ISSN 2347-4289

Packet Attribute Data Aggregation In Wireless Sensor Networks Using Potential Based Dynamic Routing

Suganya M.S, Sahaya Stalin Jose G.

M.E. Student, Dept. of Information Technology, St. Xavier's Catholic College of Engineering, Nagercoil, Tamilnadu, India.
Assistant Professor, Dept. of Information Technology, St. Xavier's Catholic College of Engineering, Nagercoil, Tamilnadu, India.
Sugysuganya777@gmail.com, josemail2000@gmail.com

Abstract: Data sampled by sensor nodes have huge redundancy,data aggregation becomes an valuable technique to remove redundancy, reduce the number of transmission, and then to save power. The packets from distinctive applications can be aggregated by, introducing the idea of packet attribute, which is used to recognize the packets from distinctive applications according to particular necessities. Then propose an attribute aware data aggregation (ADA) which can create the packets with the related attribute convergent as much as possible. Potential Based Dynamic Routing(PBDR) is elaborated to put up with an ADA strategy shortest path. There is a chance for path crash in PBDR. Caching Based Dynamic Routing is designed for recover consistency. CBDR achieves availability by incorporating not only an inventive content file available in storage space but also every copies in caches into the routing process. Especially, it adaptably takes into relation copies in caches which tend to have a superior volatile performance due to a replacement scheme. Thus Caching Based Dynamic Routing (CBDR) provides consistent move of the aggregated packets to the sink node along the shortest path.

Index Terms: Wireless sensor Networks, Data Aggregation, Dynamic routing

I. INTRODUCTION

Sensor nodes are usually much thick, data sampled by sensor nodes have huge redundancy, data aggregation becomes an valuable method to reduce redundancy, reduce the number of transmission, and then to save power. Most phenomena or actions are spatially and temporally interrelated, which imply data from closest sensors are often redundant and highly interconnected. To exploit both spatial and temporal interrelations, the data aggregation, which can be regarded as simple data fusion, is introduced to conduct some simple operation on raw data at intermediate nodes, such as MAX, MIN, AVG, SUM, etc., and then only the abstracted data are transmitted to the sink, and thus save power consumption by avoiding unnecessary transmissions. Data aggregation schemes can successfully make packets more spatially and temporally convergent to recover aggregation efficiency, most of them believe that there are identical sensors and only one application in WSNs, and disregard considering whether the packets really carry redundant and correlated information or not. Actually, nodes are set with various sensors (i.e., pressure, temperature, humidity, light intensity, etc.) and unusual applications can also run in the similar WSN concurrently. It is impossible to perform simple aggregation operations on the packets from various sensors even if all packets can be transmitted along the same pre constructed aggregation trees and timing control schemes can also guarantee packets have a high possibility to meet with each other. Even data fusion can fuse multiple heterogeneous raw data to produce new data, which is expected to be more informative and synthetic than input raw data. Many applications can be deployed in WSNs and different sensors are fixed in nodes, the packets generated by various sensors or different applications have dissimilar attributes. The packets from dissimilar applications cannot be aggregated. Otherwise, most data aggregation schemes employ static routing protocols, which cannot vigorously or purposely onward packets according to network state or packet types. The spatial isolation caused by static routing protocol is critical to data aggregation. Each node wants to protect the predetermined way to assure successful transmissions. When the network topology changes due to energy collapse on some nodes, the route requests to be reconstructed and the topology information maintained by each node needs to be rationalized, which will introduce considerable transparency. The shortest path tree with the cluster method and developed a hybrid routing protocol to hold data aggregation. A head node in each minimum dominating set performs data aggregation and all head nodes are related by constructing a global shortest path tree. The idea of packet attribute, which is used to recognize the packets from different applications or heterogeneous sensors according to specific necessities. An ADA scheme is also used to intentionally make the packets with the similar attribute convergent as much as possible in the WSNs with various sensors or various applications. It is expensive to predetermine the proper routing path for each packet attribute. Therefore, a distributed and dynamic routing protocol is expected to adjust to the frequent variation of packet attribute share at each node. Inspired by the concepts of both potential field in physics and pheromone in ant colony, a dynamic routing protocol is richly designed to support the ADA scheme. But Potential Based Dynamic Routing(PBDR) is unreliable. Caching Based Dynamic Routing is designed for superior consistency. CBDR achieves availability by incorporating not only an unique content file published in depository but also all copies in caches into the routing process. Especially, it adapt ably takes into account copies in caches which tend to have a high explosive behavior due to a replacement scheme. Thus Caching Based Dynamic Routing (CBDR) provides reliable convey the aggregated packets to the sink node along the shortest path.

