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Implementation Benefit to Business Intelligence using Data Mining Techniques

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Abstract: ***This paper is discussing data mining techniques and business operations areas includes marketing, finance, fraud detection, manufacturing, telecommunication to improve their business and found excellent results. A wide range of marketing companies requires the analysis of millions of shopping transaction records daily such as sales revenue by products to guide personalized marketing, promotional campaigns, costs and incomes and provide historical, current and predictive views of Business operations. An important component of many of these applications is customer profiling, which aims to extract patterns of behavior from a collection of transaction records, and the comparison of such patterns. The outcome of research shows that data mining tools are capable of discovering patterns in data in few hours those expert human quantitative analysts might not find in years of work to help make decision in complex supply chain management, customer relationship management collect and analyze transaction records continuously.***

Keywords: Data mining techniques, Business operations, Business intelligence, Supply chain management, Customer relationship management

1. Introduction

The development of information technology has generated large amounts of data from various databases, data warehouses and other repository information. The research operations on databases give the approach for future use store and process information to make better business results. Data mining techniques give useful information from various database sources .These data mining tools provides information into useful patterns. The traditional method of turning data into knowledge relies on manual analysis and interpretation. For these applications this form of manual probing of data set is slow, expensive, and highly subjective. In fact, as data volumes grow dramatically, this type of manual data analysis becoming completely impractical in many domains. The need to scale up human analysis capabilities to handling the large number of bytes that we can collect is both economic and scientific. Businesses use data to gain competitive advantage, increase efficiency, and provide more valuable services to customers. Data we capture about our environment are the basic evidence we use to build theories and models of the universe we live in. Because computers have enabled humans to gather more data than we can digest, it is only natural to turn to computational techniques to help us unearth meaningful patterns and structures from the massive volumes of data. Hence, Knowledge discovery Techniques is an attempt to address a problem that the digital information era made a fact of life for all of us. Data mining tools allows users to analyze large database to solve business decision making problems. This 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. The business community is well aware of today's information overload and business source analysis shows that

- 61% of managers believe that information overload at their own workplace,
- 80% believe the situation will get worse,
- over 50% of managers ignore data in current decision-making process because of the information overload,
- 84% of managers store this information for the future use , it is not used for current analysis,
- 60% believe that the cost of gathering information outweighs its value.

2. Data Mining Technology In Business

A new business culture is developing today. Within it, the economics of customer relationships are changing in fundamental ways, and companies are facing the need to implement new solutions and strategies that address these changes. The concepts of mass production and mass marketing, first created during the Industrial Revolution, are being supplanted by new ideas in which customer relationships are the central business issue. The tools and technologies of data warehousing, data mining, and other customer relationship management (CRM) techniques afford new opportunities for businesses to act on the concepts of relationship marketing. Data mining tools can answer business questions that traditionally were time consuming to resolve decision-making problems. Data mining is the process of extracting hidden knowledge from large volumes or raw data. This process includes collection and mining of records on a continuous basis of large volumes of transactions. The goal of this technique is to find pattern that were previously unknown. Once these pattern are found they can further used to make better decisions for their businesses.

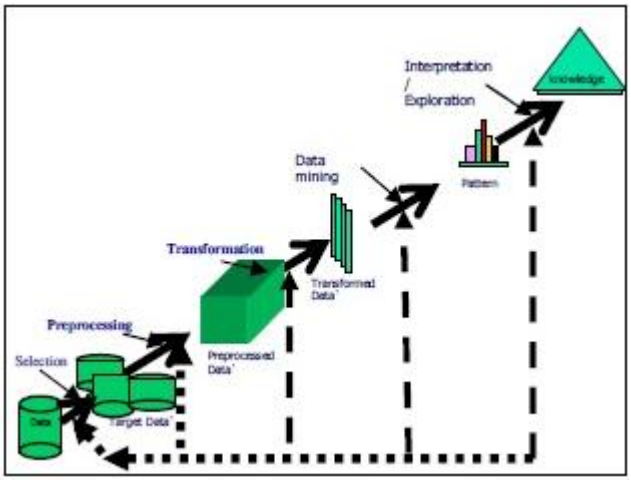

Figure 1: Knowledge Discovery Process

There are four key stages in the customer lifecycle:

1) **Prospects**—people who are not yet customers but are in the target market
2) **Responders**—prospects who show an interest in a product or service
3) **Active Customers**—people who are currently using the product or service
4) **Former Customers**—may be "bad" customers who did not pay their bills or who incurred high costs;

Those who are not appropriate customers because they are no longer part of the target market; or those who may have shifted their purchases to competing products. The outcome of this process is marketing data intelligence, which is defined as "Combining data driven marketing and technology to increase the knowledge and understanding of customers, products and transactional data to improve strategic decision making and tactical marketing activity, delivering the Business development challenges.

