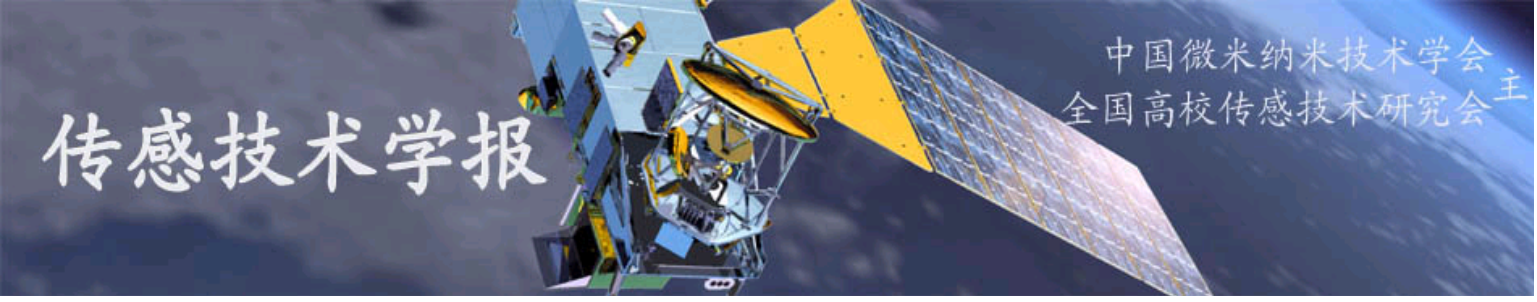

基于灰色模型的无线传感器网络动态功耗管理研究

作　者：魏海龙, 李迅波, 沈艳, 张海

单　位：电子科技大学

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摘　要：

传感器节点能量受限是制约无线传感器网络使用寿命的关键因素，为了节约传感器网络的能量，提出了灰色模型的动态功耗管理（DPM）方法。该方法利用传器节点上的历史数据应用灰色模型预测未来值，预测过程中可以动态调整预测参数，实现自适应预测，和小波自回归预测算法相比，提高了预测的准确性。基想是根据Sink节点上的数据来决定整个传感器网络的工作模式，在下个周期内若传感器节点的观测值不超过预定的阀值则不向Sink节点发送数据，通过缩短传感节点的工作时间，降低节点间数据传输量来减少传感器网络的能量消耗。理论分析和实验结果表明本文提出的方法无论在预测准确性方面，还是在节约能量方是有效的。

关键词：传感器网络；动态功耗管理；灰色模型；预测

The research on dynamic power management of wireless sensor networks based on Grey Model

Author's Name:

Institution:

Abstract:

The energy constraint for sensor nodes is the key factor that limit the life of wireless sensor networks. So an effective method of dynamic power management that based grey model is proposed to save energy of wireless sensor networks. Historical data gathered of sensor node is used to forecast the future value in this method, while the parameters are adjusted automatically in the process of forecast so as to realize the adaptive forecast. Compared with the algorithm of wavelet and AR, the accuracy of forecasting for grey model is improved. The basic idea is to decide the working pattern of the entire sensor networks by Sink, and in the next period sensor nodes do not back results if their observed values are not out of threshold. Reducing energy consumption of the entire sensor networks is by shortening the working hours and reduci transmitted messages between the nodes. Theory analysis and experiment result show that it is effective not only in the forecasting accuracy but also in the energy efficiency.

Keywords: sensor networks; dynamic power management; grey model; forecast