

面向精细农业的土壤温度监测传感器节点设计 Smart Sensor Nodes for Wireless Soil Temperature Monitoring Systems in Precision Agriculture

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关键词: 精细农业 土壤温度 传感器节点 无线传感器网络 ZigBee

摘要: 设计了一种能够监测土壤温度的无线智能传感器节点, 硬件系统基于片上系统CC2430和DS18B20进行开发, 软件部分包括温度采集和数据传输。实验表明, 该节点可以实现土壤温度信息的采集和传输, 且结构紧凑、工作稳定和功耗低。节点之间有效通信距离可达80m, 误码率为1%左右。可以满足精细农业作业要求, 同时也为无线传感器网络通信协议的进一步研究提供了实验平台。 A new smart sensor node to monitor soil temperature, including hardware and software, is developed through modular method. The hardware system is developed based on a CC2430 micro-controller and DS18B20. The software system includes the temperature collection and information transmission. The results show that the node can collect soil temperature data and then send the data to the upper network node. This node possesses compact structure, stable performance and low energy consumption. The effective communications distance among nodes reaches 80m and the error ratio is approximately 1%, which meets the requirement of precision agriculture. The node provides a better hardware platform for further study on the communication protocols of wireless sensor networks.

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