The application of data mining techniques in risk management in banking industry

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ABSTRACT: The study aimed to investigate the banking industry in the first definitions of data mining techniques risk - risk types of industry, banking industry risk management Bankdary be addressed. The definitions of data mining techniques and steps. Implement its methods and its application in risk management in the banking industry have been discussed. In this study, we determined that, Considering that the volume of electronic data generated by banks and other commercial establishments Vshkrkhav has been growing in such a way that their analysis to people in order to create an appropriate model for decision-making is difficult and impossible. So Data mining is a tool that is used to extract important information existing data and provides the possibility Tsym better decisions and as a matter of course to detect and identify fraud is Managers-estimate credit risk and business unit performance.

Keywords: data mining-Risk Management Risk Management Customer Care

INTRODUCTION

In recent years we have grown gradually by the fact that a huge amount of data that computers in the local network and have learned all our lives. Government agencies, academic institutions and commercial capital to collect and store large amounts of data are allocated. The volume of information collected and stored has taken rapid growth and some research suggests that the global data are doubling almost every year. At the same time the cost of storing the data significantly reduced (2004 selfert) by logging into the digital information age explosion of data, information and the necessity of maintenance and analysis of data every day, more than ever able additional knowledge on specific business motivation and transparency of data in order to extract knowledge will be achievable in all data in its raw form and not paid is of little value Hstndanchh that, in fact, is invaluable insight and knowledge that could be achieved data and used data mining techniques Bgyrd.kh here is a handy tool.

Data mining is one of ten developing knowledge that will face the next decade with a technological revolution in recent years and thus have an extraordinarily rapid expansion in the world. Today, in the developed world interest-free venues and topics of data mining knowledge to be found, so that this knowledge in all facets of the countries in all areas involved. Data mining, knowledge discovery process knowledge embedded data which has a wide range of specialized Zyrzmynh to describe, explain, predict and control phenomena widely divergent, today has very broad application in various fields including industrial, medical, communications, agriculture, energy, social, cultural, political, economic, trade, military and educational services so that boundaries are not considered for the application of this knowledge and this knowledge in all areas of business fields having considered the data. The world is changing and developing banking industry and the spread of electronic banking transactions more convenient data recording and data volume is growing considerably. All databases can be detected by analyzing bank customers better and optimal allocation of resources to profitable customers, banks increased productivity.

Now, due to the high volume of bank loans, their repayment risk is a big challenge for banks. The risk lies in the nature of banking activities and virtually eliminates the risk of banking operations is impossible.

The only solution seems to be, it is management practice methods for extracting behavioral patterns of customers using data mining techniques that managers and decision makers with the knowledge that this technique lies in the set of rules obtain and use it to their advantage in serving customers.

The definition of risk:

The risk of causing a threat to achieve success and profit opportunities. Lang-hn in the dictionary meaning of something bad or undesirable risk or probability of risk is defined. In other words, the occurrence of any event,
any event that potentially through the exercise of and restrictions on capacity and activities of the possibility of achieving organizational goals undermines. The risk is inherent and inseparable from the market economy must be evaluated. Generally there are two types of risk, compulsory and optional second mode it has the ability to control and manage.

**The risk in the banking industry:**
There are risks in all institutions and organizations that may bring numerous losses and the damage may be directly and through time income and capital to be created or indirectly to achieve the business objectives of our limitations and financial arisen. Banks are considered risky as the car that ran the risk of buying the products and services and thus are profitable.

Based on the comments (Nicky, 1992) and (Rose, 1999), five major risks in banks that are:
1. Credit risk
2. Market risk
3. Operational risk
4. Interest rate risk
5. Profitability

Other types of risk in other studies, such as the risk of currency fluctuations, investments there.

**Credit risk:**
Credit risk is the promised cash flows for the financial demands of persons (natural or legal) such as loans and bonds to financial Mosse, to what extent attainable in other words the possibility of definition, the receipt or non-receipt suspicious principal and interest loans in the form of facilities offered to the applicant. There are two types of credit roads. 1. Atary own risk. That in case of non-fulfillment of the obligation is created as a result of special circumstances pledged to the bank.

**Systemic risk:**
In the event of non-fulfillment of commitment and ranked the economy as the recession and the economic crisis.

**Operational risk:**
Calculate the risk of loss resulting directly or indirectly from inappropriate and ineffective internal processes, people and systems and external operational risk events also say, in other words the likelihood of problems in operations and banking activities such as creating Tsms in computer systems, misuse and fraud in bank documents, theft and misappropriation, intentional or inadvertent human errors.

**Market risk:**
The forecast error rates in the market such as inflation, interest and exchange.

In general, the bulk of transactions banks in the world by providing financial facilities to customers in Iran, this issue is more prominent than the rest because the overall structure of the banks provides a dependence on the government and the obligation to to provide various facilities to people without sufficient knowledge of their financial capabilities and past performance in order to repayment problems has led, according to KPMG international Institute of bad loans in the top of the operational risk represent.

