ESTIMATION IN PARTITION MARKOV MODELS

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TALK 1: A COPULA-BASED PARTITION MARKOV PROCEDURE

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The number of parameters needed to specify a discrete multivariate Markov chain grows exponentially with the order and dimension of the chain. On a model selection procedure, the order of each candidate model is limited, usually bounded by log_{|A|}(n) where |A| is the size of A, alphabet of the chain and n is the size of the dataset. When the dataset is not large enough, the model selection procedure produces a model with an order smaller than the order of the process which generates the data. Depending on the law of the process, the information loss about the long dependence can be significant. This problem comes from a range of phenomena cited as the curse of dimensionality. In order to solve this problem, in this paper we introduce a strategy to estimate a multivariate process. Through the new strategy the estimated order will be greater than the order achieved using standard statistical procedures. We apply the partition Markov models, which is a family of models, where each member is identified by a partition of the state space. The procedure consist in obtaining a partition of the state space that is constructed from a combination of the partitions corresponding to the marginal processes of the multivariate chain, and the partition corresponding to the multivariate Markov chain. Finally the conditional probabilities are derived from the combination of the marginal estimations through the copula of the joint estimation. This is a joint work with M. Fernández and J. García.

TALK 2: COPULA-BASED ANALYSIS OF RHYTHM

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In this paper we establish stochastic profiles of the rhythm for three languages: English, Japanese and Spanish. We model the increase or decrease of the acoustical energy, collected into three bands coming from the acoustic signal. The number of parameters needed to specify a discrete multivariate Markov chain grows exponentially with the order and dimension of the chain. In this case the size of the database is not large enough for a consistent estimation of the model. We apply a strategy to estimate a multivariate process with an order greater than the order achieved using standard procedures. The new strategy consist on obtaining a partition of the state space which is constructed from a combination, of the partitions corresponding to the three marginal processes, one for each band of energies and the partition corresponding to the multivariate Markov chain. In order to estimate the transition probabilities, all the partitions are linked using a copula. Joint work with J. García and V.A. González-López.