传感技术学报
中国微米纳米技术学会
全国高校传感技术研究会 主办

WSN中基于加速动态时间弯曲的异常数据流检测

作　者：刘瑞琴, 刘学军

单　位：南京工业大学

基金项目：国家自然科学基金

摘　要：

在无线传感器网络下，进行分布式系统下数据流时间序列的离群检测研究，对实际生活中的火灾检测、欺诈、入侵检测和金融分析等诸多领域都有非常重要的作用。本文先对序列进行标准化，再利用动态时间弯曲距离进行序列间离群检测，较大地提高了检测的精度。同时针对DTW的计算复杂度瓶颈问题，加入了提前终止的思想，并利用多级判断来进一步提速。通过NS2仿真实验，验证了本文所提出的分布式系统下离群序列的加速检测方法既节省了能量消耗，又保持了较高的检测准确率和速度。

关键词：无线传感器网络;离群数据;动态时间弯曲;时间序列;数据流

Abnormal Data Stream Detection Based On accelerating DTW in WSN

Author's Name:

Institution:

Abstract:

In wireless sensor network, abnormal time series sequence detection under distributed system plays a very important role in many areas in real life such as fire monitoring, fraud, intrusion detection and financial analysis. This paper firstly does Z-normalization for the sequences, then uses dynamic time warping to detect outliers, which largely improves the accuracy of detection. Meanwhile, to solve the bottleneck of computational complexity of DTW, the paper is added the early abandoning and multistage judgment to accelerate the DTW algorithm. The algorithm was verified by NS2 simulator. The results demonstrate that this algorithm not only decreases the energy consumption, but also keeps a high precision and time efficiency.

Keywords: Wireless Sensor Network; outlier data; Dynamic Time Warping; time series; Data stream

投稿时间：**2013-03-06**

查看pdf文件