**Risk Management in Banking Industry**
Businesses that obtained using the past two decades suggests that methods to deal with risks in a comprehensive risk management framework is vital for the five groups of companies that include banks, non-bank institutions, money market institutions financial capital market and stock exchange, insurance companies, pension funds and social security.

Banks deemed risky, such as the car that ran the risk of buying the products and services provided and thus are profitable. Line of the fundamental requirements for future profitability. Moreover, Mhatrat today may become the realities of tomorrow. Bank managers make decisions for the many decisions need to know whether or not they are bank customers reliable. If they do not have full information about their customers, from providing credit cards to new customers, existing customers expanding credit and loan approval, this Tsmmyat for the bank can be risky.

So the banks have no chance of life because risk management in the banking industry and financial services, the balance between profitability and growth enterprises depend highly strategic risk.

The familiar concepts of risk management in banking session when it comes to the formation of banks. Conventional banks traditionally are active in the financial market. A Trfbh monetary resources as the applicant and the other investors as providers of funding sources are. Banks and non-bank institutions activity in the money market, two sets of regulations in the field of management methods by the Basel Committee under the Basel 1 and Basel 2 Tdyvn Navyt and made available to market participants and regulatory authorities countries. Basel 1 regulations developed in 1998 and the two main assets of the bank capital adequacy and classified in terms of their degree of credit risk is covered. Basel 1 rules from the beginning of the 90s in major international banks was implemented. Shortly after the implementation of the rules and regulations mentioned in the late 90's.
characteristic of many aspects of international banking with weaknesses and flaws. That's why at the beginning of this decade, new rules and to run with the ball development banks and banking supervisory authorities was proposed. The new regulations covering the male risk, market risk and operational risk not only credit risk but also put under observation and study.

**Credit Risk Management**

Credit risk measurement from 2 to 1.2 ranking method of internal standards and then manage it in the following ways.

1. Identify clients and determine the validity of the
2. Ceilings and collateral granted the necessary facilities
3. Correct analysis and approval of projects in the Credit Committee
4. Diversification of lending based on specific divisions (industries, regions, geographic, country) to determine if a deferred delay penalty and other expenses facilities
5. Fully aware of the quality of its facilities granted
6. Calculation of capital adequacy ratio in certain time periods

Risk Management Market: Market risk Value at Risk is measured by standard methods and then through risk management in common: 1- futures, futures and swaps

Operational risk management is applied in the following steps

1. Upgrading computer systems and control and monitor their
2. Improve the internal control system of banks
3. Staff training
4. Using the necessary allocations commensurate with the complexity of

According to the risk management of the banking industry has been written about data mining approach in identifying and evaluating risk management used to be.

**The definition of data mining:**

The concept of data mining:

Data mining is to analyze the data in order to discover previously unknown relationships that provide useful information (Hand et al., 2001) Bose and Mahapatra (Bose and mahapatro) Data mining data mining process to identify interesting patterns in the database that can be used in decision-making. Interesting patterns in data mining bases that can be used in decision-making, has been defined. Turban et al. (Turban et al., 2007) Have defined the data mining process that seeks to Astrah and identify useful information and knowledge from large data base of statistical methods, mathematics, artificial intelligence and machine learning uses. Fraley et al. (Fraley et al., 1992) State that the purpose of data mining implicit useful information from the data stored in huge warehouses and data mining of the bridge between science, statistics, computer science, artificial intelligence, pattern recognition, machine learning and visual representations of the data. Data mining complex process to identify a new and potentially useful patterns and correct models, is the large amounts of data in ways that are understandable patterns and models to humans. Data mining can be purchased as a product but rather a discipline and a process that should be defined as a project in steps of predetermined and planned and implemented to be controlled.

**Data mining applications:**

Data mining in many branches such as marketing, finance, banking, manufacturing, medicine, customer relationship management, tracking, predict failures and corporate training applications. Some data mining applications are summarized as follows:

1. Typical applications business: such as analysis and market management, market basket analysis, target marketing, understanding
2. Manage and detect fraud: detection of deception telephone, car insurance and detect fraud, credit card fraud detection, discovery of suspicious financial transactions (money laundering)
3. Text Mining: refine the text (e-mail, newsgroups, search for specific topics and articles and so on.)
4. Medical: To explore the relationship between symbols and disease, the analysis of DNA And medical images
6. Site work: before the linked pages, improve or customize the search tools on the website.

The following table reflects the influence of data mining applications in various industries that statistics indicate use of data mining as one of the most important tools in customer relationship management.
| customer relation management | 1/26% |
| Banking                      | 9/23% |
| Direct Marketing             | 3/20% |
| Identify the crime           | 8/18% |
| Web mining                   | 1/10% |
| retail                       | 1/10% |
| Insurance                    | 7/8% |
| Finance and Leasing          | 2/7% |
| Electronic business          | 8/5% |
| Security and anti-terrorism  | 3/6% |
| Investment and stock         | 9/2% |

**steps of data mining process:**
1. Identify target: At this point it becomes clear that what the user wants and to what level of information intends to obtain from the database.
2. Selected data: In this phase the data should be based on clear criteria.
3. Data preparation: data available at this stage and dummy variables are identified.
4. Data Evaluation: This step criteria such as the type of data distribution, features and database structure and data to assess the overall situation.
5. Formatting A: It formats the image, chart, offers a neural network ...
6. Selection tool: the output of this stage is to choose the right tools for data mining.
7. Modeling: data mining process starts form the core of this stage include the search for patterns in data collection, classification and valuation data.
8. The findings validate the test templates are at this stage.
9. See the results: In this stage, a final report will be prepared for the user.
10. Use Results: The main goal and motivation for using data mining is a new and better location (for rescue Akbari 1378).