II. RELATED WORK

Geographic Routing Around Connectivity Holes[2]a mechanism to sense and path around connectivity holes. It together reply the problem of routing around a dead end without overhead-intensive methods such as graph planarization and face routing. The protocol is contained and distributed, and adapts proficiently to uneven traffic and node deployments. It is an energy-efficient protocol that achieves amazing routine in terms of packet delivery ratio and end-to-end latency in different scenarios, thus being appropriate for real network deployments. Improve in route length is its drawback. Geographic K-Any cast Routing [6] To guarantee K-delivery of packets. Azzedine Boukerche[7] and R3E Routing [5] proposes about correct monitoring. It is also required that these networks can function for years without replacing the gadget batteries. One of the major technical challenges for realization of WSNs is to offer dependable and proficient communication in dynamic and harsh environments. Pro Het[10] a Probabilistic routing protocol for various sensor networks, which can handle asymmetry links well and work in a scattered manner using local information with less overhead and assured delivery rate. Hiroki Nishiyama[1] Hybrid Multi-hop routing(HYMN) to alleviate the impact of sink node isolation. With the sink node moving, the power consumption can be impartial over all the nodes in the WSN. It facilitates sink mobility to assemble data, but fails to take benefit of the basically correlated nature of the data collected from the WSN Energy-Efficient Routing**[**6] and Mary Ann Weitnauer[4]**.**Transmission is the major basis of power consumption. Cooperative transmission (CT) is one way to get better the communication quality of single-antenna communication plans. It is a serious confront to propose an energy efficient routing scheme for exposure sensory data to attain a high delivery ratio and prolong the network lifetime. In clustering, cluster head and gateway nodes are main observer in packet delivery. If the cluster head exhausts its battery power, the routing path may be damaged. If the cluster head is associated with a poor class link, it generates additional retransmissions, which leads to needless power consumption. The passive clustering technique, proposes a link-aware clustering mechanism (LCM) to hold energy capable routing in WSNs. The main goal of the LCM is to establish a persistent and responsible routing path by determining proper nodes to become cluster heads and gateways.LCM achieves a improved packet delivery ratio, energy consumption, and delivery latency. It is hard in multicast, geocast. The duration optimization problem by linear programming (LP),which requires considerations of CT's single individuality and sophisticated variable definitions .By evaluating LP for various cases, the use of cooperative routing by comparing it with the non-CT case. Its benefit is its network duration can be extensive. Allowing any node to be a VMISO receiver is not always crucial. A gradient based routing scheme"[8]Routing for wireless sensor networks based on gradient is a effortless, consistent solution resulting in low information overheads for the network package, as well as for the node itself. It is used for convergent traffic, where sensor nodes send announcement to the sink node. Due to message transmission failures instinctive to wireless sensor networks, researches in this area agree that point-to-point message verification in these networks is essential. This work proposes solutions for gradient-based routing with a verification mechanism for different neighbors, where four protocol variations are evaluated for sensor networks applications in order to check and control electrical variables. It is easy and longest distance routing has the best recital. Its disadvantage is high energy consumption. An Energy-balanced Routing Method[3] and Energy-Efficient Cooperative Routing[6] says that In the sensor networks each sensor node is equally a sensor and a router, and its computing skill, storage capacity, communication ability and the power supply is partial. All sensor nodes are isomorphic, they have part capabilities to compute, communicate and store data. In order to poise the energy consumption, maintain coverage and connectivity, multiple mechanisms are efficient to WSN topology manage and routing designing. There are abundant nodes and community structures in WSN, important nodes have more relations than common nodes. The data flow on each relations varies significantly in WSN because of these distinctive distances to the sink node. Quantify to the fore transmission area, describe onward energy density, which constitutes forward-aware factor with link weight, and design a new energy-balance routing protocol based on forward-aware factor. The node separate may be the possible next-hop node when the next broadcast is completed, and the revocation of the edge doesn't affect the probable reconnection. The node's real time power is needed to calculate the sum of strengths. WSNs can be considered as scale-free slanted networks which replicate their existing forms and dynamic uniqueness under the banner of Internet of Vehicles. The topology has sturdiness and fault tolerance, reduces the probability of successive node crash and enhances the synchronization. The finest relay selection and power allocation are performed theme to signal-to-noise ratio constraints. It determines whether a straight transmission is preferred for a given bargain of nodes, or a cooperative transmission. For each node, data transmission to the destination node is performed in two successive phases: broadcasting and relaying. The proposed strategy provides the best set of relays, the optimal broadcasting power and the optimal power values for the supportive transmission phase. The proposed framework determines whether direct transmission is the most favorable policy for a given pattern of nodes or cooperative transmission. In case cooperative transmission is the best solution, the same framework is used to obtain the best set of relaying nodes along with the corresponding optimal transmission power values while rewarding same constraints on the SNR at the relay nodes and at the destination node .This gives the variety of parameters for which a specific transmission policy remains optimal. This algorithm obtain best cooperative route. Performance degradation is its drawback.

