An Adaptively Balancing Workload Protocol on Query Trees for Maximizing Lifetime in Sensor Networks

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Abstract—Since querying trees in wireless sensor networks are normally built in an ad-hoc manner, equal workload among sensors cannot be guaranteed. A sensor with more descendants has to relay more data that cause its energy exhausted more quickly. To prolong the lifetime of such a sensor and its network we propose an adaptive balancing workload protocol consisting of two phases. First, it builds a balanced-query tree that allows nodes close to a sink to share their workload. Second, it adaptively switches the workload from an exhausted node to non-exhausted nodes. The simulation was carried out to validate the proposed protocol and compare it with previous work. The simulation shows that after running 2,100 rounds, the node by our proposed scheme still remains 20% of initial energy while the one by previous schemes runs out of energy fully exhausted.

Index Terms—sensor networks, balancing workloads, energy, network lifetime, query trees