recent concept, it's not science. The accuracy of the study, while decreasing expense, is significantly improved by continuous advances in data processing, disk storage and statistical tools[6-9].

Literature Survey on Data Mining

The method of data mining is usually a mechanism by which data from different angles is analyzed and summarized into useful information, which can be used to increase profits, minimize costs and more. Technically speaking, data mining is a tool for finding correlations or patterns in thousands of places of large relational database systems (sometimes referred to as data mining or information foundation). states: 'Data mining is a method that takes data from broader datasets to the extraction of previously unknown, true or accessible data and then uses it to make critical business decisions,' Fabris says. 'There are automatic analyzes of vast

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volumes of data to find patterns and trends that would have otherwise gone undiscovered [10-14].

Steps of Data Mining

Different stages of data mining could be done depending on the hardware and statistical viewpoint

1. Driven data extraction helps enterprise users to deduce groups and clusters.
2. Clusters are used by non-directed data mining to classify pure statistical designs.
3. Association helps to detect relations between variables. The store revealed that on some days of

the week, shoppers ordered beer and diapers. And the store shop then began putting pricey drinks right behind the diapers.

4. Data are derived to forecast activity patterns and demand levels at the end of the day. The data collected can be evaluated using special statistical methods to have effective market views. Among the most commonly used computational techniques are artificial neural networks, genetic algorithms, decision trees, the nightlife method, rule inference, methods of data visualization and the Bayes method [15-16].

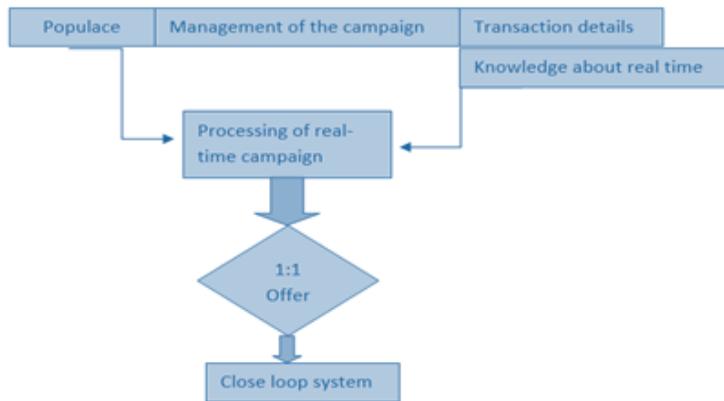


Figure 1: Real time marketing method application of predictive technologies Test

Challenges in Mining of Retail transaction

Setting up a Business Intelligence system involves a series of interrelated steps as follows:

1. Information collection
2. Creation of the Data ware house
3. Business Intelligence
4. Deployment of the information
5. Requirements Gathering

However several challenges are being posed in each of the steps of designing data mining process for retail transactions.

1. Information collection

The emphasis of this stage is the architecture for capturing and storing the data at suitable locations. In this process, the follow-up of the "business event" to the

appropriate levels and the simplicity of the data entry practitioners are important.

For eg, as the transaction is processed and the cash receiver automatically locked any time the billing takes place, software tracking the transactions on the point of billing would be only available to employer, which may create complications to employers on the counter whose main concern is to ensure a smooth financial transaction[17].

2. Analysis of data of ware house

The establishment of a data warehouse involves major transformations from the operating system, and it is estimated that 80 percent of the time for computational processes is wasted on the transformation of the data.

3. Industrial Intelligence

The aim of data mining is to provide enterprise customers with interesting knowledge that can only be

accomplished if the non-programmers can effectively communicate with datasets and comfort. Detailed models including decision-making bodies, laws of decision and Naïve Bayes can help to achieve that goal. One clear trend, for example, created from mining retail purchases was that, three days after a high in tomato sales, daytime temperatures peaked. This may be significant for someone who has a weather preview and not for a retailer.