III. EXISTING SYSTEM

POTENTIAL BASED DYNAMIC ROUTING:

To make data aggregation more proficient, the concept of packet attribute, defined as the identifier of the data sampled by different kinds of sensors or applications, and then propose an attribute-aware data aggregation (ADA) scheme.ADA Scheme can create the packets with the similar attribute convergent as much as possible to improve the efficiency of data aggregation in heterogeneous sensors .A packet will depart attribute-dependent pheromone when passing a node to attract the afterward packets with the same attribute, which will make the packets generated by the same applications more spatially convergent. Motivated by the concepts of both potential field in physics and pheromone in ant colony, a dynamic routing protocol is elaborately designed to support the ADA scheme. PBDR consists of two autonomous virtual potential fields. One potential field is built using the parameter related to network topology to promise packets reaching the sink at last, and the other potential field is constructed using the pheromone left by packets to purposely attract the packets with the same attribute, and then these independent virtual potential fields are combined together to form a hybrid potential field acting on the routing decisions. Since the information for making dynamic routing decisions can be easily gotten by each node, PBDR scheme not only makes the packet with the same attribute more spatially convergent but also is simple and scalable. In Potential Based Dynamic Routing , the packets will be forwarded to the neighbor using potential field model. Depth potential field will drive packets move to the sink along the shortest path. This Depth Potential Field can provide the basic routing function also Pheromone potential field is constructed to gather the packets with the same attribute together .Using this potential field ,nodes can make dynamic routing decisions. Thus PBDR is used in WSN with multiple sinks. Hence by using Attribute Aware Data Aggregation (ADA) scheme and Potential Based Dynamic Routing(PBDR) aggregated data are send to the sink along its shortest path.

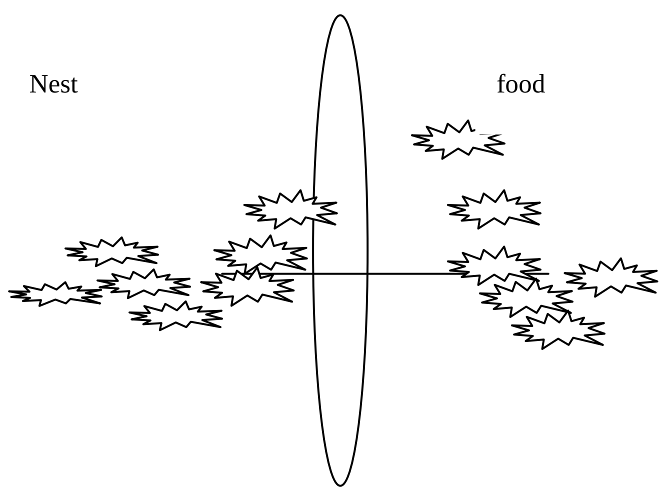

Fig 1: Ant Hoc Net

IV. PROPOSED SYSTEM

CACHING BASED DYNAMIC SOURCE ROUTING:

The DSR protocol allows nodes to dynamically discover a source route across multiple network hops to any destination. Each data packet sent then carries in its header the complete, ordered list of nodes through which the packet must pass, allowing packet routing to be trivially loop-free and avoiding the need for up-to-date routing information in the intermediate nodes through which the packet is forwarded. By including this source route in the header of each data packet, other nodes forwarding or overhearing any of these packets may also easily cache this routing information for future use. The use of DSR is supporting heterogeneous networks and interconnecting to the Internet. Packets may be lost or corrupted in transmission on the wireless network. A node receiving a corrupted packet can detect the error and discard the packet. The operation of Route Discovery and Route Maintenance in DSR are designed to allow uni directional links and asymmetric routes to be easily supported. When some node originates a new packet destined to some other node , it places in the header of the packet a source route giving the sequence of hops that the packet should follow on its way to destination. Normally, source will obtain a suitable source route by searching its Route Cache of routes previously learned, but if no route is found in its cache, it will initiate the Route Discovery protocol to dynamically find a new route. To initiate the Route Discovery, source transmits a Route Request message as a single local broadcast packet, which is received by all nodes currently within wireless transmission range of source node. Each Route Request message identifies the initiator and target of the Route Discovery, and also contains a unique request id, determined by the initiator of the Request. Each Route Request also contains a record listing the address of each intermediate node through which this particular copy of the Route Request message has been forwarded. This route record is initialized to an empty list by the initiator of the Route Discovery. When the initiator receives this Route Reply, it caches this route in its Route Cache for use in sending subsequent packets to this destination. Otherwise, if this node receiving the Route Request has recently seen another Route Request message from this initiator bearing this same request id, or if it finds that its own address is already listed in the route record in the Route Request message, it discards the Request. Otherwise, this node appends its own address to the route record in the Route Request message and propagates it by transmitting it as a local broadcast packet. Packet Forwarding using a source route ,each node transmitting the packet is responsible for confirming that the packet has been received by the next hop along the source route; the packet is retransmitted until this confirmation of receipt is received. For sending such a retransmission or other packets to this same destination , if source node has in its Route Cache another route to destination, it can send the packet using the new route immediately. Otherwise, it may perform a new Route Discovery for this target. A node forwarding or otherwise overhearing any packet may add the routing information from that packet to its own Route Cache. DSR has very low routing overhead and is able to correctly deliver almost all originated data packets, even with continuous, rapid motion of all nodes in the network. The reaction to routing changes to be much more rapid, since a node with multiple routes to a destination can try another cached route if the one it has been using should fail. This caching of multiple routes also avoids the overhead of needing to perform a new Route Discovery each time a route in use breaks.

