ISCI Seminar Series 2006



Speaker: Dr. Yi Zhao Time: 2:00 pm - 4:00 pm, Sep. 21th, 2006 Venue: A103, LiZe Building

Modeling nonlinear dynamics with applications

Over-fitting has long been recognized as a problem endemic to models with a large number of parameters. The usual method of avoiding this problem in neural networks is to avoid fitting the data too well. In our research project we propose an alternative information theoretic criterion to determine the number of neurons in the optimal model. When applied to the time series prediction problem we find that models, which minimize the description length of the data, both generalize well and accurately capture the underlying dynamics.

The optimal neural network based on the estimation of the minimum description length and the surrogate data method are then combined to apply to human cardiac systems. The experimental results present that pulse waveform measure on the lateral arterial artery (wrist) is equivalent to pulse measure on the fingertip, and pseudo-periodic determinism exists in both ECG and pulse time series but human ECG and pulse data do not conform to the same deterministic process. The human ECG data might provide additional information of the human body than the pulse.

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