Informatik-Kolloquium

Rheinisch-Westfälische Technische Hochschule Aachen
Lehrstuhl für Informatik VII

RWTH

EINLADUNG

Zeit: Donnerstag, 18. Juli 2002, 17.00 Uhr

Ort: AH I, Ahornstr.55

Referent: Dr. H. Jaeger, Frauenhofer Institut für Autonome Intelligente Systeme, Sankt Augustin

Titel: The "echo state" approach to analyzing and training recurrent neural networks

Abstract:

The talk introduces a new approach to the supervised training of recurrent neural networks, "echo state networks" (ESN). ESNs are characterized by two properties: (1) a large "echo state" recurrent neural network is used as a "reservoir" of complex dynamics; this network is not changed by learning; (2) only the weights of connections from the echo state network are learnt. The basic mathematical idea is sketched. The training algorithm solves a linear task, which makes it possible to exploit standard linear regression techniques for offline learning and standard adaptive linear algorithms (like LMS or RLS) for adaptive nonlinear system identification. An important aspect of ESNs is their long trainable short term memory span. Memory depths of 100 time steps are easily accessible and can be exploited to identify nonlinear systems with long memory spans. Numerous examples are presented, e.g. chaotic time series prediction, stochastic sequence modeling, dynamic feature detection for robots, adaptive identification of a 30th order nonlinear system, and nonlinear control.

Es laden ein: Die Dozenten der Informatik