PREDICTING CUSTOMER CHURN IN BANKING INDUSTRY USING NEURAL NETWORKS

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ABSTRACT

The aim of this article is to present a case study of usage of one of the data mining methods, neural network, in knowledge discovery from databases in the banking industry. Data mining is automated process of analysing, organization or grouping a large set of data from different perspectives and summarizing it into useful information using special algorithms. Data mining can help to resolve banking problems by finding some regularity, causality and correlation to business information which are not visible at first sight because they are hidden in large amounts of data. In this paper, we used one of the data mining methods, neural network, within the software package Alyuda NeuroIntelligence to predict customer churn in bank. The focus on customer churn is to determinate the customers who are at risk of leaving and analysing whether those customers are worth retaining. Neural network is statistical learning model inspired by biological neural and it is used to estimate or approximate functions that can depend on a large number of inputs which are generally unknown. Although the method itself is complicated, there are tools that enable the use of neural networks without much prior knowledge of how they operate. The results show that clients who use more bank services (products) are more loyal, so bank should focus on those clients who use less than three products, and offer them products according to their needs. Similar results are obtained for different network topologies.

KEY WORDS
data mining, neural network, banking, customer churn

CLASSIFICATION
JEL: C45, G21

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Predicting Customer Churn In Banking Industry Using Neural

Poonam Nandal,Mamta Dahiya,Meeta Singh,Arvind Dagur,Brijesh Kumar

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Smart Computing Paradigms: Intelligence and Network Applications Vikrant Bhateja,Angela Lee Siew Hoong,Jude Dzevela Kong,Shabana Urooj,2026-01-07 This book presents best selected papers presented at the 7th International Conference on Smart Computing and Informatics SCI 2025 held at the School of Engineering and Technology SET Sunway University Selangor Malaysia during 8 9 April 2025 It presents advanced and multidisciplinary research towards the design of smart computing and informatics The theme is on a broader front and focuses on various innovation paradigms in system knowledge intelligence and sustainability that may be applied to provide realistic solutions to varied problems in society environment and industries The scope is also extended towards the deployment of emerging computational and knowledge transfer approaches optimizing solutions in various disciplines of science technology and healthcare The work is published in four volumes **Proceedings of the 2nd International Conference on Business and Policy Studies** Canh Thien Dang,Javier Cifuentes-Faura,Xiaolong Li,2023-10-07 This proceedings volume contains papers accepted by the 2nd International Conference on Business and Policy Studies CONF BPS 2023 which are carefully selected and reviewed by professional reviewers from corresponding research fields and the editorial team of the conference This volume presents the latest research achievements inspirations and applications in applied economy finance enterprise management public administration and policy studies CONF BPS 2023 was a hybrid conference that includes several workshops offline and online around the world in Cardiff Jan 2023 London Feb 2023 and Sydney Feb 2023 Prof Canh Thien Dang from King s College London Prof Arman Eshraghi from Cardiff Business School and Prof Kristle Romero Cort s from UNSW Business School have chaired those offline workshop *Innovations in Electronics and Communication Engineering* H. S. Saini,R. K. Singh,Mirza Tariq Beg,J. S. Sahambi,2020-04-22 This book is a collection of the best research papers presented at the 8th International Conference on Innovations in Electronics and Communication Engineering at Guru Nanak Institutions Hyderabad India Featuring contributions by researchers technocrats and experts the book covers various areas of communication engineering like signal processing VLSI design embedded systems wireless communications and electronics and communications in general as well as cutting edge technologies As such it is a valuable reference resource for young researchers **Artificial Intelligence and Speech Technology** Arun Sharma,Ritu Rani,2025-05-29 This two volume set CCIS 2389 and CCIS 2390 constitutes selected papers presented at the 6th International Conference on Artificial Intelligence

