

基于精细化梯度的水分传感器网络能量高效查询算法Energy-efficient Query Algorithms for Moisture Sensor Networks Based on Fine-grain Gradient

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摘要: 在分析现有无线传感器查询算法基础上, 借鉴了数据融合树以及位置辅助查询的思想, 提出一种基于精细化梯度的能量有效动态水分传感器网络查询算法EEQA-FGG。EEQA-FGG包含了查询路由生成、查询执行流程及查询异常处理3个算法的详细设计, 同时模拟分析了不同规模下区域和全网查询运行情况, 并与融合树、位置辅助等方案进行了比较。仿真显示, EEQA-FGG算法可以有效降低网络能耗、均匀网络负载、延长网络生命周期, 尤其在区域查询中, EEQA-FGG的生命周期可比SPT和Compass方案延长10%~50%, 特别适合大规模农田监测数据查询方案。 On the basis of the existing query algorithms in wireless sensor networks, with the target to extend the life cycle, the energy-efficient query algorithms for moisture sensor networks based on fine-grain gradient (EEQA-FGG) was proposed by binding the excellent idea of the aggregation tree with location-assisted querying. Further more, three sub-modules of EEQA-FGG about query routing, query processing, and query unconventionality processing were designed in detail. The EEQA-FGG in regional query and whole network query from small to ultra-large-scale network was simulated, and was compared with aggregation tree query and location-assisted query. Simulation shows that EEQA-FGG can effectively reduce energy consumption, uniform network load and extend network life cycle, and it is especially suitable for large-scale farmland monitoring data query. Particularly in regional query, the life cycle of EEQA-FGG is longer than SPT querying and Compass querying by 10% to 50%.

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