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Texture synthesis using local Gaussian patch models

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Exemplar based texture synthesis is the process of generating, from an input texture sample, new texture images that are perceptually equivalent to the input. We propose the use of local Gaussian patch models to generate new texture images. This technique combines the positive aspects from statistics-based methods and from non-parametric patch-based methods. The self-similarities of a given input texture are modeled with conditional multivariate Gaussian distributions in the patch space. A new image is generated patch-wise as samples from Gaussian distributions inferred from the nearest neighbors in the patch space of the input sample. The synthesized textures are therefore everywhere different from the original. In general, the results obtained are visually superior to those obtained with statistics-based methods and comparable to the visual results obtained with the non-parametric patch-based methods. Since texture images usually have details at different scales, we extend the method to a multiscale approach which reduces the strong dependency of the method on the patch size. We finally use these results as guide textures for texture synthesis based on the statistics-based method of Portilla and Simoncelli [1]. In this way we achieve a faithful representation of the global statistics of the input texture images.

Références

- [1] J. PORTILLA AND E.P. SIMONCELLI, *A Parametric Texture Model based on Joint Statistics of Complex Wavelet Coefficients*, International journal of computer vision, 2000.

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