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Reducing Transmission Energy of Sensor Node for Enhancing Lifetime of the Wireless Sensor Networks

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ABSTRACT— *Network lifetime has turned out to be the important thing for comparing sensor networks in a utility precise manner. In wireless sensor networks, the sensor nodes are powered by small batteries; hence, the strength consumption in working a WSN should be as little as possible. The wireless sensor community present all sensor nodes generate an equal amount of statistics packets in a WSN, nodes around a sink should relay more packets and have a tendency to die earlier than other nodes due to the fact that the energy intake of sensor nodes is nearly absolutely dominated by means of data communication in place of sensing and processing. Therefore, the overall network lifetime can be improved by balancing the communication load at heavily loaded nodes around a sink. This problem is one of the most important issues for WSNs. At present, the heterogeneity of networks and a fair cooperative routing method is analyzed. To avoid unfair improvement only on certain networks, we introduced one or a few shared nodes that can use multiple channels to relay data packets. The sinks and shared nodes can communicate with any WSNs node, different WSNs can use cooperative routing with each other since shared nodes allow sensor nodes to forward data from another WSN as the function of interchange points among respective WSN planes. However, still the sensor nodes in the wireless sensor network facing energy consumption problem. To avoid this problem in this journal we are implementing energy saving method in wireless sensor network. We can observe the reduced transmission energy simulation results of the energy saving on NS2 simulator.*

1. INTRODUCTION

In latest years, wireless sensor networks (WSNs) had been specially utilized in packages along with fitness, army, and environmental monitoring. This increase has been fueled by means of its great reputation in wireless verbal exchange. However, there are boundaries because of energy constraints. Depends on energy level variation, the network lifetime will be reduced**.** Therefore, big attempt is wanted to make it more efficient.

With the proliferation of wi-fi sensor networks, absolutely new software domains for Wi-Fi ad hoc networks have emerged. From natural world monitoring and precision agriculture to habitat tracking and logistics packages, there's an increasing call for developing greater efficient sensor networks. Especially the characteristic capabilities of WSN, along with the limitations within the available sources (energy, processing velocity, storage), distinguish sensor networks from other ad hoc networks. Besides those restrictions, WSN are also exposed to various necessities, for example the various densities of the node deployment, and in all likelihood unsafe environmental conditions. Many elements concerning sensor networks have already been investigated, e.g. Routing and information dissemination schemes, self-employer issues, the efficient deployment of sensor nodes, and the interplay of sensor and actor networks (SANETs), even as others

are nonetheless paintings in development. This includes the study of network lifetime as a key characteristic of WSN. Network lifetime is perhaps the most essential metric for the evaluation of sensor networks. Of route, in a resource-restricted environment, the intake of each limited aid has to be considered.

However, network lifetime as a measure for power intake occupies the extraordinary function that it paperwork and higher bound for the application of the sensor community. The community can only fulfill its purpose so long as it is considered as alive, but now not after that. It is therefore a hallmark for the maximum utility a sensor community can offer. If the metric is used in an analysis preceding a real-existence deployment, the expected network lifetime also can make contributions to justify the fee of the deployment. Lifetime is likewise considered a fundamental parameter in the context of availability and protection in networks. Network lifetime strongly depends on the lifetimes of the unmarried nodes that represent the network. This fact does not rely upon how the network lifetime is described. Each definition can finally be reduced to the question while the individual nodes fail. Thus, if the lifetimes of unmarried nodes are not expected correctly, its miles feasible that the derived network lifetime metric deviates in an uncontrollable way. It needs to consequently be clear that an accurate and consistent modeling of the unmarried nodes is very vital. However, a detailed discussion of all the different methods discovered within the literature is beyond the scope of this journal. The lifetime of a sensor node depends essentially on factors: how tons energy it consumes through the years, and what kind of strength is available for its use.

The predominant quantity of power is consumed by using a sensor node for the duration of sensing, communication, and data processing activities. A sensor community includes a number of those nodes. In this sort of community, the nodes speak to form an ad hoc community and are as a consequence able to transmit the accrued sensor information to specific sinks. In principle, that is also proper if in-community processing mechanisms are employed.

