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Review on Use of Data Mining in Focusing Bank Frauds and Enhancing Business

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Abstract- The purpose of this paper is to give a view on uses of Data Mining in detecting bank frauds or dodgy transactions which can be harmful to bank in future and also to find those transactions which can be useful for bank or may be helpful in business. This paper will also provide an overview of Data Mining concept .With the adoption of new technology as well as changing customer and staff expectations it is challenging for bank to navigate technology strategy alternatives. Data mining is new and powerful technology of extracting useful information from large databases. It helps in improving business decisions, enhance the value of each customer and helpful in customer requirements. An organization can achieve a great advantage over its competitors with Data Mining. The banking sector is not only a small co-operative bank but is a large sector which includes public sector , private sector, foreign banks as well as banking products and services like Credit Card service , Loan service , ATM service.

Keywords: Data Mining, Frauds, Banking, Customer Management, Patterns.

I. INTRODUCTION: DATA MINING

Data Mining is a powerful new technology with great potential to help organizations by focusing on most important data in their corresponding data warehouse. It is the process of extracting information from large volumes of row data. Data Mining has been defined as” The non-trivial extraction of implicitly previously unknown and potentially useful information from data.” Basically Data Mining is also one of the important tasks in the process of knowledge discovery. The steps included in data mining are given below [4, 5]:

A. Data Selection

The relevant data for analysis is decided and extracted from various databases.

B. Data Preprocessing

It is the process of data cleaning and data integration.

1) *Data Cleaning:* In this phase, noisy or irrelevant data is removed from the collected data.

2) *Integration:* In this phase, a number of data sources may be of different types are combined in a common source.

C. Data Transformation

In this phase, the selected data is transformed into that form which is appropriate for data mining.

D. Data Mining

The important phase in which different techniques are applied to extract useful patterns and information from data.

E. Interpretation and Evaluation

In this phase, the discovered knowledge which is visually presented to the user is in form of patterns are identified on given measures.

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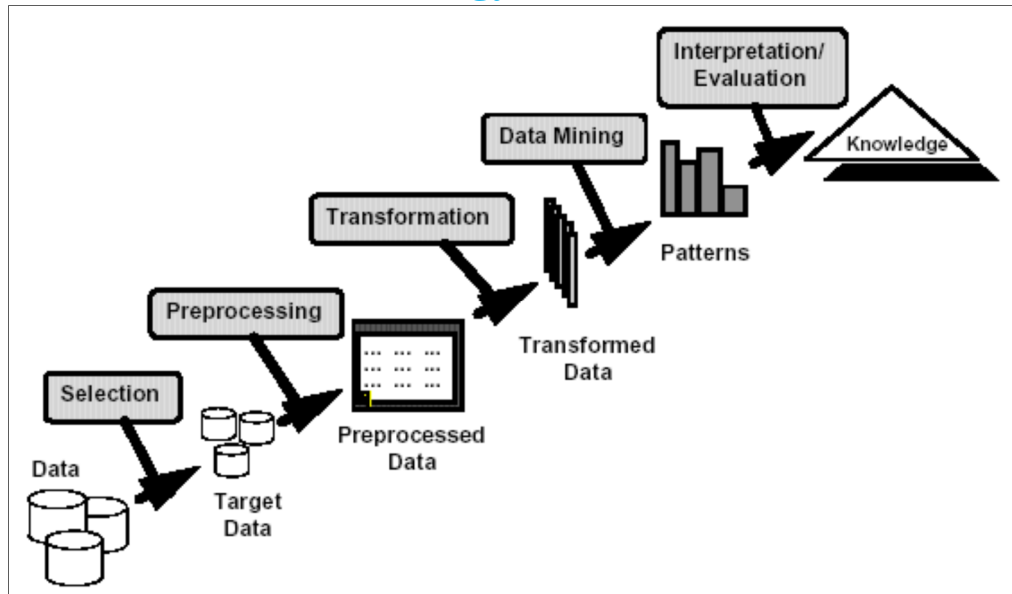


Figure 1: Knowledge Discovery Process [8]

II. EVOLUTION AND SCOPE OF DATA MINING

Data mining technique is the result of a long process of research development [6]. The evolution started when the data is stored in the computer and there is continuity in improving data and more recently, technologies that gives allowance to users to traverse data in real time.

Table 1: Expansion of Data Mining

Evolutionary Step	Business Question	Enabling Technologies	Product Providers	Characteristics
Data Collection (1960s)	"What was my total revenue in the last five years?"	Computers, disks	IBM, CDC	static data delivery
Data Access (1980s)	"What were unit sales in New England last March?"	Relational databases (RDBMS), Structured Query Language (SQL), ODBC	Oracle, Sybase, Informix, IBM, Microsoft	Backward-looking, dynamic data delivery at record level
Data Warehousing & Decision Support (1990s)	"What were unit sales in New England last March Drill down to Boston?"	On-line analytic processing (OLAP), multidimensional databases, data warehouses	Pilot, Comshare	Backward-looking, dynamic data delivery at multiple levels
Data Mining (Emerging Today)	"What's likely to happen to Boston unit sales next month? Why?"	Advanced algorithms, multiprocessor computers, massive databases	IBM	Prospective, proactive information delivery

The scope of data mining can be understood by its capabilities which it provides to business organizations:

A. Automated prediction of trends and behaviors

Data Mining automates the process of finding information from large databases. Predictive problems like bankruptcy and target marketing can be answered with data mining because data mining uses the past stored data on which the prediction can be done [6].