4. Implementation of information

The identification of individualizing errors, simple oversight and falsely associated correlations that result in parallel misinterpretation for causalities shall be taken before the use of data obtained. The data cleaning is a vital requirement for any form of data analysis. Visualization techniques like diagrams, hardware and scatter plots will help users to consider the interaction between certain variables, and thus to use them properly. „Therefore an image is worth 1000 words.“

5. Criteria Collection

In this stage, the right market problems to be exploited are found. This includes a detailed knowledge of the market situation and a continuing relationship with the managers of retail stores. "Defining the business problem is the trickiest part of successful data mining because it is exclusively a communication problem. [18]. The underlying problems that emerge must then be taken into deeper study.

For instance, the simple question may be "The customers who have answered promotional coupons have a demographic profile." This could be translated into the awareness of whether or why the promotional coupon has not been successful.

6. Last challenge

The big obstacle for the success of the Retail Data Mining operation is to engage and interfere manually. An optimal combination of field experience and data processing skills is required to automate the feature design. While mechanical outputs can be standardized, people with varying skills and experience at all levels cannot standardize themselves. More direction and monitoring of success in the process is important. With due regard for the difficulties to be met in each level, the data mining infrastructure must be prepared. Figure 2 shows the different levels and complexities of a retail unit's data mining process.

Data Mining in Retail Applications

For primarily marketing purposes the data collected from a retail unit's data warehouse is used. Transaction information may be analyzed in a retail data warehouse as 'customer-oriented' or 'visit-centered' retailing.

The consumer attention depends on the customer's comprehensive profile. The consumers with a homogenous profile are then grouped together into goals for subsequent marketing initiatives in age, income and education. Ethnicity, family and the like.

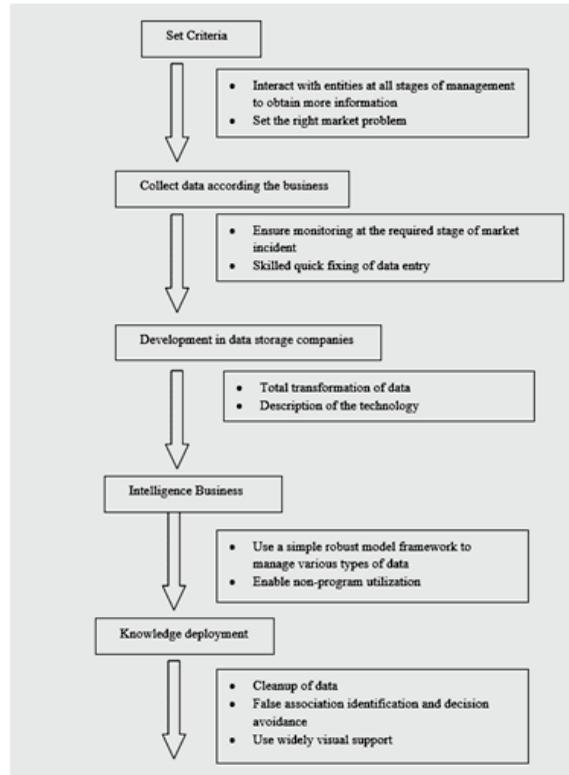


Fig.2 Different Phases of Data Mining

The visit-centered approach aims to create a category focused on retail customers' behavioral trend and allow for exclusive strategies. Detailed transaction log analysis and continuous optimization of operations are central to this strategy

In the retail sector these particular applications include:

- Analysis of the business basket - a shopping movement survey at the points of sale - to help decisions on distribution of the shelving space, configuration of the shop, place of the stock, placement of the merchandise and productive marketing. Thus fine-tuned data gave the information that eggs are steadily sold in combination with the POS bread. This review also offers further insights into the placement of the commodity.
- Data mining is capable of promoting CRM calculations of a retail store. "Vinitas," a leading

female beauty clinic at Madurai, issues "Loyalty" cards to honor its frequent and casual customers.

