Association des Doctorants du campus STIC

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Wavelet Transform Scalable Video Coding with Optimal Motion Estimation

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Abstract. This talk is about a simple yet efficient scalable scheme for wavelet-based video coders, able to provide on-demand spatial, temporal, and SNR scalability, and fully compatible with the still-image coding standard JPEG2000. Whereas hybrid video coders must undergo significant changes in order to support scalability, our coder only requires a specific wavelet filter for temporal analysis. Our study shows that scalably encoded sequences have the same or almost the same quality than non-scalably encoded ones, without a significant increase in complexity. Competitive performances are assured by a novel motion estimation scheme, which takes into account the specificity of the wavelet-based video coding, and by an optimal bit allocation procedure based on models of rate-distortion curves.
Finally full compatibility with Motion JPEG2000, which tends to be a serious candidate for the compression of high-definition video sequences, is ensured.

References

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Tensor-Based Blind Identification of Multiuser Nonlinear Channels Using Markov Signals

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Abstract. In this work, a channel identification technique using Markov-like input signals and Second Order Statistics (SOS) is proposed for multiuser nonlinear communication channels. The considered channel is modeled as a memoryless Multiple-Input-Multiple-Output (MIMO) Volterra filter. This kind of nonlinear models has important applications in the field of telecommunications, e.g. to model uplink channels in Radio Over Fiber multiuser communication systems. State-dependent modulation codes (constrained codes) allow to model the transmitted signals as Discrete Time Markov Chains (DTMC). They are used to introduce temporal correlation and to ensure the orthogonality of products of the transmitted signals for several time delays, allowing the construction of a Parallel Factor (PARAFAC) third order tensor formed from spatio-temporal covariance matrices. The redundancy provided by the codes introduces temporal correlation in a controlled way, in order that the transmitted signals verify some statistical constraints associated with the channel nonlinearities. Identifiability conditions for the problem under consideration are addressed and simulation results illustrate the performance of the proposed estimation method.

Notes

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Les séminaires des doctorants STIC permettent aux futurs docteurs d'échanger leurs expériences dans leur travail de thèse, tant sur le plan scientifique que sur le plan professionnel et éducatif. Ces rencontres ont lieu mensuellement dans l'un des laboratoires STIC de Sophia Antipolis.

Un séminaire est l'occasion de deux à quatre interventions. Chaque intervention comporte un exposé technique d'une vingtaine de minutes suivi d'une période d'échanges et de retours d'expérience d'une dizaine de minutes.

Ces actes compilent les résumés en anglais des exposés techniques du séminaire doctorant du 25 octobre 2007.

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