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Efficient Energy Saver for Multi-hop Wireless Sensor Communication

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***Abstract* – A network is a series of points or nodes interconnected by communication paths. The purpose of a network is to enable sharing of files and information between multiple systems. Wireless Sensor Networks usually battery powered, and very energy constrained, the present main challenge is the energy efficiency. Now-a-day's sensor networks are static, if anyone of the node gets failed, the entire data will be lost. Moreover, all the nodes are active during the communication between only two nodes so that remaining nodes are also using the power. Due to that, power consumption is high and sensor node's life gets reduced. In the proposed system sensor networks are dynamic and asynchronous. The nodes are placed randomly over the area of interest and their first step is to detect their immediate neighbours. Distributed traffic flow consolidation algorithm is proposed in which only the two nodes in communication are alone active and remaining nodes are in sleep state and remain as deactivated nodes so as to reduce the power consumption.**

***Keywords*— Wireless connectivity, Local synchronization, Network delay, Deactivated nodes, Energy consumption**

I. INTRODUCTION

In most sensor networks the nodes are static. Nevertheless, node connectivity is subject to changes because of disruptions in wireless communication, transmission power changes, or loss of synchronization between the neighbouring nodes. Hence, even after a sensor is aware of its immediate neighbors, it must continuously maintain its view, a process we call continuous neighbor discovery. The issues are Loss of local synchronization due to accumulated clock drifts, Disruption of wireless connectivity between adjacent nodes by a temporary event, such as a passing car or animal, a dust storm, rain or fog. When these events are over, the hidden nodes must be rediscovered. The ongoing addition of new nodes, in some networks to compensate for nodes which have ceased to function because their energy has been exhausted. The increase in transmission power of some nodes, in response to certain events, such as detection of emergent situations. For these reasons, detecting new links and nodes in sensor networks must be considered as an ongoing process.

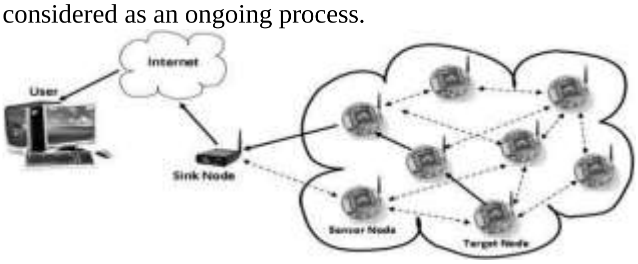

Fig.1:Typical illustration of multi-hop wireless sensor communication network

II. HISTORY

Wireless sensor network (WSN) contains a number of sensor nodes distributed in the sensor field. Sensor nodes gather information from the environment, process them and then transmit data to the sink node. To send data from the source node to sink node require efficient routing algorithm. This routing algorithm plays important role in finding the reliable path for a data transmission in the network.

