

基于WSN的分布式城市噪声监测系统设计

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摘要:

针对城市环境中的噪声监管问题设计了基于无线传感器网络(WSN)的多节点分布式噪声监测系统。与以往的噪声信号采集系统相比较,基于WSN的噪声监测系统解决了信号采集困难、布线复杂、维修繁琐等问题。城市环境中丰富的供电线路配合太阳能电池板可为无线节点持续工作提供所需的能量。WSN通信在TinyOS环境下采用nesC语言设计开发。在LabVIEW环境下实现了WSN网关节点与主机通信,设计了人机交互监测显示面板,同时与城市地图数据库相连,以三维等高图的形式实时显示监测范围内的噪声强度分布。系统在实验室环境下进行了噪声信号监测实验,实验结果表明系统设计合理、结果正确。

关键词: 无线传感器网络; 城市噪声监控; TinyOS; LabVIEW

Design of distributed city noise monitoring system based on Wireless Sensor Network

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Abstract:

A multi-nodes distributed noise monitoring system based on wireless sensor network (WSN) is proposed in this paper to solve the noise monitoring problem in the city. Compared with the conventional noise data acquisition system, it solves the problem of difficult data acquisition, complex wiring and maintenance. The city environment rich supply lines or solar batteries meet the energy requirement of wireless nodes' sustained working. The nesC language is used to design the WSN communication in TinyOS environment. LabVIEW is applied to achieve communication between WSN gateway and host PC and moreover, human-computer interaction panel is completed. With a link to the city map database, 3-D distributed city noise contours can be dynamically displayed in real-time. This system was tested under laboratory environment; the experimental results are correct and show this system was reasonable.

Keywords: Wireless Sensor Network (WSN); city noise distributed monitoring; TinyOS; LabVIEW

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