Preface

Churn detection and mitigation in everyday business is always interesting, but it is also a very important topic for companies. Data mining as a discipline increases productivity and efficiency in churn detection and mitigation.

The existing literature is mainly concentrated on data mining techniques, and churn is mentioned as an accompanying topic, often as an illustration for specific method usage. Data mining books with case studies in churn detection are more detailed about churn, but they do not provide a systematic, holistic approach to churn where churn is the central topic of the book.

This book is a reference book for solving churn problematic with data mining techniques and SNA. The main aim of the book is the integration of data mining techniques with business requirements, taking into consideration market conditions, existing data sources, information extraction from existing data sources for knowledge extraction, and reducing uncertainty for making right decisions, churn monitoring, churn mitigation, and reduction. The book provides answers to how to plan churn projects regarding different industries, market conditions, disposable data, changes in market, and how to prepare data for building churn detection/mitigation models. The book also gives information on how to apply this knowledge for business decision purposes. The presented methodology is a synthesis of 20 years of experience in data mining and churn development models in different industries.

The systematic approach to churn problematic is the main characteristic of this book. It makes a step-by-step connection between business needs, data sources, data mining techniques, and decision making. Regarding all those facts, the target audience includes managers, business analysts, data mining analysts, practitioners, students, and in short, any audience that wants to understand churn problematic from a business perspective or from the perspective of how to solve specific churn situations with data mining methods or how to manage/struggle with churn in different industries.

Churn observation within the company should not be obvious, because in this situation, it is often too late to change negative trends. It should be always present as a part of the early warning system. This book is about to demolish several myths connected with data mining and churn modeling.
Contrary to the belief that churn modeling is mainly concentrated on using data mining models, this book gives proof that churn modeling is not only about data mining methods. Using data mining techniques in churn modeling covers 20% of the whole process. The remaining 80% includes aim definition, data extrapolation, derived variable construction, data sampling, attribute relevance analysis, hypothesis testing, choosing adequate analytical strategies, and many other activities that are the basis for data mining technique usage.

Another myth the book demolishes is the assurance that usage of one data mining method for churn-modeling purposes is enough. Churn modeling is like a building edifice with bricks. It implies using different data mining techniques by chaining it or using it parallel, depending on the current problem. There is no cookbook for churn solutions. It depends on industry, current situation in the market, the internal situation of the company, and many other factors. Most of the situations in this book are covered with proposed strategies and solutions, depending on enumerated factors.

Building predictive churn models is often synonymous with churn modeling, which is wrong. It is in line with the proverb, “If all you have is a hammer, everything looks like a nail.” Predictive churn models are important and a common piece of churn solutions, but there are a variety of other approaches and methods that give insight into other churn aspects. Finding out who will probably churn in the next period is a valuable piece of information, but this information does not tell us anything about churner profiles (except maybe through attribute relevance analysis); it does not give us information about churner value for the company, preferences, or other important staff.

That information uncovered with predictive models is important for making churn mitigation and reduction. Strategies like discount prices for all clients with high churn probability are not a good idea because some of them are unprofitable for the company and some of them—even profitable—will not react to the discount because discounted prices could be offered for the items or services for which customers do not care. On the other hand, churn intensity related to the time variable could be important information, as well as its influence. It could be seasonal influence or it could also be caused by competitors’ activities.

These facts show the complexity of churn projects where predictive churn models do not provide all-important information for making good churn reduction strategies.

Involving businesses in modeling stages is a must in churn modeling. Business people have information and experience, which is often neglected during modeling stages, which is not the right approach. They can help in the aim definition phase of churn modeling, derived variable construction phase, data sampling, model testing, and use test. No one data mining analyst or churn modeler could be a better expert in the industry for which it develops churn solution than experts who work in the industry and live with the problems every day. Even two companies that are
in the same business, like retail, regarding company size, market conditions, and
buyer structure, could be the benchmarks to each other regarding churn solution.
The myth that a data mining analyst is sufficient for churn solution development
will be demolished in this book.

With churn problematic as a central piece of the book, data mining methods,
sampling, derived variable construction, prospective customer value calculation, and
attribute relevance analyses are described from the perspective of churn reduction/
detection/mitigation service.

It is a different approach in comparison to other books dedicated to data mining
that put churn as an illustration for using data mining techniques.

CHAPTER DESCRIPTIONS

Divided into 11 chapters with a conclusion at the end, our journey starts with an
introduction about churn. Using simple language to explain churn and the corre-
sponding environment, the first chapter introduces the reader to the overall churn
perspective, giving several samples through real world situations.

Once we know what churn analysis is, it is important to understand what really
can or cannot be done. In addition, it is important to understand common errors
analysts have to be aware of when planning and conducting churn analyses. It is
advisable for the reader to move back to the introduction and Chapter 1 after finish-
ing reading in order to once again understand the full potential and restrictions of
the proposed methods and techniques.

The next chapter overviews data mining starting with an explanation of the data
mining methods used the most. Data mining methods are explained together with
recommendations of when and how to use them and how to iteratively combine dif-
ferent methods. The methods are explained briefly to understand their role in projects.

