

# Online Change Point Detection via Copula Based Markov

## Models

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### Abstract

The time series analysis is a critical issue in the varied fields such as finance, industry, and biology. However, due to the possibility of the structure change, the corresponding damage or loss can be expected. See the stock market during the financial crisis in 2008 and also the COVID-19 in 2020 for instance. Hence, the change point detection for structure change is worth to discuss and study. In particular, based on the feature of data in finance, the online change point detection is an important problem in order to obtain the suitable price for derivatives or investment strategies. To detect the change point online for time series data or correlated date, we propose the model for online change point detection via copula based Markov models where the time serial data is described by copula based Markov model and the change point detection based on the run length distribution using the Bayesian approach. Finally, the performance of the proposed method is illustrated through numerical and empirical studies.

Keywords: Online detection, change point, copula, Markov model