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Nested Autoregressive Processes for MPEG Encoded Video Traffic Modeling

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Abstract

This talk will present a new traffic model for MPEG encoded video sequences. The hybrid Gamma/Pareto distribution is used for all three types of frames in MPEG encoded video sequences and the present model takes scene changes into account. The autocorrelation structure is modeled using two second-order autoregressive (AR) processes nested with each other. One AR process is used to generate the mean frame size of the scenes to model the long-range dependence and another AR process is used to generate the fluctuations within the scenes to model the short-range dependence. The parameters of the AR processes are estimated from measurements of empirical video sequences. Simulation results show that the present model captures the autocorrelation structure in the empirical traces at both small and large lags. The MPEG traffic model developed is then used to in predicting queuing performance of single and multiplexed MPEG video sequences at an Asynchronous Transfer Mode multiplexer. Comparison study shows that the present model provides accurate prediction for quality of service measures such as cell loss ratio under different traffic loads and various buffer sizes.

About the Speaker

Derong Liu received the Ph.D. degree in electrical engineering from the University of Notre Dame in 1994. He is now an Assistant Professor of at the University of Illinois at Chicago. He has coauthored two books “Qualitative Analysis and Synthesis of Recurrent Neural Networks” (Marcel Dekker, 2002) and “Dynamical Systems with Saturation Nonlinearities: Analysis and Design" (Springer-Verlag, 1994).