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Computational Intelligence in Data Science Vallidevi Krishnamurthy,Suresh Jaganathan,Kanchana Rajaram,Saraswathi Shunmuganathan,2021-12-11 This book constitutes the refereed post conference proceedings of the Fourth IFIP TC 12 International Conference on Computational Intelligence in Data Science ICCIDS 2021 held in Chennai India in March 2021 The 20 revised full papers presented were carefully reviewed and selected from 75 submissions The papers cover topics such as computational intelligence for text analysis computational intelligence for image and video analysis blockchain and data science **Data Analytics Applications in Gaming and Entertainment** Günter Wallner,2019-07-11 The last decade has witnessed the rise of big data in game development as the increasing proliferation of Internet enabled gaming devices has made it easier than ever before to collect large amounts of player related data At the same time the emergence of new business models and the diversification of the player base have exposed a broader potential audience which attaches great importance to being able to tailor game experiences to a wide range of preferences and skill levels This in turn has led to a growing interest in data mining techniques as they offer new opportunities for deriving actionable insights to inform game design to ensure customer satisfaction to maximize revenues and to drive technical innovation By now data mining and analytics have become vital components of game development The amount of work being done in this area nowadays makes this an ideal time to put together a book on this subject Data Analytics Applications in Gaming and Entertainment seeks to provide a cross section of current data analytics applications in game production It is intended as a companion for practitioners academic researchers and students seeking knowledge on the latest practices in game data mining The chapters have been chosen in such a way as to cover a wide range of topics and to provide readers with a glimpse at the variety of applications of data mining in gaming A total of 25 authors from industry and academia have contributed 12 chapters covering topics such as player profiling approaches for analyzing player communities and their social structures matchmaking churn prediction and customer lifetime value estimation communication of analytical results and visual approaches to game analytics This book s perspectives and concepts will spark heightened interest in game analytics and foment innovative ideas that will advance the exciting field of online gaming and entertainment **Progressive Computational Intelligence, Information Technology and Networking** Poonam Nandal,Mamta Dahiya,Meeta Singh,Arvind Dagur,Brijesh Kumar,2025-07-22 Progressive Computational Intelligence Information Technology and

Networking presents a rich and diverse collection of cutting edge research real world applications and innovative methodologies spanning across multiple domains of computer science artificial intelligence and emerging technologies This comprehensive volume brings together different scholarly chapters contributed by researchers practitioners and thought leaders from around the globe The book explores a wide array of topics including but not limited to machine learning deep learning cloud computing cybersecurity Internet of Things IoT blockchain natural language processing image processing and data analytics It addresses the practical implementation of technologies in sectors such as healthcare agriculture education smart cities environmental monitoring finance and more Each chapter delves into specific challenges frameworks and experimental outcomes making this book an essential reference for academicians researchers industry professionals and students who aim to stay ahead in the rapidly evolving digital world **ABA Banking Journal** American Bankers Association,1999 **Datamation** ,1997 **Informationweek** ,1997 A Neural Network Approach to Predicting Customer Attrition in Banking Wendy M. Gilbert,2004 Predicting Customer Churn Using Voice of the Customer Carolina Martínez Troncoso,2019 **Effective Algorithms to Predict Customer Churn in Financial Services** Boriane Yousseu Tchaleu,2019 *NEURAL NETWORKS FOR CHURN PREDICTION IN THE MOBILE TELECOMMUNICATIONS INDUSTRY* Ionut Brandusoiu,Johnny Brandusoiu,2020-05-12 This book presents a CRISP DM data mining project for implementing a classification model that achieves a predictive performance very close to the ideal model namely of 99 55% This model yields such a high accuracy mainly due to the proprietary architecture of the machine learning algorithm used We implement a multilayer perceptron neural network which is improved using multiple techniques existent in the literature A detailed theoretical explanation is offered regarding multilayer perceptron learning algorithms and several optimization techniques and each decision taken in building the final architecture is motivated To demonstrate the predictive performance of our classification model we use a telecommunications synthetic dataset that contains call details records CDR for 3 333 customers with 21 independent variables and one dependent variable which indicates the past behavior of these customers with respect to churn This is a generic dataset frequently used in research as a benchmark for testing different architectures of machine learning algorithms proposed for classification The methodology presented in this book is scalable to datasets that have hundreds of thousands of instances and hundreds or thousands of variables coming from various industries such as telecommunications finance astronomy biotech marketing healthcare and many others and can be applied to any real world classification problem Predicting Customer Churn in Telecom Companies Through a Machine-learning Approach Hlayisani Result Khoza,2024 **Predicting Customer Churn in the Telecommunication Industry** Anne-Sophie Hadaschik,2017 The increasing occurrence of customer churn that implies customers discontinuation of their current relationship with a service provider has forced many companies in competitive markets to redirect their strategic focus to consider customer acquisition and customer retention equally In particular in the telecommunication industry a high degree

