Abstract

Marketing literature states that it is more costly to engage a new customer than to retain an existing loyal customer. Churn prediction models are developed by academics and practitioners to effectively manage and control customer churn in order to retain existing customers. As churn management is an important activity for companies to retain loyal customers, the ability to
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correctly predict customer churn is necessary. As the cellular network services market becoming more competitive, customer churn management has become a crucial task for mobile communication operators. This paper proposes a neural network (NN) based approach to predict customer churn in subscription of cellular wireless services. The results of experiments indicate that neural network based approach can predict customer churn with accuracy more than 92%. Further, it was observed that medium sized NNs perform best for the customer churn prediction when different neural network’s topologies were experimented.

Reference

- Hung, C., & Tsai, C.-F. (2008). Segmentation based on hierarchical self-organizing map for markets of multimedia on demand. Expert Systems with Applications, 34(1), 780–787.
- Berry, M. J. A., & Linoff, G. S. (2003). Data mining techniques: For marketing, sales, and customer support. John Wiley & Sons.
- Burez, J., & Van den Poel, D. (2006). CRM at a Pay-TV Company: Using analytical models to reduce customer attrition by targeted marketing for subscription services. Expert Systems with Applications, 32(2), 277–288.
- Van den Poel, D., & Larivie`re, B. (2004). Customer attrition analysis for financial services using proportional hazard models. European Journal of Operational Research, 157, 196–217.
- Han, J., & Kamber, M. (2001). Data Mining: Concepts and Techniques. Morgan Kaufmann.
- Hung, S. Y., Yen, D. C., & Wang, H. Y. (2006). Applying data mining to telecomm churn management. Expert Systems with Applications, 31(3), 515–524.
- Baesens, B., Viaene, S., Van den Poel, D., Vanthienen, J., & Dedene, G. (2002). Bayesian neural network learning for repeat purchase modeling in direct marketing. European Journal of Operational Research, 138(1), 191–211.
- Keaveney, S. M. (1995). Customer switching behavior in service industries: An exploratory study. Journal of Marketing, 59, 71–82.
- Kim, H. S., & Yoon, C. H. (2004). Determinants of subscriber churn and customer loyalty in the Korean mobile telephony market. Telecommunications Policy, 28, 751–765.
- Berson, A., Smith, S., & Thearling, K. (2000). Building data mining applications for CRM. New York, NY: McGraw-Hill.
- Kentrias, S. (2001). Customer relationship management: The SAS perspective, www.cm2day.com.
- Coussement, K., & Van den Poel, D. (2008). Churn prediction in subscription services: An application of support vector machines while comparing two parameter-selection techniques. Expert Systems with Applications, 34, 313–327.
- Buckinx, W., & Van den Poel, D. (2005). Customer base analysis: partial defection of behaviourally loyal clients in a non-contractual FMCG retail setting. European Journal of Operational Research, 164(1), 252–268.
- Chiang, D. A., Wang, Y. F., Lee, S. L., & Lin, C. J. (2003). Goal-oriented sequential pattern for network banking churn analysis. Expert Systems with Applications, 25, 293–302.
- Wei, C. P., & Chiu, I. T. (2002). Turning telecommunications call details to churn prediction: A data mining approach. Expert Systems with Applications, 23, 103–112.
- Markopoulos, A. P., Manolakos, D. E., & Vaxevanidis, N. M. (2008). Artificial neural
network models for the prediction of surface roughness in electrical discharge machining. Journal of Intelligent Manufacturing, 19, 283–292.
- Lippmann, R. P. (1987). An introduction to computing with neural nets. IEEE ASSP Magazine, 4, 4–22.
- C. L. Blake and C. J. Merz, Churn Data Set, UCI Repository of Machine Learning Databases, http://www.ics.uci.edu/~mlearn/MLRepository.html. University of California, Department of Information and Computer Science, Irvine, CA, 1998.
- Clementine data mining workbench, http://www.spss.com/clementine.

Index Terms

Computer Science

Information Systems

Key words

Neural Network

Churn prediction

Wireless Network

Services