Exploring the Techniques of Classification Rule Mining

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Abstract : From a given database for the extraction of hidden Classification Rules (CRs), One of the Data Mining technique is Classification Rule Mining (CRM), the objective being to build a classifier to classify "unseen" data. Survey of different techniques used for CRM has been done with thorough description of all dimensions of CRM.

Keywords: rule, mining, CRM

INTRODUCTION

In order to manage customer relationships in an organized way Customer Relationship Management (CRM) are referred as the methodologies and tools that help business. CRM (Customer Relationship Management) is to manage and select business strategy and valuable customer relationships, to support effective marketing, service and sales CRM requires a customer-centric corporate culture. Customer Relationship Management of the implication is that through the details of clients' in-depth analysis, to improve customer satisfaction, thereby enhancing the competitiveness of enterprises as a means of it. In different contexts, CRM may be a management academic language, may be a software system, and are usually referred to CRM, is a computer automated analysis of sales, marketing, customer service and application support processes of the software system. Its goal is to reduce the sales cycle and marketing costs, increase revenue, expand their business needs and new markets channels and enhance customer value, satisfaction, profitability and loyalty. CRM is to select and manage valuable customer relationships and a business strategy, CRM requires a customer-centric corporate culture to support effective marketing, sales and service processes. King[1] introduced CRM as a key e-government enabler that uses ICT to collect and store data which can then be used to discover valuable knowledge about customers. Schelling[2] introduced the concept of CRM as a part of New Public Management (NPM) that is included in the area of e-government One of the effective techniques that can be used in analyzing the customer data is data mining that have been widely used in this domain .

On the basis of CRM classification different techniques used:

I.   **CRM identification:**
A.   For CRM element segmentation
a)   From classification data mining function: Kim et al[3] used decision tree as a technique to identify the particular customer while Ha et al. [4] has used Self-organizing map, decision tree and Markov chain model in his research in field of CRM.
b)   From Clustering data mining function: Dennis et. al [5] proposed K-means technique while Lee and Park proposed [6] Data envelopment analysis, self

organizing map& decision tree. Yang and Padmanabhan [7] used pattern based clusters. Bae et al[8] and Vardu et al [9] both of them used self organized m
B.   For target customer analysis:
a)   From Clustering: Lee et al [10] used Self organized map
b)   From Visualization : Woo et al [11] used Customer map

II.   **Customer attraction:**
A.   Direct marketing:
a)   Regression: Prinze and Poel [12] used logistic Regression for this element of CRM
b)   Classification: Baesens et al [13] used Baysian network classifier ,Buckinx et al [14] used Decision tree, Kim and Street used neural network and genetic algorithm, Ahem et [15] used gentic algorithm.
c)   Clustering : He et al[16] used outlier detection

III.   **Customer retention**
A.   Complaints Management:
a) Clustering: Bae et al [17] used Self Organised map.
b) Sequence discovery: Larivi Re and Poel[18]   used survival analysis
B.   Loyalty Program:
a) Classification: Douglas et al [19] used Decision tree 20, Kim et al [20]used genetic algorithm, Lee et al [21] used classification and regression tree and multivariate adaptive regression splines, kim[22] used logistic regression and neural network.
b) Clustering: Li et al [23] used attribute oriented induction. Clustering its tools and techniques have been extensively discussed in [43].
c) Regression: Cassab Maclachlan [24] used logistic regression
d) Sequence Discovery: Chiang et al [25] used goal oriented sequential   pattern
C.   One to one Marketting:
a) Association: Jiao et al [26] used association rules, Changchian and Lu [27] used set theory and self organized map,
b) Clustering: Chang et al[28] used analytical mining neural network

IV. Customer Development:

A. Life time Value:
   a) Clustering: Drew et al [29] used Neural network, Rosset et al used survival analysis
   b) Forecasting : Etzion et al [30] used Markov chain model
   c) Regression: Verchoef and Donkers [31] used linear regression

B. Market Basket analysis:
   a) Association: Juckic and Nestorov [32] used association rules, Guddici and Passeron[33] used Markov Chain mode
   b) Sequence discovery: Chen et al[34] used Association rule

C. Up/ Cross selling: Pinzie and Poel 35] used mixed transition distribution.

Goodhue et al. [36] examined several organizations' opportunities and challenges of CRM. The changing demands of the business for the availability of large amount of data, quality service and the role of information technology effects the growth of CRM. A major change in business practices and organizational culture is needed for firms in order to get full benefit. Significant commitment is required for organizational changes and has high potential in terms of challenges and opportunities. For CRM depending on the organizational needs and maturity different levels of transformation, integration, and application is recommended by author.

Ogwueleka [37] concluded that prediction is main application in data mining. Classification is the prediction of a target variable that is categorical in nature and suggested that CRM is essential to banking industry to aid in competing effectively in today's marketplace.

VivekBhabri [38] suggests Data Mining techniques can be of enormous help to the financial institutions and to the banks for better aiming and fraud detection in real time, acquiring new customers, analysis of the customers' purchase patterns over time for better retention, providing segment based products for better targeting the customers, and detection, relationship of emerging trends to take positive approach in a highly competitive market making a lot more value to existing services and products and launching of new service bundles and product.

Mark Lavender [39] suggests by adapting internal process and culture to a customer-centric one that is shared across the group banks can vastly improve the way they manage customer relationships and the returns from one of their greatest assets.

Arun Kumar Agariya et al[40] provides a conceptually validated CRM scale catering to Indian banking sector, which can help the managers in implementing the CRM in an effective manner and also can be used as a technique to recognize the main areas requiring attention.

Babita Chopra et al[41] throw light on the perspective applications of data mining and underlying technology in CRM. According to her, organization cannot extract important information from huge databases. The solution lies in the use of Data Mining tools marketing, for customer segmentation and profitability and customer relationship management.

The composition and key function of the bank's CRM, and constructs decision tree to analyze the kind of the bank's customers by applying the ID3 algorithm, was expounded by Yong Wang et al[42]. This will achieve the intellectual need in the CRM interactive process, improve the service level of the bank and help the bank understand the behavior of the customers to a fuller extent.

CONCLUSION

Thus in this taxonomy of different dimensions of CRM has been done and on the basis of these dimensions different data mining functions and techniques used are surveyed . So that it can help for future work to develop new technique in this area.

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