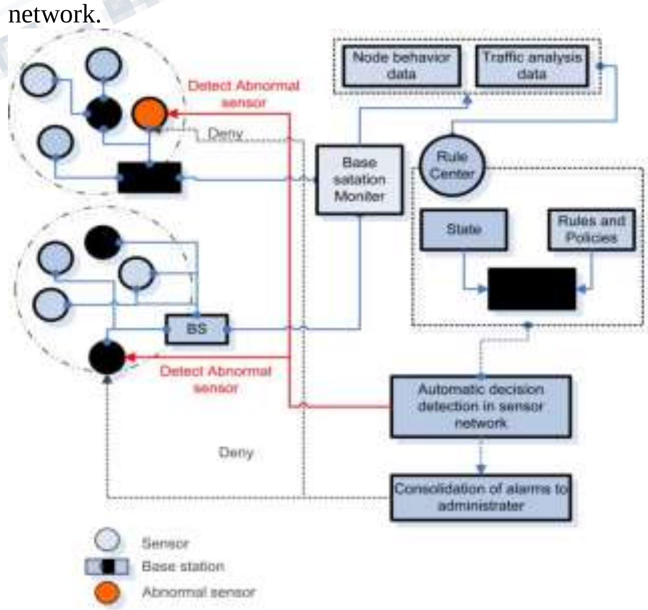

Fig2: A typical workflow of traffic among nodes in the network

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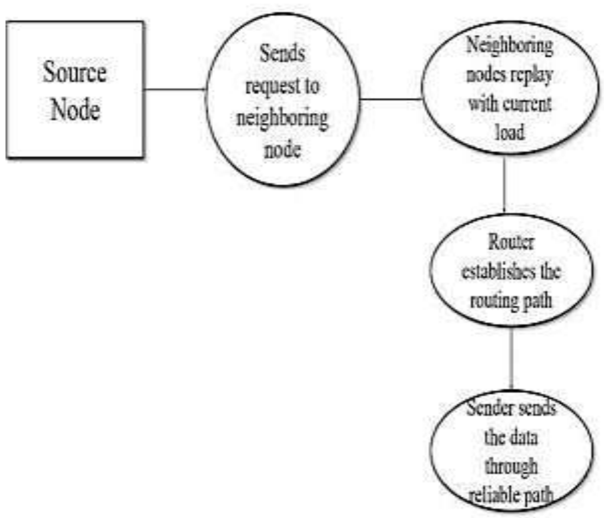
In the sensor network model considered in this paper, the nodes are placed randomly over the area of interest, and their first step is to detect their immediate neighbors, the nodes with which they have a direct wireless communication and to establish routes to the gateway. So, to detect the nodes at the time of transmission should be implemented by keeping only those two nodes active and remaining nodes should remain at the sleep state. This paper presents and analyzes such a scheme.

III. COMPONENTS

This model consists of 3 modules which serves the following functions:

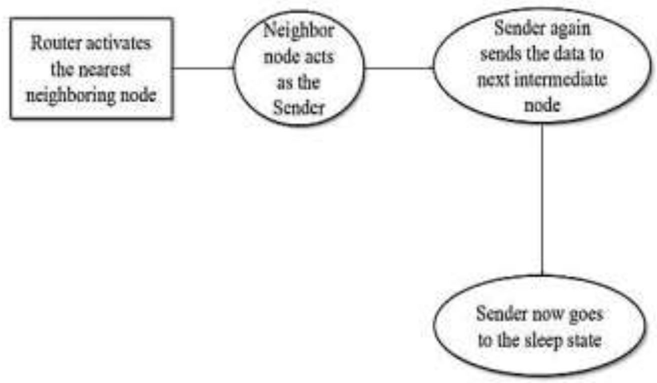
i. SOURCE NODE IDENIFYING ITS NEIGHBOUR NODE:

Source node will broadcast request message to the neighbor node for sending the data. The router only contains the information of the neighboring node of every node. Based on that information, the source node transmits the data to the neighboring node that is active during the time of transmission.



ii. NEIGHBOUR DISCOVERY MODEL:

A node decides randomly when to initiate the transmission of a HELLO message. If its message does not collide with another HELLO, the node is considered to be discovered. The goal is to determine the HELLO transmission frequency, and the duration of the neighbor discovery process.



iii. DESIGNATION MODULE:

The main objective of this module is to show that how the data is received at the server side in the sensor network. Often clients and servers communicate over a computer networks on separate hardware, but both the client and the server may reside in the same system.

IV. WORKING OF DISTRIBUTED TRAFFIC FLOW CONSOLIDATION(DISCO) ALGORITHM

This algorithm is used to consolidate traffic flow onto a small set of links and switches, such that unused network devices can be dynamically shut down for power savings and woken up later if the workload increases. We now briefly introduce the concept of correlation-aware traffic consolidation. It was first proposed and has been shown to provide over 20% more power savings than traditional method like ElasticTree, which will serve as the foundation of our DISCO power optimization design.

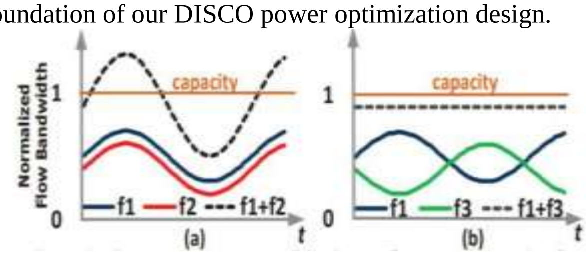


Fig3:Correlation aware consolidation of (a)Positively correlated with variation magnified in aggregation. (b)Negatively correlated with variation cancelled in aggregation

1) Initial Flow Consolidation: In DISCO-F, each flow optimizer begin with the search of the available flow path sets for each fi, denoted as {Pathfi (m)} (1mPi), where Pi is the number of available paths for flow fi and only paths

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without loops are considered. In each period, the flow-level optimizer shares its flow bandwidth requirements with other optimizers in the same pod, and conducts the local correlation analysis of the neighboring flows.

2) Flow Path Adjustment: For all Q switches, each switch SWj inspects the rate of each passing flow and the utilization of its links. When congestion occurs, SWj identifies related flows starting from the lowest-priority to resolve the congestion condition, by notifying the corresponding flow optimizers for path adjustments. This process keeps running until the congestion is resolved or all the options are tried. After all flow paths are settled, each unused switch puts itself to sleep, until the beginning of the next period. In the implementation, this decision is made after the global convergence time.

3) Switch-based algorithm: Every switch performs traffic consolidation individually.The switch optimizer on SWj starts the correlation analysis only among the flows that pass itself. Since flow paths without loops can be calculated and stored in the forward table of each switch in advance, only links on these paths are considered.

