R. Clifton Bailey Statistics Seminar Series

Modeling of Multivariate Time Series of Counts: A Bayesian Perspective

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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 hypergeometric negative binomial distribution. We develop 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. We also discuss extensions to other multivariate non-Gaussian time-series.

Bio: Refik Soyer is professor of decision sciences and of statistics at the George Washington University (GW). He is the Mitch Blaser Distinguished Scholar in Business Analytics. He also serves as the director of the Institute for Integrating Statistics in Decision Sciences at GW. He received his DSc in operations research from GW, MSc in operational research from the University of Sussex, England and BA in economics from Bogazici University, Turkey. His area

of interests are Bayesian statistics and decision analysis, stochastic modeling, statistical aspects of reliability analysis, and time series analysis. He has published over 100 articles and directed or co-directed 13 doctoral dissertations. His work has appeared in journals such as Journal of the American Statistical Association, Journal of the Royal Statistical Society, Ser. B., Technometrics, Biometrics, Journal of Econometrics, Statistical Science, International Statistical Review, Annals of Applied Statistics and Management Science. He has also co-edited a volume titled Mathematical Reliability: An Expository Perspective. His research was supported by Army Research Office, National Science Foundation and Office of Naval Research. Soyer is an elected member of the International Statistical Institute, Fellow of the Turkish Statistical Association and a Fellow of the American Statistical Association. He was a vice president of the International Association for Statistical Computing. He served on the editorial board of the Journal of the American Statistical Association and is currently an associate editor of the Applied Stochastic Models in Business and Industry.