3. Data Mining Techniques

Various data mining techniques used for business development are Classification, Regression, Clustering, Summarization, Association Rules, Genetic algorithm used for knowledge discovery from databases.

1) Classification

Classification is the most commonly applied technique, which employs a set of pre-classified examples to develop a model that can population records at large. Fraud detection and credit-risk applications are particularly well suited to this type of analysis. Examples of classification methods used as Part of discovery application classifying of trends in financial markets and automated identification objects of interest in large databases. The classifier training algorithm uses these classification techniques used for business development. Financial marketing companies want to classification to automatically decide further decision making which help them to safe from fraud and risks.

2) Regression

Regression technique can be adapted for predication. Regression analysis can be used to model the relationship between one or more independent variables and dependent variables. In data mining independent variables are attributes already known and response variables are what we want to predict. Unfortunately, many real world problems are not simply prediction. For instance sales volumes, stock prices and product failure rates are all very difficult to predict because they may depend on complex interactions of multiple predict variables. Therefore more complex techniques may be necessary to forecast future values. Examples predicting the amount of biomass present in a forest given remotely sensed microwave measurement, estimating the probability that a patient will survive given the results of a set of diagnostics tests, predicting consumer demand for a new product as a function of advertising expenditure, and time series where input variables can be time-lagged versions of prediction variables.

3) Clustering

Clustering can be said as identification of similar classes of objects. By using clustering techniques we can further identify dense and sparse regions in objects space and can discover overall distribution pattern and correlation among data attributes. Examples of clustering applications in a knowledge discovery context include discovering homogeneous subpopulations for consumers in marketing databases and identifying subcategories of spectra from infrared sky measurements. From group of customers based on purchasing patterns to categories genes with similar functionality.

4) Summarization

Summarization involves methods for finding a compact description for a subset of data. A simple example would be tabulating the mean and standard deviations for all fields. More sophisticated methods involve the derivation of summary rules, multivariate visualization techniques, and the discovery of functional relationships between variables Summarization techniques are often applied to interactive exploratory data analysis and automated report generation. These techniques report generation provide better decision making for complex large volumes customer database with visualization tools to gets more functionality in business.

5) Association Rule

Association and correlation is usually to find frequent item set finding among large data sets .This type of finding helps business to make certain decisions such as catalogue design, cross market and customer shopping behavior analysis. Association rule algorithm need to be able to generate rules with confidence values less than one. However the number of possible Association rule for a given data set is generally very large and a high proportion of the rules are usually of little values.

4. Data mining application in real life Business

There are number of industries that are using data mining applications. Some of these organizations include retail stores, hospitals, banks, insurance companies, manufacturing combing with data mining such things as statistics, pattern recognition and other important tools used to find patterns and connections that would otherwise difficult to find .This technology used in smart making decisions and business problems and solutions using data mining technology.

1) Retail Marketing

Through the use of store-branded credit cards and point-of-sale systems, retailers can keep detailed records of every shopping transaction. This enables them to better understand their various customer segments. Some retail applications include:

- Performing basket analysis—Also known as affinity analysis, basket analysis reveals which items customers tend to purchase together. This knowledge can improve stocking, store layout strategies, and promotions.
- Sales forecasting— examining time-based patterns helps retailers make stocking decisions. If a customer purchases an item today, when are they likely to purchase a complementary item?

- Database marketing—Retailers can develop profiles of customers with certain behaviors, for example, those who purchase designer labels clothing or those who attend sales. This information can be used to focus cost–effective promotions.
- Merchandise planning and allocation—when retailers add new stores, they can improve merchandise planning and allocation by examining patterns in stores with similar demographic characteristics. Retailers can also use data mining to deter- mine the ideal layout for a specific store.

