Dynamic changepoints re-revisited: A generalization of the evolving process model

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Abstract

Prior research has introduced dynamic changepoint models in the area of new product forecasting. To capture the dynamics of a non-stationary timing processes, two different models were proposed, one based on the exponential, the other on the Erlang-2 interpurchase time distribution. The evolving process model (EPM) is a complementary approach, which models a purchase process evolution from the more random exponential to the more regular Erlang-2 process. This paper improves the EPM by likewise allowing for only one changepoint, but relaxing the assumptions of (1) a default development direction and (2) the parameter value concerning purchase regularity. By specifying two successive gamma processes with different shape parameters, the proposed model generalizes the EPM to additionally account for alternative behavioral evolution patterns. The empirical analysis of two datasets demonstrates a superior performance on model fit and prognostic power.

Keywords: *changepoint model; gamma process; purchase forecasting*

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