

Chordiant Recommendation Advisor: Adaptive and Rule Based Decisioning for Real Time Marketing

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1. Introduction

In this proposal we would like to present an outline for an intended demonstration of Chordiant Recommendation Advisor at the KDD 2006. Recommendation Advisor is a commercially successful, deployed application of data mining that is currently running on thousands of call center agent desktops. However in this demonstration we would like to focus more on a number of concepts that are interesting from a data mining methodological and research point of view. To be able to do this we will reveal some of the key nuts and bolts under the hood of Recommendation Advisor.

2. Main contributions

An important factor in the success of a company are the decisions that are taken in customer interactions such as who to target with what kind of sales offer, who to retain and with what save tool or how to handle particular service requests a customer may have. This problem is traditionally studied in economics and management science in research fields such as decision theory, decision analysis and theories of rational choice and decision making. Data mining may provide input to these decisions in the form of predictions of customer behavior. Decisioning on the other side may prove to be a useful framework for model deployment, a step from the data mining process that is largely ignored in KDD research, given the widespread belief that this is application specific so generic methods do not apply.

Recommendation Advisor (see figure 1) is a tool developed by Chordiant that produces a *next best action* for any customer interaction in real time, for instance in a call center or on a self service website. It integrates with a generic decision management framework that has been applied to a variety of application areas in the past including marketing, credit risk management and medical decision support.

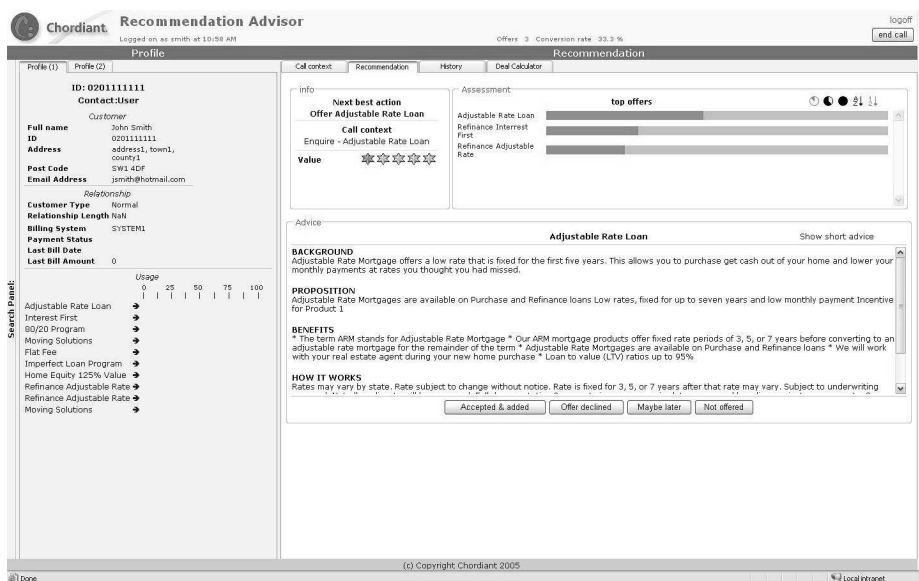


Figure 1: Recommendation Advisor Screenshot (call center channel example)

In our demonstration we will generally start with the external view of the application, i.e. what the agent or the customer sees. We will also mention some results achieved at customers like O2, Time Warner Cable and AOL to provide confidence that we are presenting a mature application. However we want to spend most of the time revealing some of the internals. We can focus on the overall decision framework, the use of predictive models that learn adaptively in real time and the combination of rules and models when taking a decision.

2. 1 Decisioning as generic methodology for model deployment

As discussed above we claim that decisioning may be a useful generic framework for model deployment, i.e. how to use the *output* of a model. We will provide an overview of some of these key steps in the decision management process such as:

- The combination of models with rules into a decision logic to define a strategy to come up with a best decision
- Deployment and real time application of this decision logic
- Monitoring of the decision logic

2. 2 Learning in Real Time: Adaptive Decisioning

Whereas some decisions are based on rules only, data mining can provide valuable input to a decision in the form of predictions of customer behavior. Predictive models that have been created offline suffice in a lot of cases, however when there are not enough analyst resources available to develop these models, or if customer behavior changes dynamically, models that learn online may be valuable.

We will present our approach to adaptive learning which includes adaptive control of other steps than just the core modeling step, such as adaptive data preparation and attribute selection. Furthermore we can discuss approaches to address the 'cold start' problem, i.e. how to deal with new propositions for which not enough feedback exists.

2.3 The Marriage between Models and Rules

A decision requires more input than just a prediction. For instance, in a marketing context tradeoffs must be made between offering various products, or between offering, servicing or retention for instance. Also company policies, business strategies and customer eligibility must be taken into account.

We will present a generic logic framework for customer decisioning and demonstrate individual components that can be used as building blocks, such as classification components (model or rule based), strategy sets that define potential actions and selection components that select across alternatives. The same framework has been in used previously in very different domains such as medical decision support so it has general applicability even though we as a company focus on marketing and risk.

2.4 Technical Specification

Recommendation Advisor is an open, web based application, all the server side components run in a platform independent and scalable J2EE architecture, with Weblogic and WebSphere as supported application servers. Major databases such as Oracle, DB2 and SQL Server are supported. Decision logic is stored in a XML format (SMML, strategy management markup language). Third party models may be consumed as PMML. Adaptive model specifications are stored inside decision logic, and so are any off line predictive models, so that scores can be generated in real time.

3. Summary

The purpose of our demonstration is not just to show a nice case example of applying data mining in the real world. In addition we would like propose decisioning as a framework for studying, generalizing and enabling predictive model deployment. As such we hope that this demonstration will not just be anecdotal but will actually be useful for an audience of data mining researchers and practitioners from various backgrounds.

4. Selected Literature

A Closer Look at Chordiant Decision Management Predictive Analytics Director Techniques and Algorithms. Chordiant White Paper, 2005

An Objective Performance Evaluation of Chordiant Predictive Analytics Director. Chordiant White Paper, 2006

The Death of Outbound Marketing? Chordiant White Paper, 2006