Retention of Customer Loyalty in Banking Sector Through Mining Techniques: A Review

[1]R. Boopathi, Dr. [2]B. Umadevi
[1]Research Scholar, [2]Assistant Professor & Head,
[1]P.G. & Research Department of Computer Science
[1]Raja Doraisingam Govt. Arts College, Sivaganga, Tamil Nadu, India.
[2]P.G. & Research Department of Computer Science
[2]Raja Doraisingam Govt. Arts College, Sivaganga, Tamil Nadu, India.

Abstract

Every citizen of the country has between associated with any one financial sector of their parent country. In that association, the financial institutions like banks play a vital role in customer service. The customer service may vary from bank to bank depends upon the customer needs. In order to provide the service in much better way the bank keeps track of their customers in a close observation. In most of the banking sectors customers are keeps minimum two account, one loan and another one savings respectively. The data mining techniques facilitate useful data interpretations for the banking sector to avoid customer attrition. Customer retention is the most important factor to be considered in today's aggressive business environment. The bankrupt is a significant problem in banking sector. Fraud prevention is a great challenge, because fraudsters develop new schemes all the time, and the schemes grow more and more sophisticated to elude easy detection. Here almost all the banks need to service their customer with full loyalty. Since they are the assets. The classified data provides a wise decision making for the top officials. In this paper various research work done by different researchers are considered for analysis and make an outcome for further exploration.

Index Terms - CRM, Banking sector, DM, Loyalty, Retention.

I. INTRODUCTION

Technologies supports in innumerable way for the banking industry to open up efficient delivery channels. At the same time the information technology has evolved in so much for supporting the banking industry to deal with the challenges such as the new cost-cutting measure. Nowadays, Banks have realized that customer relationships are a very essential factor for their success. Customer relationship management (CRM) is a strategy [1] that can help them to build long-lasting relationships with their customers and increase their revenues and profits.

The CRM contribution starts form customer acquisition to customer retention for providing their best service. The challenge that the bank face is how to retain the most profitable customers and how to do that at the lowest cost. At the same time, they need to find a solution to implement this quickly and easy to follow. To manage the fraudulent activities they require complex and time-consuming investigations to deal with different domains of knowledge like financial, economics, business practices and law [2]. Fraud instances can be similar in content and appearance but usually are not identical. Using data mining technique, it is simple to build a successful predictive model and visualize the report into meaningful information to the user [3].

CRM tries to achieve a single integrated view of customers and a customer centric approach. The major components of CRM are Customer, Relationship, and Management. The major goals of CRM are to increase the growth of revenue through customer satisfaction and reduce sales cost and the distribution cost. The CRM provides many phases for identifying the best customer, Customer differentiation, Customer Interaction, and Customization. The following Figure 1. Shows the framework of data mining techniques in CRM.

The diagram explains the framework of CRM in association with mining techniques. A close study [4][5] and management of customer relationships and their interactions will help to identify attract and retain effective customers in the domain.