**data mining methods:**
Data mining purposes, including predicted and described or a combination of them. The aim predict accurately focus on the ability to forecast and "description" focuses on understanding the manufacturing process data. In anticipation until the model's predictive power. No significant application of this model reflects reality. For example, in the form of non-linear model that combines financial indicators to predict the exchange rate. On the other hand, descriptive models to be interpreted as fact. Using data mining data mining goals will be realized. The so-called data mining methods In fact, a large number of algorithms and techniques from disciplines such as statistics, machine learning, databases and visualization is derived. Examples of methods of data mining include neural networks, decision trees, genetic algorithms, basic set theory, Mrvdcgra reasoning, mathematical programming.

**data mining applications in risk management in the banking industry**
Data mining is a very efficient tool to evaluate risk management in the banking industry. The two items of data mining applications in the banking sector in the area of credit risk management and credit management services are mentioned.

Credit risk management and provide convenience to customers: one of the most important applications of data mining in banking risk assessments provide lending to individuals and various companies. Since loans and credit cards is not a risky behavior with the behavior of confidence, to the consideration and decision of the banks to enter the degree of risk in lending is very necessary. Because if appropriate customer database based on the degree of risk may be considered a valid creditworthy clients and be guaranteed a lot of subprime credit side of a client is exceeded its capacity. By measuring the natural and legal persons credit rating to determine their risk of lending to banks and customers and relationships based on the level of risk they assume. Banks can use detailed analysis based on existing data and records and past experiences and Tdynn models in this regard, companies that invest in high-risk and low credit values are, and with the correct choice of the type of loan specify and pricing appropriate to consider the risk factors and try to defeat an appropriate profit margin in these cases and can reduce stress to any specific proposal to offer customers the number of customers and as a result to collect information and model-building increase by analyzing and exploring data from vital activities in this area banks to provide credit is risky activities.

Design models for credit risk measurement and calibration for the first time in 1909 by John Murray on bonds was done. Prior to 1990, during the recession, data mining and statistical analyzes were limited in providing comprehensive risk management models and spending decisions based only on expert opinion and the base of structural and statistical analysis was a little bit and. But banks are gradually structured methods such as data
mining-based approach to understanding and managing credit risk, they tend to set an example Citigroup to collect and preserve valuable information and performance records of clients and the successful or unsuccessful in assessing the reliability of their data storage to the credit risk modeling. Big empty facilities and methods of risk assessment and modeling tools need many precise and yet be compatible with each other. Citigroup enjoying 12 years of experience in credit assessment processes organizations use valuable benefits such as Vsys the corporate market, quality management, risk managers and application systems so as to improve audit and risk models were used Abtray. Examples of types of risk assessment models can be basic models estimate credit risk warning two models named.

Credit Cards:

Credit cards nowadays have become big business in credit collection services. This service record decades ago. Despite the lucrative trade in its present form owes Pyrft storage and management of information and knowledge is data mining. A buyer's credit card account is in circulation for some time that it will withdraw its repayment amount as a dividend payment card issuer and seller of the% of its sales the employer to the card issuer to pay. In the initial operations of companies offering credit card purchases data collection, billing and commission is calculated that the volume of information in this operation is very high. The ability to store and communicate data and exploring the data connection, pure business ideas and created numerous methods to earn money. The application of data mining in risk management services in the following areas took credit cards.

CONCLUSIONS

Banks, financial institutions and organizations that are in the nature of fees, requires risk management processes and data mining are the most important tools available to these organizations to evaluate, identify and predict various risks ahead.in the field of data mining applications and services in operational risk management in the banking world, but much research has been done on the potential applications of these methods has not been much research on the Iranian banking system. Iran's most important risks facing banks in the Check returned, the customer's credit that many problems are created for banks and to customers. Many credible monetary resources in these institutions offered to borrowers Return the resources to secret survival and development of enterprises, it is necessary.

REFERENCES

Chen SC and Huang MY (2010); constructing credit auditing and control & management model with datamining technique; Expert System with Application; Vol 39; pp 10-174.
Huang C. and Chen M. and Wang C. (2007); Credit scoring With a Data mining approach Based On Support Vector Machines; Expert System With Application; Vol 33; pp 1-3.
Thomas 1. (2000); A Survey Of Credit And Behavioural Scoring: Forcasting financial Risk Of Lending To Consumers; Inter Journal Of Forecasting; Vol 16; pp 2-4.