

BRINGING DATA MINING TO CUSTOMER RELATIONSHIP MANAGEMENT OF EVERY COMPANY

*Esa Rinta-Runsala
M.Sc. (Eng.),
VTT Technical Research Centre of Finland
esa.rinta-runsala@vtt.fi*

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INTRODUCTION

The current trend in customer relationship management (CRM) is to be analytical. Customer transactions are being recorded by more and more businesses and there is a great demand to use this data efficiently. Data mining (DM), the science of finding new, interesting patterns and relationships in huge amounts of data is a proven solution to analytical CRM. However, the commercial DM tools for analytical CRM have some weaknesses that hinders their wider use. The most important ones are the pricing, the need for data mining expertise of the user and the limited number of methods and algorithms they offer. Especially the costs related to tools and expertise limit the use of DM in small and middle-sized enterprises (SMEs). Louhi data mining tool developed at VTT Technical Research Centre of Finland is designed to overcome these limitations to enable broader use of data mining methods in various customer related businesses also including SMEs. The tool was piloted during year 2003 with end-users in real-world CRM cases.

LOUHI TOOL

The Louhi tool provides the business analysts and decision makers an intuitive and easy to use interface to the algorithms as well as good visualizations of the results (Figure 1). The easy to use approach of Louhi tool is based on packing the whole data mining process into pre-defined workflows each of which is suitable for solving a certain marketing function. Thus, the details and parameters of the algorithms are hidden from the business experts, and all the mining is done automatically after the workflow is selected. This keeps the use of Louhi tool in hands of the domain and business experts allowing them to totally focus on interpreting and exploiting the results. The data mining experts only define the variety of workflows and specify their details with the domain experts, thus guaranteeing the reliability of the results.

The defined workflows are currently divided into four main marketing functions. These functions are product specific selling, customer specific selling, cross-selling and selecting customers. Each of these marketing functions solves a certain business problem. In product

specific selling, the workflows are aiming to find the most potential customers for a given product, and in customer specific selling the table is turned around by finding the products most probably purchased by a given customer or a group of customers. The cross-selling marketing function solves the problem of finding the best products to be sold together, and selecting customers finds the customers fulfilling the given criteria.

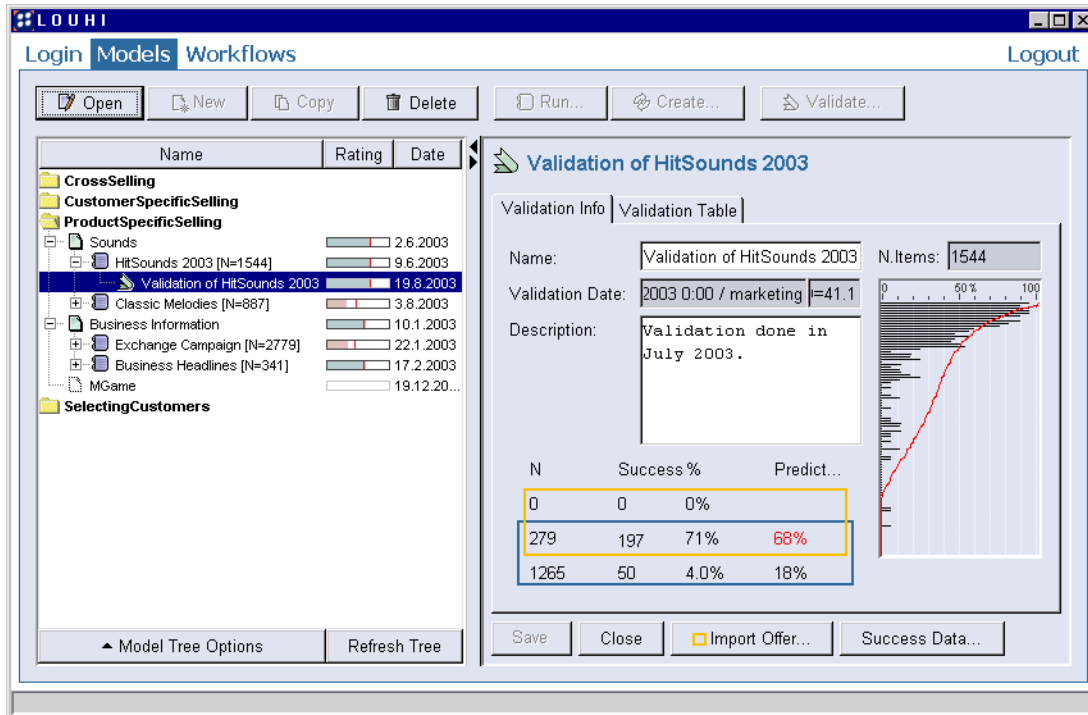


Figure 1. Louhi tool graphical user interface.

The increasing data availability implies also the variety of different data types and purposes. Instead of traditional billing data, the companies are now gathering and saving data about transaction and campaign history, the product attributes and their relations, and so on. To exploit this novel data, also new DM algorithms are developed. However, the flexibility to use and adapt the new algorithms is lacking from most of the commercial DM products. One way to take advantage of the most recent DM algorithms is to link the tool to the programs made for research purposes. Louhi CRM tool is implemented in Java and it has a modular structure, which enables it to be linked to multiple external DM tools, both free and commercial ones. This gives Louhi a great flexibility both in means of methods and algorithms, and DM tool costs. So far, Louhi utilizes the results of two freeware DM libraries, namely Weka machine learning library [Witten & Frank 2000] and Apriori algorithm [Agrawal et al. 1993] implementation by Christian Borgelt [Borgelt & Kruse 2002].

The user interface of Louhi is used through a standard web browser and the exporting of the data mining models and results is done with XML-files. The workflows defined by the DM experts are currently written manually, but there is a separate tool under development for their definition.

RESULTS OF THE PILOTS

The tool was piloted with two real-world cases with two companies during the year 2003. In the first case, the tool was used to model the acceptance of a direct marketing campaign offer. For comparison, the modeling was also done with a well-known commercial data mining product. The results of the models were quite similar and the maximum difference between the lift curves was 6 percentage units. With the commercial DM tool, logistic regression was used in the model, whereas Louhi used SMO support vector machine algorithm, which is not, according to our knowledge, used in any popular commercial DM tool yet.

The other pilot was also related to direct marketing. The purpose was to choose the best one of two products for every customer. The sending of the offer could also be canceled if the customer was not likely to buy either of the products. The customers were divided into two groups of 1/3 and 2/3 of the customers. The smaller group was targeted by using conventional methods of the company and the bigger group was targeted with Louhi. Also in this case the results were good. Especially the decrease of unnecessary mailings and returned products was considered valuable by the company representatives. In year 2004, Louhi will be tested in operational use in the company by their marketing and sales personnel.

CONCLUSIONS

There is a great need for easy to use, but technically advanced tool for analytical customer relationship management tasks. Louhi has showed its potential in the two successful real world pilot cases. In the cases, a state-of-the-art classification algorithm was used and Louhi's ability to utilize the results of freeware DM tools was proven. At the moment, the variety of workflows is still quite limited, but we shall concentrate on that on 2004 and widen the range of workflows available. In year 2004 the tool will also be tested in operational use by marketing and sales experts. With the feedback from the end users we shall enhance Louhi and further improve its features for better usability.

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