

Modeling Lifetime Value in a Non-contractual Setting with Markov Models

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Abstract

Understanding customer purchasing behavior is critical for the efficient allocation of marketing resources. This study focuses on the use of Markov chain “migration” models in estimating customer lifetime value (LTV). Pfeifer and Carroway (2000) and Libai, et al. (2002) have already documented how to use first-order Markov Chains with states defined by recency and possibly frequency. Blattberg et al. (2008) document other applications that incorporate these migration models and “spreadsheet” implementations of these models are commonly used by practitioners. The assumptions of this model, however, have not been confirmed with direct marketing data, its performance relative to alternatives has not been evaluated, and its properties have not been studied. We present an empirical study of four data sets from different industries evaluating whether predictive accuracy is improved by (1) relaxing the first-order assumption and (2) adding covariates such as factors accounting for seasonality and trends, previous values of recency, transaction sizes as well as time-dependent covariates for future marketing activity. We use logistic regression models to estimate transition probabilities and show how to estimate expected future LTV by traversing a binary tree. Predictions are also compared with estimates from the Pareto/NBD model and other popular models. We analytically study some statistical properties of the estimates from this model.

References

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