Department of Decision Sciences

Statistics Seminar

Bayesian Modeling and Analysis of Multivariate Time Series of Counts

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Thursday, 11th February 2016
12:30pm Room 3-E4-SR03 Via Rontgen 1 Milano

Abstract

We consider modeling of multivariate time-series of correlated counts which often arise in finance, operations and marketing applications. Dependence among series arises as a result of sharing a common environment. We consider a class of multivariate Poisson time series models by assuming a common environmental process modulating the rates of the individual series. This setup gives us a class of dynamic multivariate negative binomial time series. We develop Bayesian inference for these models using particle filtering and Markov chain Monte Carlo methods. A by-product of particle filtering in our set up is predictive likelihoods which we refer to as multivariate confluent hyper-geometric negative binomial distribution. We discuss issues of sequential filtering, smoothing and prediction and illustrate the proposed models using a simulated data set as well as actual data on weekly household shopping trips.

Joint work with Tevfik Aktekin, University of New Hampshire and Nicholas, G. Polson, University of Chicago.

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