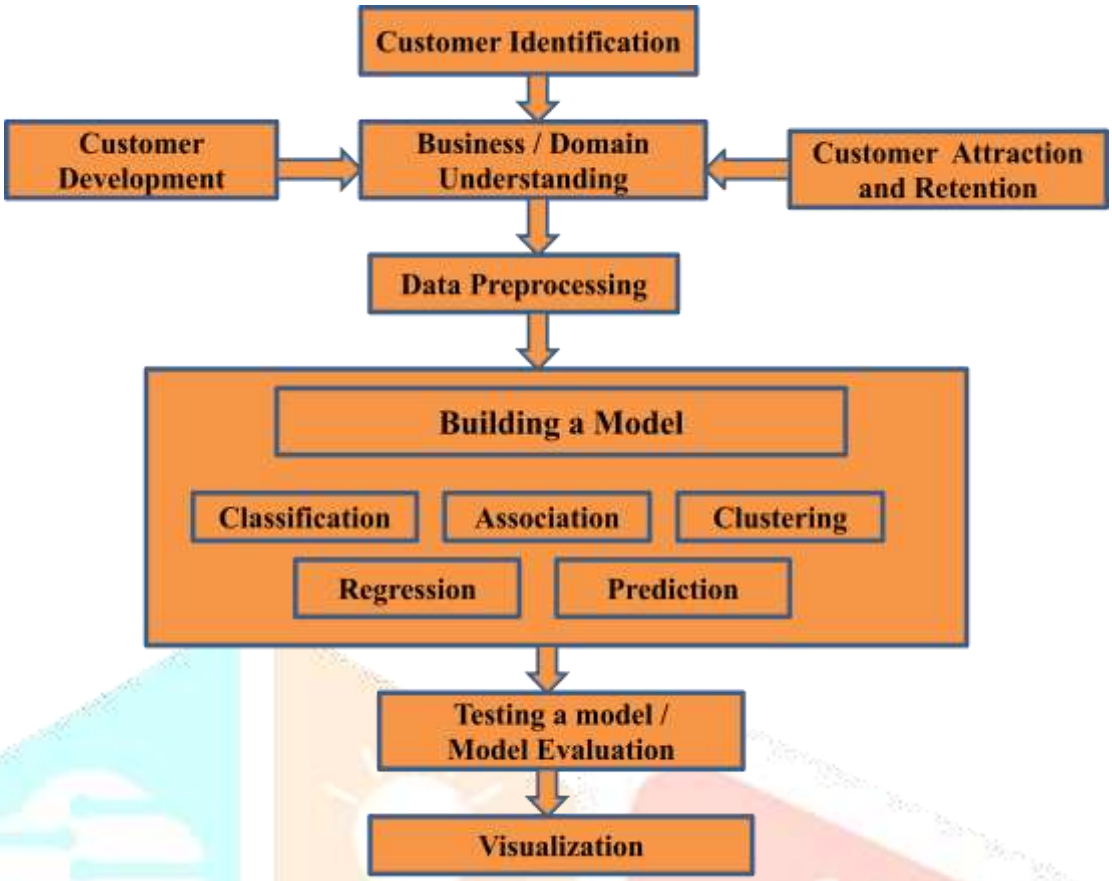

Figure 1. The Framework of Data Mining Techniques in CRM.

II. RELATED WORKS

The authors K. Chitra and B. Subashini et al., analysed [2] that the data mining techniques and its applications in banking sector like fraud prevention and detection, customer retention, marketing and risk management. They concluded that Data Mining techniques are very useful to the banking sector for better targeting and acquiring new customers, most valuable customer retention, automatic credit approval which is used for fraud prevention, detection in real time, providing segment based products, analysis of the customers, transaction patterns over time for better retention and relationship, risk management and marketing [2].

Md. Rashid Farooqi and Naiyar Iqbal et al., made an empirical study on "Effectiveness of Data mining in Banking Industry". They analyzed that the data mining techniques widely supports in banking sectors particularly for services marketing, retail management, risk management and fraud detection. They also concluded that capital allocation across trading activities in order to maximize the possibilities of profit or minimize the risk.

T. Femina Bahari and M. Sudheep Elayidom [5] et al., proposed a model which is used to predict the behaviour of customers to enhance the decision-making processes for retaining valued customers. They used two classification models such as Naïve Bayes and Neural Networks to design their framework. They found that Neural Network produced high accuracy than the Naïve Bayes technique.

The authors Sunil Yadav, Aaditya Desai and Vandana Yadav et al., intended in their paper "Knowledge Management in CRM using data mining technique" which focused on how company can use Data mining methodology in CRM. And also they analyzed how the applications of Data Mining method in CRM like Classification, Clustering, Association, Prediction and Correlation.

Sanjay Misra, Ricardo Colomo-Palacios and Luis Fernandez et al., proposed in their research article the Artificial Neural Network (ANN) model, which is developed using a six-step procedure. They discussed that back-propagation algorithm is used to train the ANN by adjusting its weights to minimize the difference between the current ANN output and the desired output. They said that an evaluation process is conducted to determine whether the ANN has learned how to perform. Also discussed that training process is halted periodically, and its performance is tested until an acceptable result is obtained. Finally, they done that the principles underlying detection software are grounded in classical statistical decision theory.

Uma Sankar Mishra, Bibhuti Bhusan Mishra, Swagat Praharaj and R. Mahapatra [6] et al., reported in their research, the adoption and use of CRM in banking sector and is just a small step in understanding the multi dimensional construct of customer relationships and its implications in competitive environment.

S. Ummugulthum Natchiar and S. Baulkani et al., proposed a new feature selection method to resolve CRM data set with relevant features by incorporating an efficient data mining techniques to improve data quality and feature relevancy after preprocessing. Finally it enhanced the performance of classification.

Seyed Mohammad, SeyedHosseini, AnahitaMaleki and Mohammad RezaGholamian et al., have proposed a study based on expanded RFM model by including one additional parameter, joining WRFM-based method to K-means algorithm applied in Data mining (DM) with K-optimum according to Davies–Bouldin Index. Then they classified customer product loyalty in under B2B concept. They developed a methodology that has been implemented for SAPCO Co. in Iran. Their result demonstrated a incredible capability to the firm to assess the customer loyalty in marketing strategy designed by this company in comparing with random selection commonly used by most companies in Iran [7].

