A Novel Technique for Lifetime and Energy Hole Evolution Analysis in Data-Gathering Wireless Sensor Networks

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Abstract- Wireless sensor network, network lifetime plays an important role for data gathering process. In WSN, battery powered sensor nodes sense the environment at the transmission and collect the data from source node and forward to the sink node. The proposed techniques such as analytic model to increase the transmission power during routing process. The theoretically estimate the traffic load, energy consumption and lifetime of sensor nodes during the entire network lifetime. Furthermore, we investigate the temporal and spatial evolution of energy hole, and apply our analytical results to WSN routing in order to balance the energy consumption and improve the network lifetime. Extensive simulation results are provided to demonstrate the validity of the proposed analytic model in estimating the network lifetime and energy hole evolution process.

Keywords— WSN,Traffic, Energy.

1. INTRODUCTION

Data gathering in large-scale wireless sensor networks (WSNs) relies on small and inexpensive devices with severe energy constraints. Network lifetime in this context is a critical concern as nodes may run out energy as a consequence of the high number of communications required to forward packets produced by nodes toward a data-gathering sink.

2. RELATED WORKS

Tung [1] present an Adaptive Staggered sleep Protocol (ASLEEP) which automatically adjusts the activity of sensor nodes, achieving both low-power consumption and low message latency. This protocol is targeted to data collection applications, in which sensor nodes have to periodically report to a sink node.

Carlo Caion [2] described a scenario in which a large WSN, based on ZigBee protocol, is used for monitoring and proposed a new algorithm for in-network compression aiming at longer network lifetime. In this approach each node autonomously takes a decision about the compression and forwarding scheme to minimize the number of packets to transmit. Performance is investigated with respect to network size using datasets gathered by a real-life deployment.

Hoi Yan Tung [3] presented the multi-interface BN development of ZBAN a Multi-Interface Management Framework (MIMF) are defined and designed such that it coordinates the operation between multiple interfaces, rendering the DR latency. It is important to highlight that the development of MIMF is not the original intention.

Yaoxue Zhang [4] proposed an analytic model to analyze the energy consumption and network lifetime in cluster-based WSNs. The proposed analytic model considers the energy consumption not only for data gathering, but also for clustering. A non-uniform node distribution algorithm to maximize the network lifetime with a fixed number of sensor nodes. The fully balanced energy consumption is also discussed in NUND as a special case, which is the sensor nodes are enough to smooth the nodal energy consumption in the whole network.

3. EXISTING SYSTEM

In Existing System the energy consumption balancing problem originated as an optimal transmitting data distribution problem by combining the ideas of corona-based network division and mixed-routing strategy together with data aggregation. We first propose a localized zone-based routing scheme that guarantees balanced energy consumption among nodes within each corona.

4. PROPOSED SYSTEM

The proposed system estimating the traffic load and energy consumption of sensor nodes, as well as the duration of each network stage. We first divide the network into a number of small regions where the nodes have similar distances to the sink. Since the energy consumption of the sensor nodes in the same region should be the same from a statistical point of view, we use the average energy consumption of this region as the nodal energy consumption of this region. To increase the transmission power from sensor nodes during routing process. It should be calculated by distance from source node to destination node. Energy hole is crucial and challenging for lifetime analysis in WSNs, because it can lead to a premature death of the network. However, recent investigations point out that energy hole does not always emerge close to the sink and highly depends on some network parameters, such as the energy consumption model and transmission range of sensor nodes. However, theoretic analysis is not provided in existing works to estimate the emerging time and location of the

energy hole, as well as its evolution process. The objective of this paper is to estimate the nodal traffic load, energy consumption and network lifetime for a given network, so as to provide important guidelines for network optimization, such as routing design and node deployment.

