A Spatial Information Network Traffic Prediction Method Based on Hybrid Model

Authors : Jingling Li, Yi Zhang, Wei Liang, Tao Cui, Jun Li

Abstract : Compared with terrestrial network, the traffic of spatial information network has both self-similarity and short correlation characteristics. By studying its traffic prediction method, the resource utilization of spatial information network can be improved, and the method can provide an important basis for traffic planning of a spatial information network. In this paper, considering the accuracy and complexity of the algorithm, the spatial information network traffic is decomposed into approximate component with long correlation and detail component with short correlation, and a time series hybrid prediction model based on wavelet decomposition is proposed to predict the spatial network traffic. Firstly, the original traffic data are decomposed to approximate components and detail components by using wavelet decomposition algorithm. According to the autocorrelation and partial correlation smearing and truncation characteristics of each component, the corresponding model (AR/MA/ARMA) of each detail component can be directly established, while the type of approximate component modeling can be established by ARIMA model after smoothing. Finally, the prediction results of the multiple models are fitted to obtain the prediction results of the original data. The method not only considers the self-similarity of a spatial information network, but also takes into account the short correlation caused by network burst information, which is verified by using the measured data of a certain back bone network released by the MAWI working group in 2018. Compared with the typical time series model, the predicted data of hybrid model is closer to the real traffic data and has a smaller relative root means square error, which is more suitable for a spatial information network.
Keywords : spatial information network, traffic prediction, wavelet decomposition, time series model
Conference Title : ICCT 2019 : International Conference on Communication Technology
Conference Location : Paris, France
Conference Dates : August 27-28, 2019