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Collision Aware & Maximizing the Lifetime in WSN-Review

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Abstract: Wireless sensor Network (WSN) consist of a number of sensor nodes which are distributed randomly over an area in order to collect information and proceed it. Wireless sensor networks are composed of a large number of tiny sensing self-powered nodes which gather information about their environment and cooperate to communicate the collected data in a wireless fashion to a base station. In Wireless sensor networks have a unique capability to remotely sense the environment. These systems are often deployed in remote or hard to reach areas. Hence it is critical that such networks operate for long durations. Therefore for extending network lifetime through the efficient use of energy has been important issue in the development of wireless sensor networks. Collisions and interferences become very frequent particularly in dense networks due to sharing of same medium by nodes. Avoiding the collision is needed in wireless sensor network to overcome energy waste caused by collisions. Therefore the energy consumption and collision of packets during transmission are major problems in WSN.

Keywords - Wireless Sensor Network (WSN)**.**

1. INTRODUCTION

A sensor node normally consists of four basic components:

- Sensing unit
- Processing unit
- Communication unit
- Power unit

In a Wireless sensor Network there are a number of sensor nodes which are distributed randomly over an area or a place or a location (e.g. buildings, farmer fields) in order to collect information and proceed it. Wireless sensor networks are composed of a large number of tiny sensing self-powered nodes which gather information about their environment and cooperate to communicate the collected data in a wireless fashion to a base station called the sink. Devices are capable of detecting change like temperature, pressure, humidity, sound and many more. These wireless sensors are connected and communicate with each other in a random and multi-hop fashion. They collect the information and pass it to the next hop (sensor). In this way the information is reached to the server and appropriate action took place. There are lots of applications where we can use wireless sensor network like environmental monitoring applications (Habitat Monitoring, Air or Water Quality Monitoring, Hazard Monitoring, Disaster Monitoring), military applications (Battlefield Monitoring, Object Protection, Intelligent Guiding), health care application (Behaviour Monitoring Medical Monitoring), home intelligence applications (Smart Home, Remote Metering) in home and building automation to industrial control. But the problem with sensor network is that when we are using them in outfields (e.g. valleys or hills area) is related to the battery.

Because whenever the battery discharges it is not possible to replace it or recharge it so to avoid this problem. In a sensor node there are three main functions which consume the energy most – (1) sensing, (2) computation, (3) radio operation. Radio operation means transmitting the collected information. The major part of energy loss comes from transmitting. This energy consumption can be reduced at some level.

Radio communication is one of the main sources of energy dissipation. As nodes share the same medium, collisions and interferences become very frequent, particularly in dense networks. In such situation, packet retransmissions, due to packet loss, contribute also to deplete rapidly nodes energy. Graph coloring concerns the assignment of different colors to all nodes in a graph while satisfying the constraints related to a certain problem. In wireless networks, coloring has been exploited mainly to resolve interference and collision problem by managing access to the channel.

2. LITERATURE REVIEW

In the paper, it minimize the delay and maximize the lifetime of event-driven wireless sensor networks, for which events occur infrequently. In such systems, most of the energy is consumed when the radios are on, waiting for an arrival to occur. Sleep-wake scheduling is an effective mechanism to prolong the lifetime of these energy-constrained wireless sensor networks. However, sleep-wake scheduling could result in substantial delays because a transmitting node needs to wait for its next-hop relay node to wake up. An interesting line of work attempts to reduce these delays by developing anycast based packet forwarding schemes, where each node opportunistically forwards a packet to the first neighboring node that wakes up among multiple candidate nodes. In this paper, it tells how to optimize the anycast forwarding schemes for minimizing the expected packet-delivery delays from the sensor nodes to the sink. Based on this result and then provide a solution to the joint control problem of how to optimally control the system parameters of the sleep-wake scheduling protocol and the anycast packet-forwarding protocol to maximize the network lifetime. **[1]**