P.Ravisankar, V.Ravi , G.Raghava and Rao I.Bose et al., analyzed data mining techniques like Multilayer Feed Forward Neural Network, Support Vector Machines, Genetic Programming, Group Method of Data Handling, Logistic Regression, and Probabilistic Neural Network [8] to identify companies that resort to financial statement fraud. They tested all the techniques they have mentioned using a dataset involving 202 Chinese companies and compared with and without feature selection. They found that Probabilistic Neural Network (PNN) outperformed all the techniques without feature selection, and Genetic Programming [9] and PNN outperformed others with feature selection and with marginally equal accuracies.

Chao-TonSu, Yung-HsinChen and D.Y.Sha et al., explored an empirical study and applied the E-CKM model has been carried out, and it met the evaluation criteria in a multiple-assessment scheme for showing a satisfactory result. Their result is used in the decision making for innovative product development in order to reduce project risk and secure commercial success.

III. DATA MINING TECHNIQUES IN CRM

Nowadays, financing products are becoming more alike, and this is a serious problem existing in most of the commercial banks in China. It is of great significance for the performance and development of the banks to provide differentiated marketing strategies aiming at different customers. As a result, it is really necessary for the banks to classify large volume of customers. The main analysis of Data Mining techniques includes Classification, Association, Clustering, Regression and Prediction etc.

3.1 Classification

Classification is conceivably the most well-known and most popular data mining technique. Estimation and prediction may be viewed as types of classification. There are innovative classification methods such as statistical based, distance based, decision tree based, neural network based, rule based and etc. In classification analysis, risk levels are organized into two categories based on past default history. For example, customers with past default history can be classified [10] into "risky" group, whereas the rest are placed as "safe" group. Using this categorization information as target of prediction, Decision Tree and Rule Induction techniques can be used to build models that can predict default risk levels of new loan applications.

3.2 Association

Association and correlation is usually to find frequently used data items in the large data sets. It is the technique of finding patterns where one event is connected to another event. This type of findings help businesses [11] to make certain decisions regarding pricing, selling and to design the strategies for marketing, such as catalogue design, cross marketing and customer shopping behavior [12] analysis.

3.3 Clustering

Cluster Analysis is to assign the record clusters reasonably according to a certain classification rule through the analysis of the record data in the database, and then putting the similar ones into one data cluster. Clustering helps in grouping the data into similar clusters that helps in uncomplicated retrieval of data. Cluster analysis is a technique [13] for breaking data down into related components in such a way that patterns and order becomes visible. This model is based on the use of the parameters' data clusterization regions.

3.4 Regression

Regression technique can be adapted for prediction. Regression analysis can be used to model the relationship between one or more independent variables and dependent variables. In data mining [14] independent variables are attributes already known and response variables are to predict.

Regrettably, lots of real-world problems are not simply prediction. For instance, sales volumes, stock prices, [15] and product failure rates are all very difficult to predict [16] because they may depend on complex interactions of multiple predictor variables. Therefore, more complex techniques (e.g., logistic regression, decision trees, or neural nets) may be necessary to forecast future values. This kind of data mining technique will help in discovering patterns from which one can make reasonable predictions.

3.5 Prediction

Prediction is a well famous technique of data mining as the name suggests it discovers the relationship between a dependent and independent variable. Regression analysis is used for prediction model as it established the relationship between one or more variables. In data mining technique independent variable attributes are already known and response variable is likening to be predict. This kind of mining techniques [17] is very helpful and beneficial in finding the pattern from which one can make a reasonable or logical prediction. Also it can be used to describe the trend extraction model or forecast data for the future.

IV. CONCLUSION

The highlights of the different research work done by various researchers focus on fraud detection, risk management and how to apply the mining techniques to retain the customer's loyalty. The financial sectors are being forced to lose their money due to various circumstances. The decision making about the fraudulent people against their behaviour in different interval. The research shows their performance and the outcome makes an initiative as well an eye opener for the naïve people who are get involved in the research in the financial sector.

REFERENCES

[1] Priyanka Rawal., Shekhar Dr., Upadhayay Dr., 2017, "CRM: Building Long Lasting Customer Relationships", IJEDR Volume 5, Issue 3, ISSN: 2321-9939.

[2] Chitra Dr. K, Subashini B., 2013, "Data Mining Techniques and its Applications in Banking Sector", International Journal of Emerging Technology and Advanced Engineering, ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 3, Issue 8, August.

