

基于改进的路网聚类结合 PSOWNN 的交通流预测

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摘要: 针对城市路网交通流数据的空间相关性、非线性和平稳与非平稳的特点, 提出一种采用基于交通流量数据相关性分析改进的路网聚类算法与基于交通流量分段加权适应度函数的粒子群小波神经网络算法(MC-MPSOWNN)相结合的预测方法, 来提高算法的预测精度. 首先, 利用基于交通流量数据相关性分析的路网聚类算法筛选出空间中与预测点交通流量数据相关系数高的其他观测点, 以此精简了样本输入数据, 减少冗余数据对预测精度的干扰, 提高整体预测精度; 其次, 再构建一种新型的粒子群算法的适应度函数, 给予整体预测样本中非平稳数据段更大的调节力度, 以此来进一步提高非平稳数据段的预测精度. 最后经实验结果分析, 提出的改进预测算法相比未进行改进前预测算法而言, 明显提高了整体及非平稳数据段预测精度, 达到较好的预测效果.

关键词: 交通流预测; 相关性路网聚类; 分段加权适应度函数; 粒子群算法; 小波神经网络

Traffic flow prediction based on improved road network clustering combined with PSOWNN

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Abstract: Aiming at the spatial correlation, nonlinearity and stationary and non-stationary characteristics of urban road network traffic flow data, this paper proposes a prediction method based on the improved traffic network data clustering algorithm based on traffic flow data correlation analysis and wavelet neural network algorithm based on traffic flow segmentation weighted fitness function particle swarm optimization algorithm(MC-MPSOWNN), to improve the prediction accuracy of the algorithm. Firstly, the road network clustering algorithm based on traffic flow data correlation analysis is used to screen out other observation points with high correlation coefficient between the traffic and the predicted traffic flow data, so as to simplify the sample input data and reduce the accuracy of the redundant data. Interference, improve overall prediction accuracy. Secondly, a new particle swarm algorithm fitness function is constructed to give greater adjustment of non-stationary data segments in the overall prediction sample, so as to further improve the prediction accuracy of non-stationary data segments. Finally, the experimental results show that the improved prediction algorithm proposed in this paper improves the convergence speed of the algorithm compared with the pre-predictive algorithm. It also improves the prediction accuracy of the whole and non-stationary data segments and achieves better prediction results.

Key words: traffic flow forecast; correlation road network clustering; improved particle swarm optimization; wavelet neural network

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