



## Image Compression by Microtexture Synthesis

By Johannes Ballé

Shaker Verlag Nov 2012, 2012. Buch. Condition: Neu. Neuware - Further compression gains beyond the state of the art in image coding are difficult to achieve when the pixel fidelity paradigm is retained. It is necessary to find an image representation that addresses the definitions of 'irrelevance' and 'redundancy' in a way that is closer to human perception. In this thesis, linear random field models, and specifically Gauss-Markov Random Fields, are investigated as models of microtexture. It turns out that they have an interpretation with respect to information theory, but also with respect to feature detection in the human visual cortex. The properties of Gaussian random fields allow to replace the common segmentation-classification approach of previous methods with a conceptually simple and elegant statistical testing framework. This gives rise to a unique structure-texture decomposition, thus avoiding problems of over- or under-segmentation. A hybrid coding system is designed which encodes texture content by a synthesis approach. Results are evaluated for a set of established test images using objective metrics which are verified using visual experiments. The presented coding system is able to provide up to 35% of bitrate savings for natural images compared to a state-of-the-art reference codec, and more than...



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