温室无线传感器网络监控系统的事件驱动调度器 Event-driven Scheduler in Monitoring and Controlling System for Greenhouse Based on Wireless Sensor Networks

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关键词： 温室 无线传感器网络 事件驱动调度器 反馈控制

摘 要： 针对基于无线传感器网络构建的温室环境监控系统的整体性能受时变传输延时、丢包、网络拥塞、延时抖动等不利网络属性的影响，提出一种采用事件驱动机制的反馈调度策略。该反馈调度策略以截止期错失率作为网络服务质量性能评价指标，针对传感器节点和汇聚节点间的数据传输，利用反馈控制技术在线调整各个传感器节点的采样周期，使传感器节点的带宽要求适应网络负载的动态变化，从而保证网络服务质量维持在一定水平；在此基础上，引入新型的事件驱动机制来降低反馈调度策略设计难度和资源消耗。实验表明，该事件驱动反馈调度策略合理、有效并实用。 In order to reduce the adverse impact of network time-varying delay, packet loss, network congestion, jitter and other properties on performance of the monitoring and controlling system for greenhouse environment based on wireless sensor networks, the event-driven feedback scheduling strategy was proposed. The basic idea of the proposed event-driven feedback scheduling strategy was to use deadline miss ratio as the indicator for the network quality of service, adjust the sampling period of each sensor nodes by means of feedback control technology at run time such that the bandwidth requirement of each sensor nodes could adapt the change of the network workload, and the quality of network service could be maintained at a certain level. The novel event-driven invocation mechanism for the feedback scheduler was adopted to reduce the design difficulty and overhead of the feedback scheduler. Experiments indicated the proposed event-driven feedback scheduling strategy was with rationality, effectiveness and practicability.

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