[3] Soni P M, Varghese Paul, Sudheep Elayidom M., 2015, " An efficient Data Pre Processing Frame work for loan credibility predition system", International Journal of Research in Engineering and Technology, eISSN: 2319-1163, Pissn : 2321-7308. Volume 4, Issue 5.

[4] Kazi Imran Moin, Qazi Baseer Ahmed Dr., 2012, "Use of Data Mining in Banking", International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622, Vol. 2, Issue 2, pp.738-742.

[5] Femina T Bahari, Sudheep Elayidom M., December 2015., "An Efficient CRM-Data Mining Framework for the Prediction of Customer Behaviour", Research gate , Procedia Computer Science 46:725-73.

[6] Uma Sankar Mishra, Bibhuti Bhusan Mishra, Swagat Praharaj, Mahapatra R., September 2011. "CRM in banks: A comparative study of public and private sectors in India", European Journal of Social Sciences 24(2):265-277.

[7] Sima Ghaleb Magatef Dr., Elham Fakhri Tomalieh Dr., August 2015, "The Impact of Customer Loyalty Programs on Customer Retention", International Journal of Business and Social Science Vol. 6, No. 8(1).

[8] https://books.google.co.in/books?isbn=3642304486.

[9] Ravisankar P., Ravi V., Raghava Rao G., Bose I., 2010, "Detection of financial statement fraud and feature selection using data mining techniques" , Decision Support Systems, Elsevier.

[10] Salman Raju P., Rama Bai Dr V., Krishna Chaitany G , "Data mining: Techniques for Enhancing Customer Relationship Management in Banking and Retail Industries", International Journal of Innovative Research in Computer and Communication Engineering, ISSN Online(2320-9801) Print (2320-9798).

[11] Vivek Bhambr, June 2011, "Application of Data Mining in Banking Sector",International Journal of Computer Science and Technnology, ISSN : 2229-4333(Print) | ISSN : 0976-8491, (Online), Vo l. 2, Issue 2.

[12] Umadevi B., Sundar D., Alli Dr P., January 2013. "An Effective Time Series Analysis for Stock Trend Prediction Using ARIMA Model for Nifty Midcap-50", International Journal of Data Mining & Knowledge Management Process (IJDKP),Vol.3, No.1.

[13] Binu Thomas, Raju G, 2009. "A Novel Fuzzy Clustering Method for Outlier Detection in Data Mining", Research Gate, January.

[14] Umadevi Dr. B., Dhanalakshmi R., April 2017. "A Comprehensive Survey of Students Performance Using Various Data Mining Techniques", International Journal of Science and Research (IJSR) ISSN (Online): 2319-7064, Volume 6 Issue 4.

[15] Sadegh Bafandeh Imandoust and Mohammad Bolandraftar, Sep-Oct 2013, "Application of K-Nearest Neighbor (KNN) Approach for Predicting Economic Events: Theoretical Background", Int. Journal of Engineering Research and Application", Vol. 3, Issue 5, pp.605-610.

[16] Umadevi B., Sundar D., Alli Dr.P., 10th June 2014, "Novel Framework For The Portfolio Determination Using PSO Adopted Clustering Technique", Journal of Theoretical and Applied Information Technology , Vol. 64- No.1.

[17] Umadevi B., Sundar D., Alli Dr.P., 2013, "An Optimized Approach to Predict the Stock Market Behavior and Investment Decision Making using Benchmark Algorithms for Naive Investors",Computational Intelligence and Computing Research (ICCIC), IEEE International Conference, 26-28 Dec. 2013,Page(s):1 – 5978-1-4799-1594-1INSPEC Accession Number: 14061140.

Authors' Biography

R. BOOPATHI is an M.Phil Research Scholar in PG & Research Department Of Computer Science, Raja Doraisingam Government Arts College, Sivaganga, Tamilnadu, India. Her research concentration include in Data mining, Machine Learning and its applications.

Dr. B. UMADEVI has received her Doctoral degree in Computer Science from Manonmaniam Sundaranar University, Tirunelveli, India. Currently working as Assistant Professor & Head- P.G and Research Department of Computer Science, Raja Doraisingam Government Arts College, Sivagangai-Tamilnadu, India. She has over 23 years of Teaching Experience and published her research papers in various International, National Journals and Conferences. Her research interests include Data Mining, Soft Computing and Evolutionary Computing. She got the Best Paper Award for her publication in the IEEE International Conference on Computational Intelligence and Computing Research held on 27th Dec 2013 at VICKRAM College of Engineering and Technology.