CUSTOMER RELATIONSHIP MANAGEMENT THROUGH DATA MINING

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ABSTRACT: Almost, each and every real time process is being automated in today's competitive world of technological advancements. Automation has become the Blood Line of life. Data Mining is one of the powerful automation tools, as it has evolved from the concept of Knowledge Discovery. Knowledge Discovery is an intelligent process and Data Mining does it artificially, thus being Artificially Intelligent. Extracting data from large databases through pruning and other implicit means is not a single handed job. Data Mining has been a 'Boon from Mars' to many technical fields. Management fields are also not immune to it. Customer Relationship Management (CRM) is one such field which has been under focus for deployment of Data Mining. Many financial companies and business organizations have grown from rats to riches by tackling marketing issues through Data Mining. This paper gives the idea about Customer Relationship Management through Data Mining.

KEYWORDS: CRM, Data Mining.

I. INTRODUCTION

Data Mining is a tool that automates the detection of relevant patterns in a Database. It is a technology, which on its progressive path leads to Knowledge Discovery, thereby making the system Artificially Intelligent. In practical terms, the system is made self reliable. There are certain prequisites needed to perform data mining. A database full of statistical data, and certain efficient pruning algorithms to mine out them, form the core region. William Frawley and Gregory Shapiro defined it as "..The nontrivial extraction of implicit, previously unknown and potentially useful information from data."

In other words it is the process of discovering meaningful correlations and hidden patterns by mining large amounts of data stored in warehouses (large repository of data). The major advantage is its capability to build predictive models rather than being Retrospective. Thus data mining is about exploration and analysis, by automatic or semiautomatic means, quantities of data can help to uncover meaningful patterns and rules.

1.1 Applications

Data mining is not restricted towards any field. In fact it has now become an integral part of every database oriented application. However the following fields have surprisingly gained more from the tool

- ✓ Marketing
- ✓ E-commerce
- ✓ ☐Medicine.
- ✓ ☐Telecommunications.

✓   ☐Transportation.
✓   ☐Research
✓   ☐Law and order

1.2 The Process

Data mining uses simple tools to perform the churning process from large ocean of data. The following are performed:-
✓   ☐Discovering knowledge
✓   Segmentation
✓   ☐Classification
✓   ☐Association
✓   ☐Referencing
✓   Visualizing data

1.3 Data Mining Softwares

Any private firm or organization generally spends more money to get a new customer than to retain the existing customer, but it is far more expensive to win back a customer after they have left, than it is to keep satisfied in the first place. So it is very much essential for a concern to maintain good relations with its customers and to keep them satisfied in all possible means for which the company might be even digging its treasury. Many data mining algorithms have emerged to solve the problems.

Financial expenditures are to be effectively handled as cash is the prime commodity and thus you need certain marketing strategies to manage cash. These issues are addressed as CRM issues. In order to stay competitive companies develop strategies to become customer focused, customer-driven, and customer–centric. All these terms define the companies' desire to build lasting customer relationships. CRM is viewed as solution that makes these efforts valuable to the company and the customers alike.

1.4 Data Mining & CRM issues-their inter relation

As data mining is about exploration and analysis, by automatic or semiautomatic means, quantities of data can help to uncover meaningful patterns and rules. These patterns and rules help corporations improve their marketing, sales and customer support operations to better understand their customers. Over the years, corporations have accumulated very large databases from applications such as Enterprise Resource Planning (ERP), Client Relationship Management (CRM), or other operational systems. This paper would deal with implementing data mining algorithm for solving a typical CRM problem.

1.5 Decision trees

The decision tree is probably the most popular technique for predictive modeling. An example explains some of the basics of the decision tree algorithm. The following table shows a set of training data that could be used to predict credit risk. In this example, fictionalized information was generated on customers that included their debt level, income level, what type of employment they had and whether they were at a good or bad credit risk.

1.6 Generating decision tree through sample probabilistic approach

There are many variations of algorithms that construct decision trees and that use different splitting methods: tree shapes, pruning techniques, and so on. Some use Entropy as the splitting criteria, Microsoft Decision Trees uses a Bayesian score as the default.

However these algorithms are complex and use calculations based on curve analysis. These may be required by high corporate based organizations which focus on high level of accuracy. But even small marketing firms would also like to have mining incorporated into their business. CRM issues are soft in nature and could compromise to a small factor in regard to various predictions. Generating the decision tree given the trained model as input is the core issue in mining.

So we try to propose a simple decision tree algorithm through probabilistic methods. In The Due Process we build up a probabilistic classification tree.

1.7 Problem solving issues

The above algorithm, is used to generate the Decision Tree for mining in a CRM based issue. Before that the following CRM issues are to be addressed.

1.7.1 Issue1: Defining the problem

The following are some important aspects to be kept in mind while defining the problem. The scope of the project. The accuracy level, which would be required. Define the deliverables. The output would be able to generate. Time and cost effectiveness of the output. Pick something well defined and small. Take abstract problems. Be aware of your limitations before defining the problem. Understand the existing CRM process. Better understand marketing strategies and the practical CRM process.

1.7.2 Issue 2: Defining the user

Build a profile for each user. Try to get the interest and the background of the user. Give him queries to tap knowledge about him. Use quick start programmers to tell about your future. Project yourself as an emerging firm. Highlight the benefits to the user.

1.7.3 Issue 3: Defining the data

Locate the data dictionary. Get details about the Meta data. Obtain various constraints on data.

Define metrics. Find the range of values or the possible values the data can take.

1.8 The final decision tree

The Decision Tree as obtained may not be complete always. After that split according to the order generated by the MSA , and stop at nodes called the leaf node where either there are no cases for that particular node (or) all the cases belong to the same state (or) the cases are distributed among the states such that no further split is possible.

II.   CONCLUSION

Thus it is shown how Data Mining could be deployed for CRM issues. It is believed that steps outlined in this paper and the algorithm formulated are to a great extent successful in optimizing the existing CRM process. Though the algorithm may have some limitations, soft issues like CRM could bear with them as a high level of accuracy is generally not required. Successful implementation of the algorithm would benefit small business organizations as some of them cannot afford to buy Clementine or any other Data mining software for that case which would make them void of Data Mining. Data mining could provide drastic performance improvements for such business oriented organizations also.

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