- The coupon printers on store checkout stands are useful when issuing a coupon for a certain brand for the consumers who buy a certain product.
- Risk assessment is another field in which data mining is successfully employed. It helps a faulty consumer to be found and stopped.
- Fraud identification is assisted by efficient data gathering. It has been determined, through systemic data capturing (using closed circuit television) and study, to be very much regulated 38 percent of retail declines that arise by fraudulent workers and pilferage by consumers on the POS.
- Under exemplary reporting, POS transactions that are vulnerable to defaults in situations like credit cards, insurance, loans and so on can be expected.

In a retail shop, the service log will also offer information into the checkout process. It helps retailers to assess the

period they are waiting for, the time of their business, the late checks for some products, and the effect on the time of checkout of payment forms.

To effective date Mining Prospects

Case Study: Wal-Mart

Wal-Mart, the largest retailer in the world, has been active in leveraging market data to effectively leverage its market. In this case the possibilities available with an effective data mining method are evaluated.

Company at a glance;

- Head Office: Bentonville, Arkansas
- Revenue: \$345 Billion USD
- Employees: 1.8 Million
- Ranked 1st Among the Fortune 500 companies
- Stores: 6,779 Worldwide
- Ownership: Publicly Trade on NYSE.

If Wal-Mart were a country, it would rank 30th. Right behind Saudi Arabia

Support of Exclusive software Retail Link

In order to track in real time goods purchases, arrivals, orders and returns, Wal-Mart uses Retail connection Tools. Both vendors expect detailed research to be returned to Wal-Mart to be supplied with the applications free of charge.

The program of Retail Connection analyzes for suppliers is a wide variety. Wal-Mart encourages Retail Connect user groups to meet and exchange best practices on a national basis. 15 billion SKUs per annum track Retail connect.

The unified information systems currently require 975 stores to use RFID tags and forklifts. By 2010, in 14 countries, Wal-Mart swits to SAP corporate resource.

In Linda Dillman's words, WalMart CIO: "This technology has a bigger potential to make a difference in retailing than anything we've ever done."

Data Mining at Wal-Mart

Allows over 3500 vendors to view and evaluate data for their goods. The identified consumer trend is used for maintaining the inventory of local stocks and finding potential business opportunities. About 1 million

dynamic data requests were managed by Wal-Mart machines in 1995.

Wal-offices Mart's in Arkansas was out of all computer networks. A credit card purchase will fly 16,000 miles in 0.5 seconds in one of Wal-Chinese Mart's stores. Headquarters in Arkansas accepted the authorization request posed in China in 0.5 seconds.

Wal-central Mart's management networks

It's 423 terabytes for Wal-mainframe. Mart's Just the Pentagon is internationally second in scale to Wal-IT Mart's infrastructure. Wal-Mart has a consolidated house of data products. This allows for the processing and constantly transfer of the data to a huge 7.5 Terabyte Tera data warehouse from over 2,900 stores in 6 countries.

Results of the system:

WalMart's impeccable scheme has had many advantages, including

1. The fulfillment centers have allowed speed, agility and reliability to flourish.
2. The increased product turnover provided the logistic advantage of 4,57 to 8,083.
3. The number of days of inventories has fallen since 80 days to about 45 days.
4. 70% of the items offered through the cash register at Wal-Martpass until payment by the Company.
5. Stock issues have regained 41 per cent of the missed revenue.
6. It is projected that RFID technology will increase revenue by \$287 million a year.

Wal-Mart thus shows the reality that an efficiently used data processing method will increase efficiency in the supermarket scenario by making springs.

Conclusions

In today's dynamic enterprise, the proliferation of technologies lets businesses rapidly and actively respond to changing consumer demands domestically and globally. Data mining techniques are theoretically the aim of the modern technical process. Data mining has shown a great deal of reliability in addressing many main market problems. However, experiments are developed and highly automated, robust and reliable mining techniques developed. These easy-to-use techniques will allow users

to understand the knowledge they have explored easily and efficiently. For the modern business model, data mining is the best answer - easy, quicker and powerful business intelligence.

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