大规模无线传感器网络数据收集与处理系统设计

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摘　要：

数据收集与处理是无线传感器网络应用系统的重要组成部分。本文给出了一种集传感器数据实时收集、信息提取与存储、以及在线发布功能的系统设计方案，汇聚至Sink结点的传感数据由上位机收数模块采用独立线程进行批量收取、拆分、错误检测、翻译等处理后存入关系数据库，基于B/S模式提供了网络拓扑结构和多元时空数据的交互式可视化远程监测。实验表明，系统在实时性、可靠性和可用性方面满足大规模长期部署的无线传感器网络应用需求，其通用灵活的设计架构具有较高的可移植性和可扩展性。

关键词：无线传感器网络；数据收集与处理；关系模式设计；浏览器/服务器模式；可视化

A Large-scale Data Collection and Processing Framework for Wireless Sensor Networks

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Abstract:

Data collection and processing is an important component of wireless sensor network applications. In this work, we introduce a new system design framework that includes real-time large-scale sensor data collection, information extraction, storage and online publishing. In our framework, the sensor data gathering to sink node are first real-time batch processed by using an independent thread; and then the data are stored in relational databases specially designed; finally, the network topology and multivariate spatio-temporal data visualization are provided based on B/S mode for interactive remote monitoring. Experimental result in large-scale and long-term WSN scenario proves that the framework has advantages of flexibility of deployment, high efficiency, facility and reliability for data collection and processing.

Keywords: wireless sensor networks; data collection and processing; relational schema design; B/S; visualization

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