Social network analysis is intentionally covered in a separate chapter for two
reasons. First, the importance of this method has rapidly increased in past few years,
and second, there are very few useable studies that cover social network analysis
concepts in churn management. By understanding the methods explained in Chapter
3 and combining them with knowledge of SNA concepts, the analysts (readers) can
unlock the full potential of advanced analytics in one of the most important fields
of research today, customer relationship and especially churn analysis.

The next chapter describes data preparation techniques for different churn mod-
els. The central topic is data sampling as preparation for building churn models,
especially for predictive models. The chapter shows how to construct a data sample
that will reflect business reality and show good performance regarding building
predictive models. A significant part of the chapter is dedicated to construction of
derived variables, which are a direct reflection of expert knowledge used within
churn models. Besides data preparation for predictive models, the chapter also describes data preparation techniques for other methods usable for churn modeling like survival models, fuzzy expert systems, K-mean clustering, etc. The attribute relevance analysis chapter described different techniques for attribute importance detection usable in churn modeling. It gave descriptions with examples of how to make an attribute relevance analysis for predictive churn models in case of binomial target variables, as well in case of multinomial target variables. This chapter covers dummy variable construction and profiling techniques based on attribute relevance analysis, as well as logic checks from the perspective of business users.

After explaining how to prepare data, an introduction to structured analytic techniques is covered in this chapter. The importance of structured techniques comes from their simplicity and wide usage, making them fast to use and efficient to structure in even complex environments.

Structured problems need to be quantified by relevance, as covered in Chapter 7. By completing this chapter, the reader is ready to start with examples in the next chapters.

The next chapter explains churn model classification, describes techniques for developing predictive churn models, and describes how to build churn segmentation models, churn time-dependent models, and expert models for churn reduction. Analysts (readers) are shown a holistic picture for churn modeling and presented an analytical method with techniques described as elements that could be used for building a final churn solution depending on current business problems and expected outputs.

Once evaluate model is chosen, its power needs to be evaluated. Simple but efficient methods for evaluating predictive power are explained in Chapter 9.

The next chapter chapter is based on the fact that the finalization of the model building stage is the beginning of the periodic monitoring and redesigning stage. The churn solution should be adopted by market changes, internal company policy changes, portfolio structure changes, and other factors. The chapter gives answers about monitoring frequency and techniques with which the company could realize when to change into the existing churn solution. Another important topic covered in this chapter is “what if” analysis techniques, how to make scenarios for future churn trends regarding planned changes while taking in consideration the current state of the existing portfolio. The chapter ends with business strategy creation based on revealed knowledge from the churn solution and explains the importance of cooperation between business sectors and analysts in all stages of churn solution development from planning and realization to usage.

The case study chapter brings two business cases in the domain of churn, both unique in many ways, combining almost all the topics covered inside book.

The first business case presents a retail company facing new competitors and consequently preparing a customer-retention strategy. The case introduces the busi-
ness environment in which the company was operating prior to the arrival of new competitors while the model is being devised for the purpose of preventing or at least buffering the churn trend as a reaction to the new competition. Development of an early warning indicator system based on data mining methods is also described as a support to the management in the early detection of both market opportunities and threats.

Second business case describes the situation in a telecommunication company called Veza in the domain of churn prediction and churn mitigation. The churn project was divided into a few stages. Due to a limited budget and cost optimization, the first stage concentrated on the prospective customer value calculation model based on fuzzy expert systems. This stage helps Veza to find the most valuable telecom subscribers. It also helped the company better understand subscriber portfolio structure. Developed fuzzy expert systems also helped Veza detect soft churn (subscriber did not cancel contract, but he decreased usage of services). Profiling and customer segmentation based on time series analysis was the next important part of the project, and it provided potential predictors for predictive churn models. The central stage concentrated on developing a traditional predictive churn model based on logistic regression. This model calculated the probability that the subscriber will make churn in the next few months. The final stage was dedicated to SNA (Social Network Analysis) model development. The SNA model find out the most valuable customers from the perspective of the existing subscriber network. In other words, this model gave us the answer to which subscribers have the greatest influence on other subscribers. If they leave Veza, they will motivate other subscribers to do the same thing. All three steps made a complete churn detection/mitigation solution that took into consideration past behavior of subscribers, their prospective value, and their strength of influence on other subscribers. This project on the one hand helped Veza to decrease its churn rate, and on the other hand, it gave directions for better understanding of customer needs and behavior, which were a basis for new product development.

Goran Klepac  
Raiffeisenbank Austria Zagreb, Croatia

Robert Kopal  
University College for Applied Computer Engineering Algebra Zagreb, Croatia  
& University College for Law and Finance Effectus Zagreb, Croatia

Leo Mršić  
University College for Applied Computer Engineering Algebra Zagreb, Croatia  
& University College for Law and Finance Effectus Zagreb, Croatia

April 2014, City of Zagreb, Croatia, Europe