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**OBERSEMINAR**
**BILDVERARBEITUNG, COMPUTERSEHEN UND COMPUTERGRAPHIK**

Prof. Dr. Tamas Sziranyi (MTA SZTAKI Budapest und Universität Veszprem)

**Cellular Neural Networks and Parallel Processing Theory and Methods**

**Abstract.** I present a new super-fast fully-parallel single-chip image analyser based on the Cellular Neural Network (CNN) architecture. Exploiting the dynamics of a locally interconnected 2-D cell array of CNNs we have developed a theoretically new method for image classification and segmentation. This technique differs from other convolution-based feature extraction methods since we utilize feedback convolution as well. For the designing of processing kernels we apply new methods for fully-parallel image analysis. For difficult nonlinear cases we use a genetic learning algorithm to determine the optimal kernel matrices of the network. The CNN operators we have found sometimes may combine different early vision effects. I show how the kernel matrices can be derived from the state equations of the network for convolution/deconvolution and nonlinear effects.

I present experimental results of texture classification and segmentation, image deconvolution, anisotropic diffusion, orthogonal decomposition and MRF segmentation using digital CNN simulation with sensitivity analysis for rubustness, noise, rotation, and scale. I also report a tested application of texture recognition performed on a programmable 22*20 CNN chip with optical inputs and an execution time of a few microseconds.

Zeit: **Dienstag, den 01. 07. 1997, 16.15 Uhr**
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Interessenten sind herzlich willkommen. Weitere Informationen bei Raouf Hamzaoui

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