微电子学与计算机（月刊）第 33 卷第 7 期 2016 年 7 月

基于压缩感知的动态区域划分 GAF 算法

梁　青，沈雅萌

（西安邮电大学 电子工程学院，陕西 西安 710061）

摘　要： 针对无线传感器网络在传输大数据量时因节点能耗过大、死亡过快，而出现网络生存周期较短的问题，提出了在对无线传感器网络区域动态划分的情况下，通过压缩感知在簇头处对数据量进行压缩的 GAF 算法.一方面由于压缩感知具有在压缩端计算简单，在构端计算复杂的特点，通过对信号的稀疏变换与观测降维，可以有效地减少簇头需要发送的数据量，降低网络耗能；另一方面，根据节点分布的稀疏度合理划分可变的动态区域，可均衡整个网络的能量消耗.仿真结果显示，基于压缩感知的无线传感器网络动态区域划分 GAF 算法能在输出信号效果优良的情况下节省了节点耗能，延长了网络生存期.

关键词： 无线传感器网络；改进 GAF 算法；压缩感知；动态区域划分；网络生存周期

The Dynamic Region Division GAF Algorithm Based on Compressed Sensing

LIANG Qing，SHEN Ya-meng

（School of Electronic Engineering, Xi′ an University of Posts & Telecommunications, Xi′ an 710061, China）

Abstract： Wireless sensor network node energy consumption when there is a large amount of data is too large, death too fast, cause the network of the problem of short lifetime, this paper put forward a GAF algorithm by compressed sensing in the cluster heads to compresses data under the condition of dynamic network area in wireless sensor network. On the one hand, compressed sensing on the compression side simple calculation, construction side computing complex characteristic, through to the signal sparse transform and observation dimension reduction, effectively reduce the cluster heads need to send the amount of data, reduce the network energy consumption. On the other hand, according to the sparse degree of node distribution to rationally divided variable dynamic area, can balance the network energy consumption. The simulation results show that the dynamic region division GAF algorithm based on compressed sensing in wireless sensor network can save the energy consumption and extend the network lifetime in the case of the output good result signal.

Key words：wireless sensor network；improved GAF algorithm；compressed sensing；dynamic region division； the network lifetime

作者简介：

梁　青　女，（1966-），硕士，教授.研究方向为无线传感器网络.

沈雅萌（通讯作者）　女，（1991-），硕士研究生.研究方向为无线传感器网络.E-mail:541587115@qq.com.