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A Review: Improved Method of Load Balancing Algorithms

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Abstract: *Wireless sensor networks have received increasing attention in the recent few years. In many military and civil applications of sensor networks, sensors are constrained in onboard energy supply and are left unattended. Energy, size and cost constraints of such sensors limit their communication range .In this paper, we examine the proposed load balancing algorithms for wireless sensor network .It is used to extend the lifetime of a wireless sensor network which is the main issue in WSN by reducing energy consumption. It can also increase network scalability. In this paper, we implemented proposed method on Load Balancing algorithm for wireless sensor networks which can achieve both energy balancing and energy efficiency for all sensor nodes.*

Keywords-Wireless Sensor Network**;** Load Balancing, Scalability.

INTRODUCTION

A wireless sensor network is typically consisting of a potentially large number of resource constrained sensor nodes and few relatively powerful control nodes. WSNs have some unique characteristics that differentiate them from traditional wireless ad hoc networks such as high scalability and resource constraints.

These devices consist of sensing, computation and wireless communication capabilities, but with limited energy source, processing speed, storage capacity, and communication bandwidth. Each sensor node has a battery and a low-end processor, a limited amount of memory, and a low power communication module capable of short range wireless communication. A sensor node is constructed from four primary units with limited performance capabilities: embedded processor, memory, low power radio transceiver, and sensing unit. Generally a sensor node does not have sufficient power to send the data or message directly to the base station. Hence, along with sensing the data the sensor node act as a router to propagate the data of its neighbor.

This technology is being used in many areas such as battlefield communication, homeland security, environmental monitoring, habitat monitoring, agriculture, disaster relief networks, medical care, pollution sensing, industrial automation, and transportation .

The emergence of wireless sensor networks (WSNs) has led to many open issues for network researchers and developers. WSNs are composed of a scalable number of wirelessly networked sensor nodes, where a sensor node is typically battery-powered. In addition to energy constraint, a reliable delivery of data is a classical design goal for reliability-oriented collection routing protocols for ad hoc WSNs. In low power WSNs, the unreliability of the links and the limitations of all resources bring considerable complications to the routing scheme.

This paper has five primary requirements to

maintain a tolerable network performance and maximise network lifetime: (1) Minimising energy consumption of each individual sensor node, as malfunctioning of some critical forwarding sensor nodes due to power failure can cause significant topological changes and may require rerouting of packets and network reorganization. (2) If certain sensor nodes, usually the nodes in the path to the sink node, have much higher workload than others, then these nodes will drain off their energy rapidly and adversely impact the overall network lifetime. Hence, the workload of sensors is distributed evenly in order to achieve balanced energy usage, thereby resulting in longer system lifetime. (3) Since the communications overheads including transmission, receiving and/or overhearing are the major energy consumer during a sensor node's operation [4]; the RLBR scheme is a simple networking protocol that require minimal communication overheads for network configuration and sensed data dissemination. (4) The most critical wireless routing-related issue is the quality of the underlying links. The RLBR scheme is an adaptive routing scheme for highly dynamic WSNs that deals with the high rate of topology changes. (5) Studying network lifetime with variable transmission power is addressed to further reduce the energy dissipation for overhearing and collisions in dense WSN.

Literature Survey

1.Load Balancing Algorithms in Wireless Sensor Network : A Survey

In this paper, we examine the proposed load balancing algorithms for wireless sensor networks. Load balancing can be used to extend the lifetime of a sensor network by reducing energy consumption. Load balancing using clustering can also increase network scalability. Wireless sensor network with the nodes with different energy levels can prolong the network lifetime of the network and also its reliability. We discuss the improvement to be made for future proposed load balancing schemes. This paper should provide the reader with the basis for research in load balancing schemes for wireless sensor network [2].

2. Load Balancing in Wireless Sensor Network using Divisible Load Theory

Optimal load allocation strategies are proposed for a wireless sensor network which is connected in a star topology. The load considered here is of arbitrarily divisible kind, such that each fraction of the job can be distributed and assigned to any processor for computation purpose. Divisible Load Theory emphasizes on how to partition the load among a number of processors and links, such that the load is distributed optimally. Its objective is to partition the load in such a way so that the load can be distributed and processed in the shortest possible time. The existing strategies for both star and bus topologies are investigated. The performance of the suggested strategy is compared with the existing ones and it is found that it reduces the overall communication and processing time if allocation time is considered in the previous strategies [1].

3. Load Balancing for Achieving the Network Lifetime in WSN-A Survey

A wireless sensor network is network form of sense compute, and communication elements which helps to observe, events in a specified environment. Sensor nodes in wireless sensor network are depends on battery power they have limited transmission range that's why energy efficiency plays a vital role to minimize the overhead through which the Network Lifetime can be achieved. The lifetime of network, depends on number of nodes, strength, range of area and connectivity of nodes in the network. In

this paper authors are over viewing techniques which are used in wireless sensor network for load balancing. Wireless sensor network having different nodes with different kind of energy which can be improve the lifetime of the network and its dependability. This paper will provide the person who reads with the groundwork for research in load balancing techniques for wireless sensor networks[7].