of saturation and competition contributed to ever increasing churn rates However resources of marketing managers to develop valid churn prediction and retention techniques are finite The aim of this study is to identify customers which are likely to churn with a constrained and thus limited set of characteristics Therefore this study investigates the churn behavior of customers of a German telecommunication company The study s finding underline the usefulness of logistic regression when building a churn prediction model Furthermore the research shows that a limited number of explanatory variables are sufficient to predict churn with proficient accuracy so that companies may carry out suitable actions to prevent customer churn In detail the study identifies a distinct correlation between customer churn behavior and attributes of customer contract history as well as certain demographic variables In order to focus on profitable customers when managing churn a classification approach is computed to improve marketing spending This thesis encourages companies to justify or expand measurements against churn by proposing an easier and more cost effective means for customer churn prediction

Understanding Customer Loyalty and Deposit Stability Ryan Kottmann,2024 Identifying the causes of customer churn in any institution is an increasingly important part of maintaining a profitable business No where is this more true than in the banking sector in which client deposits are the life blood of banks This analysis focused on analyzing features from a publicly available data set utilizing SMOTE and a threshold adjustment to gain the best model performance A Random Forest model was trained using a 70% training 30% test split and hyper parameters were tuned using Bayesian Optimization Further threshold adjustment Threshold 0 44 improved the model s predictive performance AUC 0 87 enhancing its ability to identify true churned clients while minimizing false positives The final Random Forest model achieved a better balance of sensitivity and specificity compared to Support Vector Machine SVM and XGBoost These findings offer valuable insights that financial institutions can leverage to study there own customer retention strategys Abstract *Artificial Intelligence in Banking* IntroBooks Team, In these highly competitive times and with so many technological advancements it is impossible for any industry to remain isolated and untouched by innovations In this era of digital economy the banking sector cannot exist and operate without the various digital tools offered by the ever new innovations happening in the field of Artificial Intelligence AI and its sub set technologies New technologies have enabled incredible progression in the finance industry Artificial Intelligence AI and Machine Learning ML have provided investors and customers with more innovative tools new types of financial products and a new potential for growth According to Cathy Bessant the Chief Operations and Technology Officer Bank of America AI is not just a technology discussion It is also a discussion about data and how it is used and protected She says In a world focused on using AI in new ways we re focused on using it wisely and responsibly **Predicting Customer Wallet** Nicolas Glady,2008 Each consumer requires a certain quantity of services or products and a single company usually provides only a part of this In the banking sector the total quantity of business a customer does is called the Size of Wallet of this customer and it is generally unobservable From a company perspective the percentage of this business done with the

company is called the Share of Wallet of this customer and is usually unobservable as well This paper focuses on the prediction of these values and on the derived concept of Potential of Wallet which is the difference between the Size of Wallet and the actual business the customer does with the focal company In the existing literature the models predicting the customer s wallet need survey data to estimate the model parameters The main contribution of this paper is to propose an approach to predict the customer s wallet without using survey data In the empirical application we show that a company can generate substantial gains by targeting customers having a large Potential of Wallet

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