2. RELATED WORK

In wireless sensor networks nodes forward the facts they gather from the environment in the direction of the base station by means of relaying through a couple of intermediate sensor nodes used as relays. If more than one sensor networks are deployed in near proximity then they can help each others' information forwarding so that all events involved in such cooperation gain from this collaborative attempt (i.e., strength intake for packet relaying reduces and the lifetime of each community is prolonged). There are many parameters that affect the effect of cooperation on sensor network lifetime consisting of number of domain names, node density, community place, propagation environment, network topology, and base station deployment. Kemal Bicakci, Bulent Tavli look at cooperation strategies for prolonging sensor community lifetime in multi-domain Wi-Fi sensor networks via a linear programming framework. While their model is certain enough to seize the essence of the multi-area cooperation they deliberately avoid using particular data. Hence, we use our framework to decide almost potential overall performance benchmarks in idealized but sensible settings. Their consequences confirmed that beneath positive conditions (sparse network deployment and vicious propagation surroundings) multi-domain cooperation can amplify the Wi-Fi network lifetime extra than an order of value while as compared to non-cooperating domain names of wireless sensor networks.

Adeniran Oluwaranti, Dauda Ayanda provided a SCLB that is an extension of the existing research on WSNs. The proposed scheme taken into consideration a balanced inter-cluster sensor network routing wherein all nodes are placed conscious and have the equal initial energy abilities; simulation consequences confirmed that the network lifetime of the proposed scheme improves with balanced energy intake. Furthermore, they also included reliability into the protocol for WSNs due to dynamic topology and random deployment. Obviously, the reliability deteriorates because the operation hour tactics the cluster head node near base station because of increased variety of failure fee in a single round of transmission of statistics.

Xiaojiang Du, Yang Xiao and Fei Dai presented an electricity-green, self recuperation CC routing protocol for heterogeneous sensor networks, that may boom network lifetime with the aid of balancing sensor electricity intake. In CC, one of a kind sets of cluster heads are formed for the duration of extraordinary time durations to stabilise the electricity consumption of L-sensors. The CC routing protocol consists of intra-cluster and inter-cluster routing schemes. They compute the minimum node density for H-sensors and L-sensors to meet a given lifetime constraint.

Their simulation experiments show that CC balances node strength consumption very well and considerably will increase network lifetime, and it performs plenty better than different clustering-based totally schemes LEACH and LRS. The simulation also validates our computation effects of the minimum node density for a given lifetime constraint.

3. FRAMEWORK

A. Overview of Proposed Framework

We regarded in this paper about the energy saving of the sensor nodes along with heterogeneity of networks and advocate a truthful cooperative routing approach, to avoid unfair development best on sure networks. Previously, we introduced one or some shared nodes that can use more than one channels to relay statistics packets. Assuming that sinks and shared nodes can talk with any WSNs here, distinctive WSNs can use cooperative routing with every different node since shared nodes allow sensor nodes to ahead information from another WSN because the function of interchange factors among respective WSN planes. When receiving a packet, a shared node selects the path to ship the packet, in line with proposed route choice strategies. This cooperation prolongs the lifetime of every community equally as viable.

However, in the cooperative routing different network nodes are communicated to transfer the data to the sink node. To packet transmission, every sensor node may take lots of energy. This is the major issue for mitigating lifetime of the wireless sensor network.

In this paper, we are extending the previous fair routing concept with energy saving. Here, while sending the data, we are calculating the energy levels of the nodes as well we can reduce the transmission energy of the routing nodes. To reduce the energy consumption, we are removing the duplicate data from the node.

B. Obtaining Lifetime Information of Sensor Node

We can obtain the lifetime information at the time of transmitting a data packet; sensor node adds the values of its network lifetime and route lifetime to the MAC frame header of the packet. If the node does not have any information on network lifetime or route lifetime yet, for instance at the time immediately after creating or updating the route, its own node lifetime is added alternatively.

Each node updates this information by overhearing data packets from other nodes. Specifically, when node overhears a data packet, it compares the value of the network lifetime in the data packet and lifetime in its own information, and updates its own lifetime to the smaller value between them.