4. Literature Survey on Energy Efficient Clustering and Routing in Wireless Sensor Networks

Wireless Sensor Network has very important applications in remote environmental monitoring areas. The one of the main issues about sensor networks is energy efficiency in communication and broadcasting informa12tion on network. Various energy efficiency schemes which are helps to extend the life time of sensor network's like Clustering, Routing and load balancing also introduces the deferent techniques of clustering in WSN[12].

5. Review on Load Balancing in Wireless Sensor Network

In wireless sensor networks routing is a challenging issue due to hardware constraints such as power, memory and computing capabilities. Wireless sensor networks are a large scale network which consists of thousands of nodes. A sensor manages the task of data sending and routing of data. Due to increases load on nodes, a loss of packet starts which degrade the performance of network. For increases the life time of network and reduce the packet lose equal distribution of load is necessary. Various load balancing strategies are discussed for equal distribution of load in the network[8].

6. A Survey on Flow Balanced Routing in Wireless Sensor Networks

Wireless Sensor Networks (WSNs) consists of a large number of sensor nodes which are densely deployed. Energy conservation and coverage preservation are two important performance metrics for a WSN. Routing is important in WSN in order to reduce the energy consumption of the sensor nodes. Multipath routing techniques enable the use of multiple alternative paths and also the energy consumption of each sensor node get balanced. Hence it helps in increasing the network lifetime. In many routing protocols, cluster formation is done at each round. Most of the multipath routing techniques does not consider the full coverage over a longer period. Hence the routing protocol which considers the overlapping degree in choosing a Cluster Head(CH) needs to be developed to provide full coverage for longer time. Event to sink directed clustering scheme form clusters only towards the sink which avoids unnecessary cluster formation. The Backbone network can be constructed by using the Load Balanced Connected Dominating Set(LBCDS) in order to balance the energy consumption of sensor nodes. The energy efficient wake up scheduling can be used to reduce the energy consumption of sensor nodes. Since the CH's at higher level have large amount of data than CH's at lower level, the wake-up time of CH's at higher level is set to be higher than the CH's at lower level, which decrease the delay and also increases the network lifetime[9].

7. Survey on Clustering Algorithms of Wireless Sensor Network

Wireless sensor network is collection of sensor nodes. These nodes can communicate by transferring data to neighbor node. Nodes also have some resources those are limited. In this paper author discuss the different clustering algorithms for efficient utilization of resources.

Also discuss the quality parameters of nodes. And gives the proposed solution method "Distributed Weighted Clustering Algorithm" for energy efficient and scalable network[10].

8. A Literature Survey on Security and Clustering in Wireless Sensor Networks

Wireless sensor networks are often used for monitoring sensitive data. Therefore security is a significant issue in WSNs. We point out the constraints, security requirements and attacks in WSNs. Clustering is the concept which increases the network scalability and decreases the energy consumption in WSNs. This article presents importance of clustering and clustering algorithm in WSNs. We first outline the basics of wireless sensor networks and general notion of cluster that is how the clusters are formed and its communication. Also we highlight merits, demerits and issues of clustering protocols in wireless sensor networks[11].

9. Literature Survey on Energy Efficient Clustering and Routing in Wireless Sensor Networks.

Wireless Sensor Network has very important applications in remote environmental monitoring areas. The one of the main issues about sensor networks is energy efficiency in communication and broadcasting information on network. This paper presents various energy efficiency schemes which are helps to extend the life time of sensor network's like Clustering, Routing and load balancing also introduces the deferent techniques of clustering in WSN[15].

10. Comparative Study of Load Balancing Techniques for Optimization of Network Lifetime in Wireless Sensor Networks

In wireless sensor networks, sensors or nodes are generally battery powered devices. These nodes have limited amount of initial energy that are consumed at different rates, depending on the power level. For maximizing the lifetime of these nodes, most routing algorithm in wireless sensor networks uses the energy efficient path. These energy efficient routing algorithms select a best path for data transmission and consume less energy. But a single best path puts extra load to a specific node causing lower lifetime. The lifetime of Wireless Sensor Networks (WSN) is crucial .In this paper, we have compared some strategies that balance the energy consumption of these nodes and ensure maximum network lifetime by balancing the load as equally as possible [15].

11. An Overview of Energy Consumption Techniques in Wireless Sensor Networks

A Wireless Sensor Network (WSN) could be a wireless network consisting of spatially distributed autonomous devices that use sensors for watching and recording the physical conditions of the surroundings and organizing the collected information at a central location. Energy Consumption is a very difficult problem in a WSN because the batteries of wireless sensor nodes have very restricted capacities. Due to this problem, every solution elaborated for these networks should be aimed at minimizing the energy consumption. This paper provides the short overview of the energy consumption techniques and algorithms for calculating energy-efficient topologies for wireless sensor networks[17].

Discussion

In this paper, we have presented the problem of load balancing in wireless sensor network using traditional divisible load theory. We extended an existing load balancing approach which allocates load in a wireless sensor network connected in

star topology. In our proposed model we have considered the allocation time and found that the reporting time is less in case of the strategy immediate measurement and concurrent reporting than immediate measurement and simultaneous reporting. Among the existing strategies for the star topology we have found from simulations that simultaneous measurement and concurrent reporting has minimum reporting time. Among the two strategies considered for bus topology the strategy no control processor and processors with frontend processor has less reporting time. Also in the existing strategies if the allocation time is considered then our proposed strategies has less reporting time.

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