



Data Mining Techniques for Secure Online Financial Transactions in Banking Sector

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ABSTRACT

In this paper we provide a detailed summarization of data mining techniques that it is possible to characterize and detect false transactions over e commerce in a year, depending on the information, historical performance and characteristics, using different types of data mining techniques. As these days, businesses have become more concerned about using transaction data to generate knowledge about the world in which they function to as called "business intelligence." The business intelligence is generated using tools such as data mining and knowledge discovery. Although much of that focus on business intelligence initially was generated about relationships with other firms, such as sales, increasingly there is a focus on internal processes. That focuses on generating business intelligence about internal processes, to facilitate management and monitoring of processes.

KEYWORDS : Business Intelligence, KDD, Artificial Intelligence, Data Quality

Introduction

Data Mining deals extracting hidden knowledge, unexpected pattern and new rules from large database. Accordingly, the purpose is to investigate and to assess and facilitate data quality, including finding fraudulent activity. It can be implemented by an organizing architecture for the data. The scope of system to investigate the processes of purchasing and accounts payable, within the context of ecommerce process management. As a result, this Paper focuses on the application approaches to facilitate data quality analysis of a process. Particular attention is given to data mining and its ability to ascertain when data seems appropriate or anomalous [1, 2]. This can be useful in facilitating the monitoring process. Trends in data mining include further efforts towards the exploration of new application areas and methods for handling complex data types, algorithm scalability, constraint based data mining and visualization methods. Internet technologies have faultlessly automated interface processes between customers and retailers, retailers and distributors, distributors and factories, and factories and their numerous suppliers. In general, e-commerce and e-business have enabled on-line Payment transactions [3, 7]. Data Mining (DM) is a well honored field of Computer Science. It emerged in late 80's by using concepts and methods from the fields of Artificial Intelligence, Pattern Recognition, Database Systems and Statistics, Data Mining discovers valid, complex and not obvious hidden information from large amounts of data. Data Mining is also known as Knowledge Discovery in Databases (KDD). Financial data are collected by many organizations like banks, stock exchange authorities, taxation authorities, big accounting and auditor offices specialized data bases, etc and in some cases are publicly available. The application of Data Mining techniques on financial data can contribute to the solution of classification and prediction problems and facilitate the decision making process.

Typical examples of financial classification problems are corporate bankrupt, credit risk estimation, going concern reporting, financial distress and corporate performance prediction. The importance of Data Mining in finance and accounting has been recognized by many organizations. The aim of the present study is to provide a state-of-the-art review about current research efforts on applying in Finance and accounting.

Challenges in Web Mining

As the World Wide Web contains the huge information that provide rich source for data mining. The web possesses great challenges for resource and knowledge discovery based on the following observations:

1. The web is too big to handle

The size of the web is very huge and rapidly increasing. This seems that the web is too huge for data warehousing and data mining.

2. Complexity in Web pages

The web page does not have unifying structure. They are very complex as compared to traditional text document.

3. Web is a dynamic information source

The information on the web is rapidly updated. The data such as news, stock markets, weather, sports, shopping etc are regularly updated.

4. Relevancy of Information

It is considered when a person is searching for small portion of the web, while the rest of the portion of the web contains the information that is not relevant to the user and may swamp desired results. Data Mining is widely used in diverse areas. There are number of commercial data mining system available today yet there are many challenges in this field.

5. Financial Data Analysis

The financial data in banking and financial industry is generally reliable and of high quality which facilitates the systematic data analysis and data mining [5, 6].

Design and construction of data warehouses for multidimensional data analysis and data mining.

Loan payment prediction and customer credit policy analysis.

3. Classification and clustering of customers for targeted marketing.

4. Detection of money laundering and other financial crimes.

B. Retail Industry

Data Mining has its great application in Retail Industry because it collects large amount data from on sales, customer purchasing history, goods transportation, consumption and services. The quantity of data collected will continue to expand rapidly because of increasing ease, availability and popularity of web. The Data Mining in Retail Industry helps in identifying customer buying patterns and trends. That leads to improved quality of customer service and good customer retention and satisfaction.

- 1 Design and Construction of data warehouses based on benefits of data mining.
- 2 Multidimensional analysis of sales, customers, products, time and region.
- 3 Analysis of effectiveness of sales campaigns.
- 4 Retention.
- 5 Product recommendation and cross-referencing of item

Predictive patterns from quantitative time series analysis will be invented fortunately, a field known as data mining using quantitative analytical techniques is helping to discover previously undetected patterns present in the historic data to determine the buying and selling points of equities. When market beating strategies are discovered via data mining, there are a number of potential problems in making the leap from a back-tested strategy to successfully investing in future real world conditions. The first problem is determining the probability that the relationships are not random at all market conditions. This is done using large historic market data to represent varying conditions and confirming that the time series patterns have statistically significant predictive power for high probability of profitable trades and high profitable returns for the competitive business investment.

