

The Study on Customer Relationship Management of B2B sales using Decision Tree

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Analytical CRM Project

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I. Abstract

To discover the hidden knowledge, Data Mining is held responsible. Rules, patterns, extraction of data, data mining is everywhere. Salespersons productivity becomes inefficient and thus report delivering also in manual method. To make existing customers satisfied and targeting new customers is an important step in this era. This problem is in contradiction with Customer Relationship Management. With that analysis, a company needs to have CRM to get the best sales based on customer relationship. CRM helps the company to analyze its customers in real-time and helps them about the products they want to get.

Keywords: *Customer Relationship Management, Data Mining, Decision Tree, RapidMiner, Sales Process, Business.*

II. Introduction

A strategy to manage an organization's interaction and relationships with its current and potential customers is known as Customer Relationship Management (CRM).

There are two types of CRM applications - Operational and Analytical.

The processes that involve direct interaction of customers' requirements like sales, marketing and service is known as Operational CRM. Whereas, those processes that do not have direct interaction with customers instead it analyses customer data to improves

decision making capability of an organization is known as Analytical CRM.

Customer Relationship Management is a broad topic with many layers, one of which is data mining, and that data mining is a method or tool that can help companies in their quest to become more customer-oriented. [1] Techniques such as Clustering, Classification, Regression, Neural Networks, Decision Tree are widely used for Analytical CRM.

III. Literature Review

To depend upon a single set of customers(groups) it is very risky for any organization. The amount of competition amongst companies these days to be at the top position is increasing at a rapid rate. The ever-increasing demand of products add to that their replacement available of the required product, the knowledge of customers about the products and their alternatives through internet and mobile, the chances of customer changing the product increases if customer satisfaction is not there.

The cancelation of purchasing the product from the company and changing it to other product or the same product but from other company is known as customer churn. To stop the customers from leaving is an essential step for any company. To tackle all such issues like; why are customers leaving, why are customers changing the product, what are the factors that influenced them to change their mind good Customer Relationship Management (CRM) is must.

With the formation of buyers' market, the role of customer has become present partner by former buyer (Rashi, 1999). Thus, because of this, traditional B2B companies must transform from the previous product-centric to customer-centric to stay and survive in this rapidly growing market [2]. To rise into strategic level, Customer Relationship Management helps the company grow in Sales, Marketing, Leads, Competitors etc. levels with the help of advanced and systematic level of implementation. Generally, many Business2Business companies don't go for CRM. Companies hesitate to spend huge sums of money to implement CRM or any other management software. Applying CRM in B2B companies, can benefit in the long-run with large-scale production and can improve consumer market. B2B provides a good environment for CRM to address all the feasible factors [3].

While many companies introduce into customer relationship management system, but 70% of CRM projects end in failure. Woodcock, (2001). CRM plays a major role in every field. Good CRM proposals should be developed and implemented into sales team to meet the required desires and demands/requests of the customers. Even though, the sales team won't be benefited immediately, they will be benefited in the long run. If implemented correctly, CRM will boost the performance of any sales team.

In this paper, Decision Tree is used. Decision Tree is an induction algorithm based on attributes, which reasons the classification rules from a group of non-priority cases. The implementation process of decision tree is keeping the process of data segmentation, each of which corresponds to a node [4].

IV. Methodology

In any CRM system that manages complex sales, actionable knowledge is vital for increased sales. The main purpose of CRM is to develop a strong relationship between company and customer. CRM helps the company to increase customer satisfaction and get more benefits for the organization.

CRM consists of three phases:

- a. Acquire new customer
- b. Enhance the customer value
- c. Retain existing customer

Methodology for B2B Sales:

H1: The customer will buy the product.

H0: The customer will not buy the product.

To carry out the analysis, variety of tools were used:

- Rapid Miner

Dataset Description:

The dataset under the study has various attributes about B2B Sales. It contains anonymized data, based on the data from real-world business selling solutions and services internationally. The data contains various attributes. Some of the attributes are:

- Product
- Seller
- Authority
- Company size
- Competitors
- Purchasing department
- Partnership
- Budget allocated
- Formal tender

- Request for Information (RFI)
- Request for Proposal (RPF)
- Growth
- Positive statements
- Client
- Scope clarity
- Strategic deal
- Cross sale
- Up sale
- Deal type
- Needs defined
- Attention to client
- Status

The data was collected from:

<http://www.salvirt.com/research/b2bdata set/>

Data Preprocessing:

Data must be preprocessed to perform predictive analysis on different techniques of Data Mining. After the data preprocessed, RapidMiner is used to perform various analysis. RapidMiner is a free downloadable Graphic User Interface for data mining, machine learning, deep learning, predictive and business analytics.