In the paper, to overcome energy waste caused by collisions and contention based algorithm, the channel assignment mechanisms, like TDMA 1, seem to be an effective way for scheduling node transmissions. To solve channel assignment problems, graph coloring theory has been exploited, primarily in order to assure collision-free communications. This paper present a novel distributed coloring algorithm for WSNs taking into account the constraints of a real WSN environment. The collision aware coloring algorithm assures a 2 hop nodes coloring, in a deterministic time execution, without requiring a neighborhood discovering phase. The algorithm takes into account the constraints of the wireless environment, especially collision and interference issues. **[2]**

In this paper, they endeavor to address the lack of a joint routing-and-sleep-scheduling scheme by incorporating the design of the two components into one optimization framework. The joint routing-and sleep-scheduling by itself is a non-convex optimization problem, which is difficult to solve. They tackle the problem by transforming it into an equivalent Signomial Program (SP) through relaxing the flow conservation constraints. The SP problem is then solved by an iterative Geometric Programming (IGP) method, yielding an near optimal routing-and-sleep-scheduling scheme that maximizes network lifetime. They attempt to obtain the optimal joint routing-and sleep- scheduling strategy for wireless sensor networks. The proposed IGP algorithm drastically outperforms the performance of optimal iterative separate routing and sleep scheduling method by an average of 29% over a large range of traffic rates. Compared with the traditional designs with optimal routing but fixed sleep scheduling, the proposed IGP algorithm prolongs the lifetime by an average of 284%. The proposed algorithm serves as a useful benchmark to evaluate practical heuristics that endeavor to maximize the network lifetime. **[3]**

In this paper, they have avoid duplicate transmission and node reconfiguration and power consumption in Wireless Sensor Networks (WSN). Wireless sensor network requires robust and energy efficient communication protocols to minimize the energy consumption as much as possible. However, the lifetime of sensor network reduces due to the adverse impacts caused by radio irregularity and fading in multi-hop WSN. The scheme extends High Energy First (HEF) clustering algorithm and enables multi-hop transmissions among the clusters by incorporating the selection of cooperative sending and receiving nodes. It focuses to develop any node to act as cluster head (CH) instead of affected CH because it need to get a data from CH continuously. To reduce energy consumption, the scheme extends with the help of S-MAC layer to get the efficient energy saving. The performance of the proposed system is evaluated in terms of energy efficiency and reliability. Simulation results show that tremendous energy savings can be achieved by adopting hard network lifetime scheme among the clusters. This paper show that the HEF algorithm achieves significant performance improvement over LEACH, and HEF's lifetime can be bounded. **[4]**

In the paper, it present a novel sleep-scheduling technique called Virtual Backbone Scheduling (VBS). VBS is designed for WSNs has redundant sensor nodes. VBS forms multiple overlapped backbones which work alternatively to prolong the network lifetime. In VBS, traffic is only forwarded by backbone sensor nodes and the rest of the sensor nodes turn off their radios to save energy. The rotation of multiple backbones makes sure that the energy consumption of all sensor nodes is balanced, which fully utilizes the energy and achieves a longer network lifetime compared to the existing techniques. The scheduling problem of VBS is formulated as the Maximum Lifetime Backbone Scheduling (MLBS) problem. Since the MLBS problem is NP-hard, it propose approximation algorithms based on the Schedule Transition Graph (STG) and Virtual Scheduling Graph (VSG). It also present an Iterative Local Replacement (ILR) scheme as a distributed implementation. This paper present a combined backbone-scheduling and duty-cycling method called VBS and formulate the MLBS problem to find the optimal schedule and prove its NP-hardness. VBS improves upon state-of-the-art techniques by taking advantage of the redundancy in WSNs. **[5]**

