

无源感知系统中的能量管理和通信优化研究

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摘 要: 可计算无线射频识别 (CRFID) 标签与阅读器通信过程中, 常因能量不足以执行完所有任务, 导致任务错过截止期, 大量数据传输失败, 造成时间和能量的浪费. 针对这一问题, 建立了 CRFID 标签的能量接收和消耗模型, 提出可预测能量的任务调度算法 PE-EDF. 该算法将能量管理和任务调度相结合, 大大减少了数据传输失败的概率, 可靠性至少提高 55%. 又针对阅读器和多个 CRFID 通信过程中存在的冲突问题, 通过求解阅读器最佳停留位置, 提出无碰撞通信算法 CFC, 使得总通信时间减少 25%, 优化二者之间通信碰撞.

关键词: 可计算无线射频识别; 能量管理; 能量预测; 任务调度; 通信碰撞

The research on energy management and communication

optimization in passive sensing system

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Abstract: In the process of communication between CRFID and reader, if the energy is insufficient, the task may miss the deadline, and large amounts of data transmission fails, resulting in waste of time and energy. In response to this problem, this paper established the energy receiving and consumption model of WISP tags, and then proposed a predictive energy task scheduling algorithm called PE-EDF. The algorithm combined energy management with task scheduling, greatly reducing the probability of data transmission failure, and improving reliability by at least 55%. Further, we considered the conflicts between a reader and multiple CRFIDs, and proposed corresponding Collision-Free Communication algorithm called CFC based on optimize the stop position of the reader. The total communication time is reduced by 25%, which greatly optimizes communication conflict.

Key words: CRFID; energy management; energy prediction; task scheduling; communication conflict

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