V. Implementation:

To compute the impact of selected attributes and how much they affect was analyzed in RapidMiner. For predicting the impact, data modelling was done. The attributes were selected which impact the predication of cross sale and up sale with the given source.

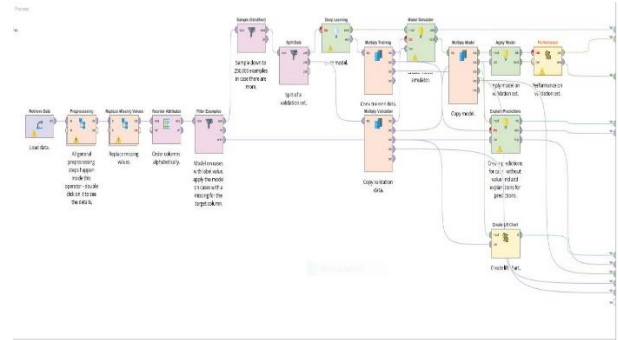


Fig.1 Data Modelling (Decision Tree)

Once the correct variables were chosen for the analysis, the data was imported into RapidMiner tool for running the machine learning techniques. After analyzing various attributes, it is found that the attributes impacting more towards the sale of the products are: Competitors, Source, Cross sale, Up sale.

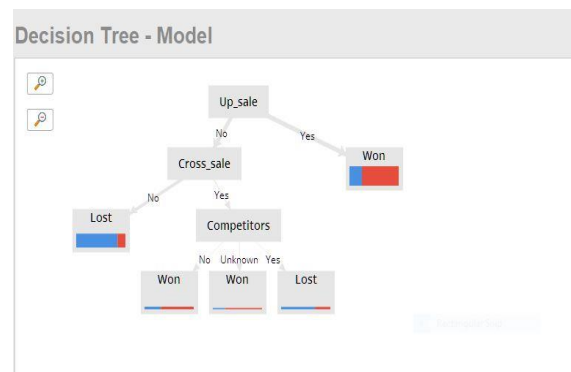


Fig.2 Decision Tree (status type) using RapidMiner

The decision tree was used to show that status (root node) which was dependent variable the number of Up sale, Cross sale, Competitors and Source are the most influential attribute to classify the policy types respectively. Just to give an understanding, cross-sale is the act of selling a product to a customer as result of another purchase, Up-sale is the act of motivating current customers to upgrade

to other profitable products. The prediction of decision tree shows, competitors play a massive role in the sales whether it is cross sale or up sale. Decision Tree shows an accuracy of 71.91% as shown in the picture below:

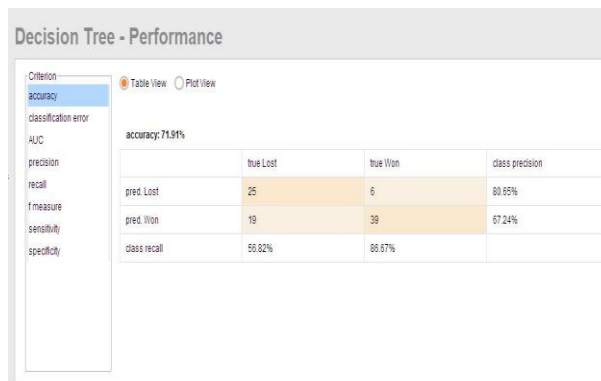


Fig.3 Accuracy rate of Decision Tree

If there are no competitors, no cross sale and no up sale, the opportunity is mostly likely lost (84%) but if the cross sale is and up sale both are yes then opportunity is mostly likely won (64%). This shows competitors have a major impact on sales and then its eventually impacts source.

Decision Tree - Performance details:

- Accuracy - 71.91%
- Classification error - 28.09%
- Precision - 67.24% (positive class: Won)
- Recall - 86.67% (positive class: Won)
- F measure - 75.73%(positive class: Won)
- Sensitivity: 86.67% (positive class: Won)
- Specificity: 56.82% (positive class: Won)

So, for the above dataset, Decision Tree is the best suited data mining technique with the accuracy of 71.91%.

VI. Conclusion:

Customer Relationship Management with the help of Data Mining plays a decisive role in getting analysis done.

Implementing CRM, cause in-depth customer relations, increase accuracy, productivity and improvement in sales that improve relationships and customer commitment.

Thus, CRM in Business2Business Sales can benefit from each other's by resource exchange and improve the brand and customer value respectively. CRM greatly enhances the core competitiveness of any company.

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