V. CONCLUSION AND EXPERIMENTAL ANALYSIS

In this project, it mainly focus on how to route the aggregated data to the sink node. Caching Based Dynamic Source Routing protocol (DSR) provides excellent performance for routing. The data aggregation is an effective mechanism to save limited energy in WSNs. Heterogeneous sensors and various applications likely run

ISSN 2347-4289

in the same network. To handle this heterogeneity, introduce the concept of packet attribute to identify different packets generated by heterogeneous sensors and different applications, and then an attribute-ware data aggregation scheme is used to intentionally drive the packets with the same attribute convergent as much as possible in the WSNs with heterogeneous sensors or various applications.DSR has very low routing overhead and is able to correctly deliver almost all originated data packets, even with continuous, rapid motion of all nodes in the network. A key reason for this good performance is the fact that DSR operates entirely on demand, with no periodic activity of any kind required at any level within the network. CBDR achieves availability by incorporating not only an original content file published in repository but also all copies in caches into the routing process. Especially, it adapt ably takes into account copies in caches which tend to have a high volatile behavior due to a replacement scheme. Thus Caching Based Dynamic Routing (CBDR) provides reliable transfer the aggregated packets to the sink node along the shortest path. CBDR can take advantage of only a few copies that are randomly distributed in the network. Thus the aggregated data is send to the destination along its shortest path.

REFERENCES

[1]. Ahmed E., Abdulla,Jie Yang(2012)"HYMN: A Novel Hybrid Multi-Hop Routing Algorithm to Improve the Longevity of WSNs" IEEE transactions on wireless communication vol:11,No:6,pp:2531-2542.

[2]. Chiara Petrioli(2013) "ALBA-R:Load Balancing Geographic Routing Around Connectivity Holes". IEEE transaction on parallel and distributed systems.vol:33 no:6

[3]. Degan Zhang, Guang Li(2013)"An Energy-Balanced Routing Method Based on Forward aware Factor for WSNs" IEEE transaction on sensors vol:14,no.6,pp:888-899.

[4]. Jin Woo Jung and Mary Ann Weitnauer (2012) "On Using Cooperative Routing for Lifetime Optimization of Multi-Hop Wireless Sensor Networks". IEEE transaction on communication vol 45 no.9 pp 1-11.

[5]. Lei Shah and Sajal J.Das(2013)"R3E Reliable Reactive Routing Enhancement for Wireless Sensor Networks".IEEE transaction on sensors.vo:6 no:7,pp:34-78.

[6]. Park S. and Sivakumar R.(2008) "Energy Efficient Correlated Data Aggregation for Wireless Sensor Networks," IEEE transactions on communication ,pp 1-14.

[7]. Regina Borges(2013)"DRINA: A Lightweight and Reliable Routing approach for In-Network aggregation in Wireless Sensor Networks" .IEEE transactions on computers vol. 62, no. 4 ,pp 676-690.

[8]. Rodrigo Palucci, Pantoni,Dennis Brand(2013)"A gradient based routing scheme for street lighting wireless sensor networks". IEEE transaction on system vol 9,no:8

[9]. Sheng-Shih Wang, and Ze-Ping Chen(2013) "LCM: A Link-Aware Clustering Mechanism for Energy-Efficient Routing in Wireless Sensor Networks" IEEE SENSORS JOURNAL, VOL. 13, NO. 2 pp 728-737.

[10]. Xiao Chen, Zanxun Dai(2013)"ProHet: A Probabilistic Routing Protocol with Assured Delivery Rate in Wireless Heterogeneous Sensor Networks" IEEE transactions on wireless communications,vol:12,no:4,pp:1524-1532.

[11]. Xiumin Wang, Jianping Wang(2013) "GKAR: A Novel Geographic K-Any cast Routing for Wireless Sensor Networks "IEEE transaction on parallel and distributed systems, VOL. 24, NO. 5,pp 916-934.