2) Banking

Banks can utilize knowledge discovery for various applications, including

- Card marketing—By identifying customer segments, card issuers and acquirers can improve profitability with more effective acquisition and retention programs, targeted product development, and customized pricing.
- Cardholder pricing and profitability—Card issuers can take advantage of data mining technology to price their products so as to maximize profit and minimizeloss of customers. Includes risk-based pricing.
- Fraud detection—Fraud is enormously costly. By analyzing past transactions that were later determined to be fraudulent, banks can identify patterns. Predictive life-cycle management—Data mining helps banks predict each customer's lifetime value and to service each segment appropriately (for example, offering special deals and discounts).

3) Telecommunications

Telecommunication companies around the world face escalating competition which is forcing them to aggressively market special pricing programs aimed at retaining existing customers and attracting new ones. Knowledge discovery in telecommunications include the following

- Call detail record analysis—Telecommunication companies accumulate detailed call records. By identifying customer segments with similar use patterns, the companies can develop attractive pricing and feature promotions.
- Customer loyalty— some customers repeatedly switch providers, or "churn", to take advantage of attractive incentives by competing companies. The companies can use data mining to identify the characteristics of customers who are likely to remain loyal once they switch, thus enabling the companies to target their spending on customers who will produce the most profit.

4) Other applications:

Knowledge discovery applications are emerging in a variety of industries

- Customer segmentation—All industries can take advantage of data mining to dis- cover discrete segments in their customer bases by considering additional variables beyond traditional analysis.
- Manufacturing—Through choice boards, manufacturers are beginning to customize products for customers; therefore they must be able to predict which fea- tures should be bundled to meet customer demand.
- Warranties—Manufacturers need to predict the number of customers who will submit warranty claims and the average cost of those claims. Frequent flier incentives—Airlines can identify groups of customers that can be given incentives to fly more.

5. Case Study

Some more business leading sectors use data mining techniques and get results.

1) Insurance Companies

Insurance companies are facing problems of mailing costs, increase marketing campaigns, cross selling to existing customers.

Results:
Effectiveness of its campaigns, optimization and execution, decreased mailing costs and increase conversion rates.

2) Telecomm Services

Fraudulent activities in services and call intrusion.

Results:
Reduced fraud activities in services and save resources time and money.

3) Financial Companies

Client attracted to their offers, cross sell standard products to clients.

Results:
Discover key drivers for purchasing remortage producers, get greater response and worth of mortage application revenue.

4) Software sales companies

Facing difficulty customer purchasing hardware and software decisions for online sales.

Results:
Recommendation engine went live pages viewed per month more than 67 percent, profits increased than previous years.

6. Conclusion

The paper reviews is many data mining techniques, particularly specialized methods for particular types of data and domains. Our paper focused on mainly on automated methods for extracting patterns or models from data. Data mining tools overcome manual search of data and assist in business development .Data mining tools such as classification, regression, clustering etc. Data mining represents the link from the data stored over many years through various interactions with customers in diverse situations, and the knowledge necessary to be successful in relationship mar- keting concepts. In order to unlock the potential of this information, data mining performs analysis that would be too complicated and time-consuming for statisticians, and arrives at previously unknown nuggets of information that are used to improve customer retention, response rates, attraction, and cross selling helps in finding the patterns to decide upon the future trends in business to grow.

References

[1] Harvinder Singh Computer Faculty ,Education Department Punjab harvinder 9815653260 @rediffmail.com http://en.wikipedia.org/wiki/Business_intelligence
[2] Jiawei Han and Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kauffman, publisher, chanpaign CS497JH,fall 2001.
[3] Jiawei Han and Micheline Kambe`r(2006), Data Mining Concepts and Techniques, published by Morgun Kauffman,2nd ed.
[4] Decision Support Solutions: Compaq. Object relational data mining technology for a competitive advantage. http://www.tandem.com/brfsps?odmadvwp/odmadvwp.htm
[5] Freeman M. The 2 customer lifecycles. Intelligent Enterprise 1999;2(16):9.
[6] Chablo E, Marketing Director, smartFOCUS Limited. The importance of marketing data intelligence in delivering successful CRM, 1999. http://www.crm-forum.com/crm—forum—white—apers/mdi/sld01.htm
[7] Apte, C., and Hong, S. J. 1996. Predicting Equity Returns from Securities Data with Minimal Rule Generation.
[8] Cheeseman, P., and Stutz, J. 1996. Bayesian Classification(AUTOCLASS): Theory and Results .In Advances in knowledge Discovery and Data Mining,eds.
[9] Agrawal, R.; Mannila, H.; Srikant, R.; Toivonen, H.; and Verkamo, I. 1996. Fast Discovery of Association Rules.