B. Automated discovery of previously unknown patterns

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Data mining tool sweep through databases and recognize the hidden patterns from databases. Pattern discovered problem is used to find fraudulent credit card transactions and identifying anomalous data which could represent data entry keying errors [6].

III. DATA MINING OPERATIONS

Data Mining operations or tasks are divide in different categories. Few Data Mining operations are: classification, segmentation, clustering, predictive modeling, link analysis, association, visualization, deviation detection. While using most analysis tools users know what questions are they going to ask from tool but with data mining tool users necessarily do not need to know questions rather the tool itself uncovers the patterns. With the help of visualization tools users can see the patterns. Even with the help of these tools three dimensional views can be shown to users.

It is hard to uniquely identify the techniques of data mining. That's why any listing of techniques is either subjective or arbitrary. Some widely used data mining techniques are genetic algorithms, artificial neural network, k nearest neighbor, decision tree, rule induction and data reduction.

IV. BANK FRAUDS

Fraud means something intended to deceive. Some examples of frauds in banking sector are:

A. Cheque Fraud

Cheques can be altered to an illegitimate payment recipient and higher transaction amount by adding a few digits or may be provided with or cheque can be make completely forged. Suspicious properties of hand or machine written cheques can be recognized by special experts [7].

B. Loan Fraud

Fraudulent loan applications which are reason of bank fraud may contain false information to hide financial problems. Also, an employee can knowingly approve loans to accomplices who declare bankruptcy.

C. Money Laundering

It is a special kind of bank fraud in which the main aim is to hide true information of origin of funds.

D. Identity Theft

In this fraud, the information of an individual is obtained and this information is used to apply for identity cards, accounts and credit in that person's name. the information can be obtained from mail scam, telephone.

E. Payment Card fraud

Payment card can be stolen or may be reproduced with skimming. Cards can be intercepted in transit when it is being sent to the user. Card can also be negotiated by merchant who undertakes duplicate transaction of card.

F. Electronic Fraud

Mainly fake websites and scam emails comes under electronic fraud. Personal information of customer is taken by the fake email id and fake websites.

V. DATA MINING IN BANKING SYSTEM

Tremendous changes can be seen and felt in banking system as the electronic banking is increasing and transactions can be captured easily but simultaneously size of data is also growing. To analyze this huge amount of data and making decisions on this data is out of human's capabilities. The huge amount of data which is collected by banks over the years can influence the success of data mining. With the help of patterns and trends which are produced by data mining tool, Bank Executives can predict the customer's behavior. Bank Executive can predict that which customer will be interesting in new offers, which customer will be at risk for defaulting on loan. Nowadays Banking sector has widely recognized the importance of information of its customers. Bank has the richest and largest information pool of the customer information, transactional data, credit card patterns and so many other

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information . As service industry is also included in banking so Customer Relation Management (CRM) is a serious issue . For CRM, the banks need to invest its resources to better understand behavior of customers. Data Mining can be used in many areas of banking industry. The areas can include customer segmentation, credit card approval, loan approval , marketing ,detecting fraudulent transactions . Bank may use data mining in high risk loan applications and high profitable credit card customers. By looking at given examples we can see how banks are utilizing Data Mining.

A. Risk Management

Data Mining is used for risk management in banking industry .Cases like offering new customer credit card, extending limit of existing credit card , approving loans can be risky decisions for bank if they do not know anything about the customer. So it is necessary for bank executives to know their customers whether they are reliable or not .With the help of Data Mining, credit behavior of individual borrowers and credit card loans can be derived on basis of credit history, length of employment and residency. In this way a score can be produced on basis of which distinguish of customers as a ‘good’ or ‘bad’ customer can be done . This score can decide whether the person is good candidate for loan or if there is high risk of default. The customer who have been with bank for long time and in a good standing and also have high wages are more likely to receive a loan as compared to a new customer with no history in bank .The bank can be in a better position by knowing the default for a customer and can also reduce the risk .

B. Fraud Detection

Fraud detection is popular area of banking industry where data mining can be used .Mainly two approaches are used by financial institution. First approach is where data is collected from third party by the bank and then data mining is applied to find fraud patterns. After this , the bank can cross reference those patterns with its own data for internal trouble. Second popular approach is falcon’s ‘fraud assessment system’ which is used by nine top credit issuing companies.

C. Customer Acquisition and Retention

Data Mining not only help in making new customers but it can also help in retaining existing customers . Customer acquisition as well as retention are concerns of banking industry . Nowadays customers are having lot of options where they are having choice of their business. Data Mining can help in targeting new customer for products and in detecting a customer’s previous purchasing patterns on basis of which bank can be able to retain its existing customers.

VI. CONCLUSION

Data Mining extracts useful information from existing databases and also enables better decision making. Data Mining tool uses data warehousing to combine various data from databases and also in acceptable format so that data can be mined. The data is then analyzed on which decision can be made. In whole world, data mining is used very effectively especially in banking industry to detect fraud detection, marketing , customer acquisition and retaining customers. Data mining has also led to set of scientific questions that how can computers can learn from past experience .Data Mining could give a great advantage in retail and telecom industry. Thus the bank which are using Data Mining and are in process of building data mining environment for their decision making will result in immense benefit and can derive competitive advantage in future.

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