

精准灌溉系统无线传感器网络休眠技术研究 Dormant of Wireless Sensor Networks for Precision Irrigation

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摘要: 结合精细农业应用需求,对传感器网络中常用的节点供电方式及其特点进行了分析。为延长普通干电池供电的节点寿命,基于节点能耗分析,提出了应用层主导的节点休眠/同步机制,并提供了根据节点期望寿命与数据采集需求计算空占比的方法。最终在实际传感器网络节点上实现了休眠/同步机制,并在国家农业信息化工程技术研究中心的小汤山农业基地进行大量实验,无休眠设计寿命约150h的节点采用休眠技术后节点寿命可达到1年以上。

According to the requirements for precision agriculture applications, the commonly-used node power supply in sensor networks and its characteristics are analyzed. To extend the node lifecycle powered by ordinary dry-cell batteries, an application layer operated node dormant/synchronization mechanism is proposed and a duty cycle computing method depending on the node lifecycle expectation and data acquisition demands is also provided, based on the node energy analysis. Finally, this dormant/synchronization mechanisms is realized on actual sensor networks nodes, and a large number of experiments were executed at Xiaotangshan agricultural bases of the National Engineering Research Center for Information Technology in Agriculture. The experimental results show that the node with dormant design increases its lifetime from about 150 hours to more than one year.

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