C. Types of Commercial Payment Solution Misuse

Non-compliance with an organization's card usage policies erodes the process efficiencies and cost savings of the payment solution. This out-of-policy spend can result from a lack of knowledge of corporate policies or from intentional abuse. Examples of transactions that should trigger audit consideration include those made by cardholders who:

- Purchase with restricted merchants or MCCs
- Withdraw cash on the company card with no associated travel or on non-work days
- Use convenience checks excessively to withdraw against the card's limits
- Make out-of-policy travel arrangements
- Transact with only one merchant
- Split large purchases into several transactions
- Suddenly begin using their card more frequently or for higher dollar amount purchases than usual

D. Emerging Compliance Management Tools

Uncovering instances of misuse not easily detected by traditional methods can be a costly and arduous task, compounded by the sheer volume of information that is created with each transaction. Cardholder name, number, merchant name, MCC, purchase amount and date are a mere fraction of the data captured each time a commercial payment solution is used. Multiply this by the number of cardholders and number of transactions each cardholder makes per month and it is clear that

intensive data mining is needed to drill down through these volumes of information and sort the data in a meaningful manner.

The marketplace is responding to this need with sophisticated new tools designed to allow organizations to reap full value from their commercial payment solutions. Using cutting-edge data mining techniques, this new class of compliance management applications is being implemented by leading organizations to:

- Detect and deter fraud and waste
- Enforce policies and procedures
- Fulfill government reporting requirements [4]

E. Key Attributes

While each provider takes a unique approach to compliance management, there are a number of attributes that can be found across many solutions. The following lists the intended benefits these features present.

1. Ongoing Monitoring

- Uncover unforeseen risks and opportunities for operational improvement
- Accelerate the ability to act on questionable Transactions
- Remove the need for time-consuming, costly Manual Efforts Transaction Evaluation
- Detect questionable or out-of-policy transactions immediately
- Eliminate spot checking no transaction falls through the cracks

2. Data Integration

- Pull information from multiple systems and sources
- Provide a more holistic view for greater insight Standard and Ad-hoc Reporting
- Allow organizations to run reports of the most benefit to them
- Permit customization of report types

3. Dashboard Visibility

- Give managers a snapshot of program performance metrics
- Provide a central location where users can easily access the level of information they need

4. Transaction Scoring

- Use algorithms to search for anomalies, including those that would not typically be detected via known rules

Leverage interactions between various transactional and cardholder attributes

Provide a view of usages patterns and trends.

5. Automated Alerts

Proactively flag non-compliant transactions
Give card managers timely access to exception reports

6. Behind-the-firewall versus SaaS Solutions

Today's class of compliance management solutions is divided between traditional delivery methods and the Software-as-a-Service (SaaS) model.

Behind-the-firewall applications can offer a number of benefits, including:

Flexibility to customize to each client' requirements and Incorporate requests for enhancements sooner.

7. An Overview of Visa IntelliLink Compliance Management

Visa IntelliLink Compliance Management is a web-based solution that provides intelligent assistance for optimal card program management. It converts transaction data into information program managers can use to minimize and deter misuse and abuse and maximize savings. Visa IntelliLink Compliance Management's monitoring of card usage in minute detail also helps card program managers ensure that their commercial payment programs are achieving optimal savings and benefits by operating according to their organization's policies and regulations. The wide range of services includes:

- Analytics and investigative reporting, including drill-down dashboard capabilities to measure program performance
- Misuse and abuse detection, including a neural-Network transaction scoring system that can detect questionable behavior not easily apparent to the human brain
- Reporting that enables program and regulatory compliance
- Self-service administration

Clustering

Using clustering, it can give us a general idea of the insight of the data when there are too many input attributes. This can help to clarify the healthy status of the system at different levels, such as: system daily, system hourly, and district daily and district hourly level. By notifying this result, one can use this information to perform a simple query on the raw data to find out cells within this range to detect the problematic cells causing high

A. Traffic Analysis by Classification

By day, by week, by month, by year: We start by aggregating weekly data on weekday basis and try to find the distribution of several parameters over each day of week. By gaining access to this type of information, we can better allocate our resources and equipments in keys dates such as days of week with high traffic.

B. Evolutionary steps in data mining

Data mining techniques are the result of a long process of research and have gone through various steps of evolution. Such evolution began when business data was first stored on computers

and generated technologies to allow users for navigating their data in real time. Data mining algorithms have existed for at least ten years, but

have recently been implemented as reliable and understandable tools. Now it is supported by further technologies that are sufficiently mature for navigation to prospective and proactive information delivery.

