模型参数联合求解的网络流量混沌预测

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摘 要：流量预测是网络管理的基础，为了提高网络流量的预测精度，考虑模型参数之间的相互影响，提出一种模型参数联合求解的网络流量混沌预测模型. 首先收集网络流量历史数据，采用混沌理论对历史数据进行重构，并确定模型参数范围，然后运用遗传算法模拟自然界的"适者生存、优胜劣汰"机制对模型参数进行联合求解，根据最优个体得到模型的最合理参数. 最后根据最合理参数对网络流量训练样本进行学习，建立网络流量预测模型，并采用仿真实验对模型的性能进行对比分析. 结果表明，此模型通过混沌理论可以有效挖掘历史数据中的网络流量变化特点，通过参数联合求解建立了精度高的网络流量预测模型，为非线性网络流量预测提供了一种新的建模思路.

关键词：网络流量；混沌理论；最小二乘支持向量机；径向基核函数；参数优化
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Network Traffic Chaotic Forecasting Based on Jointly Solving Forecasting Parameters of Model

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Abstract: Network traffic forecasting is the basis of network management, in order to improve the network traffic forecasting precision, considering the mutual influence between parameters of model, so this paper put forward a network traffic chaos forecasting model based on jointly solving forecasting parameters of model. Firstly, network traffic history data are collected and use chaotic theory reconstruct historical data, and determine the scope of the model parameters, and secondly, genetic algorithm is used to determine most reasonable parameters according to optimal individuals based on nature "the survival of the fittest, superior bad discard" mechanism, finally, the most reasonable parameters are used to establishing network traffic forecasting model by using training sample of network traffic, and the simulation experiments is used to analyze performance of the mode. Results show that the proposed model can accurately mine network traffic network flow change characteristics among historical data by chaos theory and get high forecasting accuracy of network traffic forecasting, it provides a modeling tool for nonlinear network traffic forecasting.

Key words: Network traffic; Chaos theory; Least squares support vector machine; radial basis kernel function; Parameter optimization

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