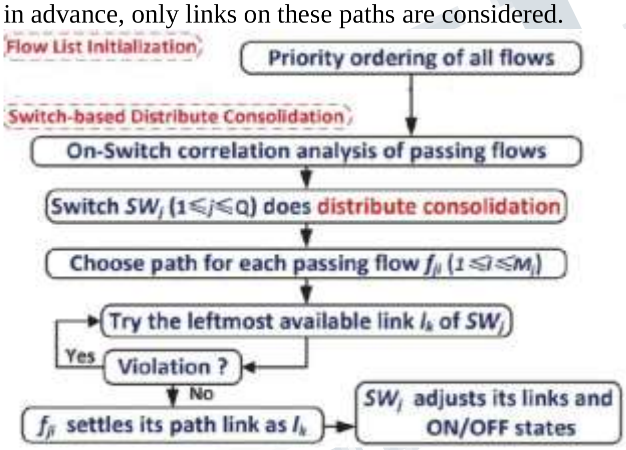

Fig4: Flow chart for Distributed traffic flow consolidation algorithm

Due to the local correlation analysis and limited path information, each switch can only choose the flow path according to its own knowledge. Thus, switches may aggressively consolidate flows to some shared paths, which leads to fewer usage of switches/links, but causes new congestion and requires further adjustments.

Power Savings: Both CARPO and Hier-CA use 144.6 switches on average, with the power savings as much as 46.8%, which is 8.9% more than that of ElasticTree. Due to the lack of global information in the path optimization as well as the delay constraints, DISCO uses more switches on average (152.1 and 146.8, respectively), but with only 1.6-2.9% less power savings than CARPO and Hier-CA.

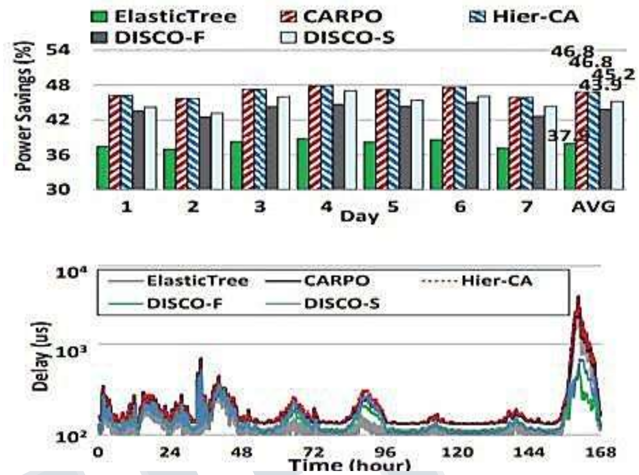

Fig5: Experimental illustration of average power consumption of using various algorithms

V. ADVANTAGES

• The proposed system increases the performance of the network.

• Low Power Consumption

• Sensor node life will be increased.

• Economically good.

VI. CONCLUSION

In this paper, we have presented DISCO, a highly scalable power optimization framework that deals with scalability, power savings, and network delay performance the performance of WSN is totally depended on the energy of the sensor node. WSN has various applications in our daily life like monitoring and control traffic, agriculture surveillance due to its promising features such as low cost, easy implementation, and easy maintenance. These sensor nodes have inadequate rechargeable battery power. For enhancing the performance of the network and reducing the routing overhead saving energy of the no rechargeable sensor node is important. The results show that DISCO significantly reduces the solution search space by more than three orders of magnitude, while achieving nearly the same power savings and improved network delay performance.

REFERENCES

[1] K. Zheng and X. Wang, "Dynamic control of flow completion time for power efficiency of data center networks," in ICDCS, 2017.

[2] A. Hammadi et al., "Review: A survey on architectures and energy efficiency in data center networks," Comput. Commun., 2014.

[3] P. Delforge, "America's data centers consuming and wasting growing amounts of energy," http://www.nrdc.org /energy / data-center-efficiency-assessment.asp, 2015.

[4] "Data center efficiency: How we do it," 2012. [Online]. Available:http://www.google.com/about/datacenters/effici enc y/internal/

[5] M. Alizadeh et al., "pFabric: Minimal near-optimal datacenter transport," in SIGCOMM, 2013.

[6] Xin Ming Zhang, En Bo Wang, Jing Jing Xia and Keun Sung," A Neighbour Coverage-Based Probabilistic Rebroadcast for Reducing Routing Overhead in Mobile Ad Hoc Networks", IEEE Transaction on Mobile Computing, Vol.12, 2013.

[7] X. Wang et al., "Correlation-aware traffic consolidation for power optimization of data center networks," IEEE Transactions on Parallel and Distributed Systems, 2016