

基于预测模式蚁群优化的传感网节能路由机制

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摘要:

论文面向传感器网络中时间序列数据的时域关联性特征, 针对网内数据流量不均衡分布模式所导致的传输能量浪费问题, 提出了基于预测模式的能量感知数据路由机制。机制的设计结合了蚁群优化机理自适应网络状况动态性的优势和预测模型揭示数据流量变化规律的优势, 通过将节点负载因子引入蚁群优化算法中启发式因子的构造和局部信息素更新规则的设计, 赋予蚂蚁代理在路由解空间探索中预知网络局域能量状况的能力, 提高了数据路由构建的自适应性和能量均衡性。实验表明, 论文提出的面向预测模式的路由机制, 通过引入蚁群优化机理和挖掘数据内涵的时域关联性, 有效地降低和均衡了数据路由能耗。

关键词: 传感器网络 预测模式 蚁群优化 数据路由 节能机制

The prediction-mode routing mechanism based on ACO in WSN

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Abstract:

The paper proposes prediction-based energy-aware routing mechanism to solve the problems of energy waste and funnel effect, which are caused by imbalanced flow distribution mode, according to the characteristic of temporal correlation on time series data in wireless sensor networks (WSN). The design of routing mechanism combines the advantages of ACO principle, which is self-adaptive to dynamic network situation, and the advantages of prediction module, which reveals the law of data flow change. By introducing node-load-factor into both construction of heuristic factor and design of local pheromone updating rule, ant agents are endowed with perception ability of local energy status in WSN, the self-adaptability and energy-cost-balance of routing construction are finally improved. The experiment shows that the above energy-saving mechanism effectively reduces and balances the energy cost of data routing by mining the temporal associability and introducing ACO.

Keywords: Wireless Sensor Networks, Prediction mode, ACO, Data routing, Energy-Saving Mechanism

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