C. Pool-Based Route Selecting

We have two route selecting algorithms for fair routing;

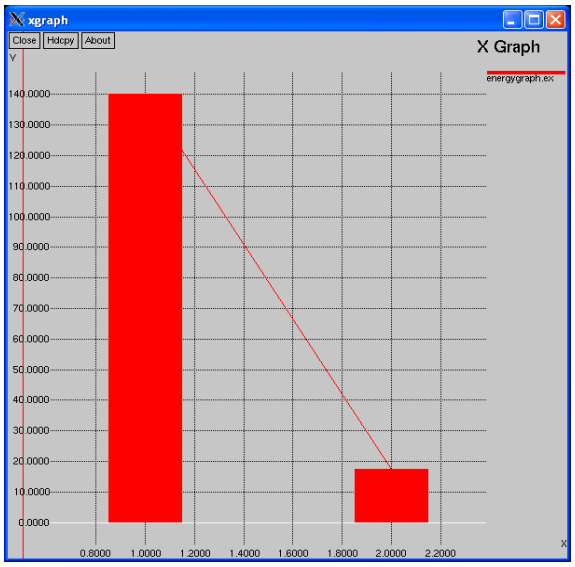
The first one is named Pool-based selecting. We resemble the cooperative forwarding to debt of energy resource. Shared nodes maintain the Energy Pool, the total amount of energy consumption used by cooperative forwarding, continuously. When a node forwards a packet from another network, the Energy-Pool of node is increased and that of another network is decreased. By selecting a route based on the value of Energy-Pool, the cooperation with the fairness of energy consumption is achieved in a heterogeneous environment. In addition, this method is able to balance the energy consumption by cooperation even if each WSN starts to operate from different time.

D. Life-based Route Selecting

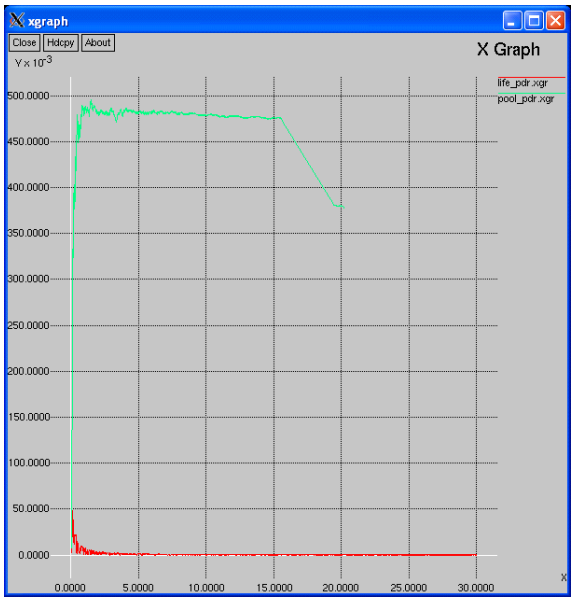
Life-based selecting, that selects the route with maximum route lifetime. In contrast to the Energy based route selection that considers only remaining energy on the nodes, Life-based is focusing on the traffic loads by estimating the route lifetime. Therefore, it is expected that the heavy-loaded nodes balance their loads to other network nodes and it leads to a longer lifetime. The proposed work depends on the life-based route selection it means our extension work done by using this selection method.

4. EXPERIMENTAL RESULTS

In this experiment we are doing simulation on NS2 simulator. We are taking life based selection methodology to reduce the energy consumption in the wireless sensor networks.



We can view the energy consumption graph for life based selection. Here, the X-axis refers the life base and Y- axis refers the energy consumption.



We can compare the existing pool based selection energy consumption with proposed life base routing selection energy consumption.

5. CONCLUSION

We conclude that in this paper we extended the previous fair routing method with energy saving. This proposed work done based on the life based routing selection method. The transmission energy will be reduced by avoiding the duplicate data from the transferring data. From the NS2 simulation results, we proved that, we can reduce the transmission energy of wireless sensor nodes to save the energy as well prolong the network lifetime.

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