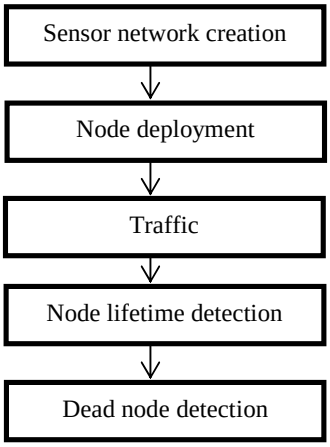

Fig.4.1 Process Flow

5. PEFORMANCE EVALUATION

The performance for proposed methods can be evaluated by using the following parameters. Parameters which are considered for evaluating the experiments are:

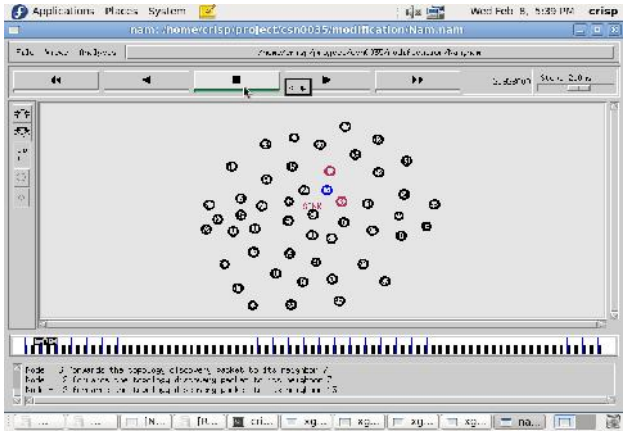

Fig.5.1 Node Deployment

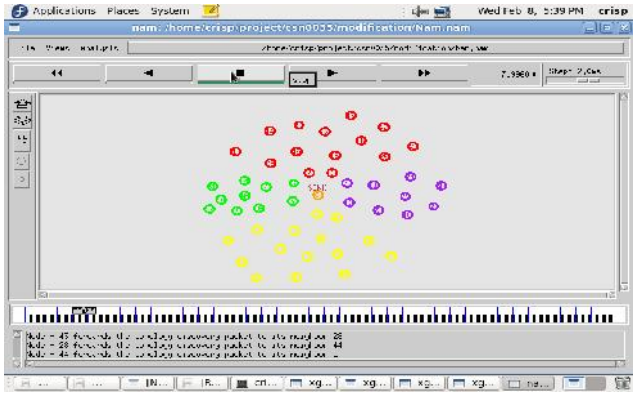

Fig.5.2 Split Regions

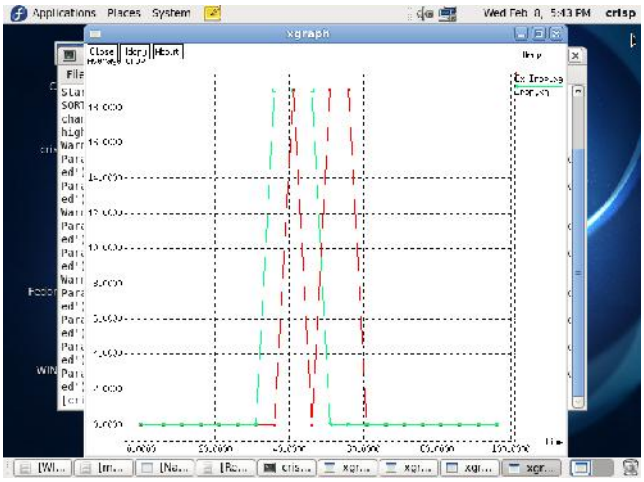

Fig.5.3 Energy Consumption

6. CONCLUSION

A network lifetime traffic load and energy consumption performance achieved through analytic model. The analytic model, we have calculated the network lifetime under a given percentage of dead nodes, and analyzed the emerging time and location of energy hole, as well as its evolution process. Moreover, two network characteristics have been found based on our analytic results, which can be leveraged to guide the WSN design and optimization. The improved routing scheme based on our analytical results can efficiently balance the energy consumption and prolong the network lifetime.

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