



Bayesian forecasting of multivariate time series: scalability, structure uncertainty and decisions

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Abstract

I discuss recent research advances in Bayesian state-space modeling of multivariate time series. A main focus is on the “decouple/recouple” concept that enables application of state-space models to increasingly large-scale data, applying to continuous or discrete time series outcomes. Applied motivations come from areas such as financial and commercial forecasting and dynamic network studies. Explicit forecasting and decision goals are often paramount and should factor into model assessment and comparison, a perspective that is highlighted. The Akaike Memorial Lecture is a context to reflect on the contributions of Hirotugu Akaike and to promote new areas of research. In this spirit, this paper aims to promote new research on foundations of statistics and decision analysis, as well as on further modeling, algorithmic and computational innovation in dynamic models for increasingly complex and challenging problems in multivariate time series analysis and forecasting.

Keywords Bayesian forecasting · Bayesian model emulation · Decision-guided model assessment · Decouple/recouple · Dynamic dependency networks · Integer count time series · Multi-scale models · Network flows · Simultaneous graphical dynamic models · Time series monitoring

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