

小波分析和相关向量机的网络流量混沌预测

黄 震, 蔡昭权, 钟锡武

(惠州学院 计算机科学系, 广东 惠州 516007)

摘 要: 针对网络流量的混沌特性和传统预测模型的不足, 提出了一种小波分析和相关向量机的网络流量预测模型. 首先采用小波分析对原始网络流量进行处理, 得到不同尺度的网络流量分量, 然后对各分量进行相空间重构, 并利用相关向量机进行建模, 得到各分量的预测结果, 最后采用对分量预测值进行组合, 并采用网络流量数据集进行仿真实验. 与其他模型进行对比测试的结果表明, 此模型可以从多个尺度对网络流量特性进行描述, 预测结果要优于其他模型.

关键词: 网络流量; 相关向量机; 小波分析; 混沌理论

Network Traffic Forecasting Based on Wavelet Analysis

and Relevance Vector Machine

HUANG Zhen, CAI Zhao-quan, ZHONG Xi-wu

(Department of Computer Science, Huizhou University, Huizhou 516007, China)

Abstract: Aiming at chaotic characteristics of network traffic and the shortage of traditional forecasting models, In order to improve forecasting accuracy of network traffic, a new network traffic prediction model based on chaos theory, wavelet analysis and relevance vector machine is proposed in this paper. Firstly, wavelet analysis is used to decompose the network traffic and the components of different frequency characteristics are obtained, and secondly, phase space reconstruction of components is carried out by using chaos theory, lastly, wavelet analysis is used to combine and get the final results of network traffic and network traffic is used to do simulation experiment. The results show that the compared with other models, the proposed model can accurately reflect the chaotic characteristics of the network traffic, and obtain the higher accuracy of the prediction results.

Key words: network traffic; relevance vector machine; wavelet analysis; chaotic theory

作者简介:

黄 震 男, (1980-), 硕士, 讲师. 研究方向为无线传感器网络、智能算法. E-mail: 195146501@qq.com.

钟锡武 男, (1993-). 研究方向为 Zigbee 无线传感器网络.