C. Financial, banking and credit or risk scoring

Data mining can assist financial institutions in various ways, such as credit reporting, credit rating, loan or credit card approval by predicting good customers, risk on sanctioning loan, mode of service delivery and customer and others. A credit card company can leverage its vast warehouse of customer transaction data to identify customers most likely to be interested in a new credit product. In addition, data mining can also assist credit card issuers in detecting potentially fraudulent credit card transaction. In general, data mining methods such as neural networks and decision trees can be a useful addition to the techniques available to the financial analyst.

D. Procedure of Data Patterns Discovery in Financial Institutions

In this method, the databases stores the data for every financial transaction over a organization day by day, We are implementing the clustering method for storing of data storage in the data warehouse. The process of grouping a set of physical or abstract objects into classes of similar objects is called clustering. A cluster is a collection of data objects that are similar to one another within the same cluster and are dissimilar to the objects in other clusters. A cluster of data objects can be treated collectively as one group and so may be considered as a form of data compression. Although classification is an effective means for

distinguishing groups or classes of objects, it requires the often costly collection and labeling of a large set of training tuples or patterns, which the classifier uses to model each group. It is often more desirable to proceed in the reverse direction: First partition the set of data into groups based on data similarity and then assign labels to the relatively small number of groups. Additional advantages of such a clustering based process are that it is adaptable to changes and helps single out useful features that distinguish different groups.

Clustering is also called data segmentation in some applications because clustering partitions large data sets into groups according to their similarity. Clustering can also be used for outlier detection, where outliers (values that are "far away" from any cluster) may be more interesting than common cases. Applications of outlier detection include the detection of credit card fraud and the monitoring of criminal activities in electronic commerce. For example, exceptional cases in credit card transactions, such as very expensive and frequent purchases, may be of interest as possible fraudulent activity.

Another test of accounts payable data is the reuse of a purchase order number for other amounts or vendors. In a system that requires a purchase order number, a fraudulent entry could "reuse" a purchase order number to meet the need of providing a purchase order number with each entry. This test would allow detection of such reuse. The Systematic of Data Classification and storage is represented as shown in the Fig.1 below:

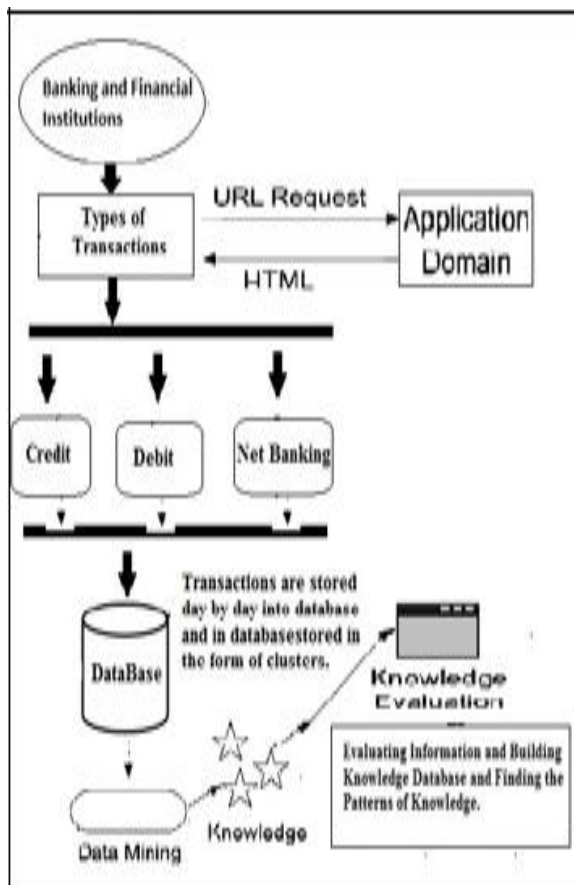


Fig.1. Systematic of Data Classification and storage

E. Data Quality-Based Data Mining

Purchasing and accounts payable systems depend on the underlying data in the system being "good data" to begin with. However, that assumption may not be true. One approach to analyzing data quality is to investigate the data using data mining, in order to determine if the basic data set contains any anomalies, indicating problems with the underlying data. For example, vendors may be fraudulent or goods may be bogus, in which case any transactions involving those vendors or goods would be suspect.

Conclusion

This paper approaches to ensure and analyze data quality in a financial payment Process in the context of business process management. Further, three different scenarios of how the purchasing and accounts payable processes would be generated and were analyzed, Data Mining provides a way of managing processes, by integrating technology. This has not been aimed at those activities but has focused more on managing cash flows in the organizations. This lays out some metrics to monitor process data, helping how knowledge discovery could be used to determine if data is meeting expectations.

Acknowledgment

The authors' would like to express their sincere gratitude to the Management of their concerned institutions for their constant encouragement and co-operation.

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