In this paper, they designed a novel load balanced routing protocol to maximize lifetime of Wireless Sensor Networks (WSNs) as balancing energy consumption and prolonging network lifetime are open challenges in Wireless Sensor Networks. To balance the energy consumption among sensor nodes, they used multiple sinks simultaneously which are connected though wired or wireless infrastructure. They introduced a potential model and propose a routing scheme in which sensor nodes construct routes based on local topology information and the state information from sinks broadcast messages. Sinks monitor their traffic load and adjust their own parameters to balance the traffic load in the network. In this paper, the protocol can improve the performance of the system in the aspects like robustness, lifetime and reliability**. [6]**

3. PROPOSED METHODOLOGY

1) Formation of network. It consist of creation of a network consist of different wireless sensor nodes.

2) As the lifetime maximization is essential thing in wireless sensor network thus
implementing the Algorithm for lifetime maximization of WSN.

3) Firstly, implementing the sleep wake scheduling and then implementing the anycast algorithm for lifetime maximization of WSN. By using anycast packet-forwarding schemes each and every node has multiple next-hop relaying nodes in a candidate set . A sending node can forward the packet to the first node that wakes up in the forwarding set. The advantage of anycast is that the anycast can reduce the expect one-hop delay and the expected end-to-end delay by n times.

4) Implementing the Algorithm for collision avoidance. Implementing the coloring algorithm for lifetime maximization of WSN.This algorithm is helpful to reduce the number of nodes executing the coloring process in a fixed time T in order to reduce the eventual collisions between the exchanged during the coloring phase.

5) System integration and result optimization.

6) Comparison and study of the results.

4. CONCLUSION

Proposed work will result in maximizing lifetime of WSN and avoiding collision in WSN which will meet to the reduction in power consumption from the battery of wireless sensor network and low collision during the packet transmission in wireless sensor network.

REFERENCE

[1] Joohwan Kim, Xiaojun Lin, Ness B. Shroff and Prasun Sinha, "Minimizing Delay and Maximizing Lifetime for Wireless Sensor Networks With Anycast".

[2] Imen Jemili, Dhouha Ghrab, Abdelfettah Belghith, Bilel Derbel and Amine Dhraief, "Collision Aware Coloring Algorithm for wireless sensor networks", 978-1-4673-2480-9/13/$31.00 ©2013 IEEE.

[3] Feng Liu, Chi-Ying Tsui, and Ying Jun (Angela) Zhang, "Joint Routing and Sleep Scheduling for Lifetime Maximization of Wireless Sensor Networks", IEEE, VOL. 9, NO. 7, JULY 2010.

[4] Lourthu Hepziba Mercy.M, Balamurugan.K, Vijayaraj.M, "Maximization of Lifetime and Reducing Power Consumption in Wireless Sensor Network Using Protocol", (IJSCE) ISSN: 2231-2307, Volume-2, Issue-6, January 2013.

[5] Yaxiong Zhao, Jie Wu, Feng Li and Sanglu Lu, "On Maximizing the Lifetime of Wireless Sensor Networks Using Virtual Backbone Scheduling", IEEE, VOL. 23, NO. 8, AUGUST 2012.

[6] Chengjie Wu, Ruixi Yuan and Hongchao Zhou, "A novel Load Balanced and Lifetime Maximization Routing Protocol in Wireless Sensor Networks ", 978-1-4244-1645-5/08/$25.00 ©2008 IEEE

[7] Junlin Li and Ghassan AlRegib, "Network Lifetime Maximization for Estimation in Multihop Wireless Sensor Networks", IEEE, VOL. 57, NO. 7, JULY 2009.

[8] Heejung Byu and Junglok Yu, " Adaptive Duty Cycle Control with Queue Management in Wireless Sensor Networks" , IEEE, VOL. 12, NO. 6, JUNE 2013.

[9] SandhyaSree Thaskani, K.Vinod Kumar and G.Rama Murthy, "Energy Efficient cross-layer design protocol by using token passing mechanism for WSN ", 2011 IEEE 572