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# Reliable Routing Approach For Wireless Sensor Networks

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***Abstract:*** In recent years wireless sensor network are rapidly using in many applications such as military applications, environmental applications because of its tiny size. Reliable routing is big challenge in wireless sensor network. In wireless sensor network there is chance that redundancy occur because of large number of events. Data aggregation can overcome redundancy in wireless sensor network. We consider different routing protocols and compare with each other. This paper gives various solutions regarding reliable routing protocol and data routing for in-network aggregation in wireless sensor network which minimize number of message exchange during path finding.

*Keywords: Data aggregation, wireless sensor network, Routing.*

## I. INTRODUCTION

The main challenge in the design of Wireless Sensor Network (WSNs) is to maximize their lifetimes. Data aggregation has a basic approach in WSNs in order to reduce number of transmissions of sensor nodes, and minimizing the overall power consumption in the network. In this paper, we study optimal data aggregation in WSNs. Data aggregation affected by several factors such as the placement of aggrrgalion points, the aggregation function, and the density of the sensors in the network.

Routing is very important phenomenon in wireless sensor network.Because it is necessary to find shortest path reliably.

The network has two things for transferring data packets. One is the routing protocol and the other is the routing algorithm. The routing protocol manages the transfer of topological information to nodes and the changes in the networks, where the routing algorithm find out the path to destination using these topological information given by the routing protocol.

Nowadays, Dijkstra algorithm is one of the most popular successful path routing algorithms to find the shortestpath in route guidance system. Sensor nodes are energy-constrained devices and the energy consumption is generally associated with the amount of gathered data, since communication is often the most expensive activity in terms of energy. For that reason, algorithms and protocols designed for WSNs should consider the energy consumption in their conception . Moreover, WSNs are data-driven networks that

usually produce a large amount of information that needs to

be routed, often in a multihop fashion, toward a sink node,which works as a gateway to a monitoring center. Given this scenario, routing plays an important role in the data gathering process.

## II. LITERATURE REVIEW

Wireless sensor networks have been used in many military and civilian applications such as

battlefield surveillance, target tracking and habitat monitoring . Since sensor nodes are generally powered by battery, techniques to prolong the network lifetime have become the recent research focus. A variety of energy conservation strategies have been proposed. In this paper, we focus on various approach of data routing in wireless sensor network.

A possible strategy to optimize the routing task is to use the available processing capacity that will be provided by the intermediate sensor nodes along routing paths. This is known as data-centric routing or network data aggregation. For more efficient and effective data gathering in wireless sensor network with a minimum use of the limited resources and sensor nodes should be configured to smartly report data by making local decisions . For this, data aggregation is an effective technique for saving energy in wireless sensor network. Due to the redundancy in raw data gathered by the sensor nodes, networking aggregation can often be used to decrease the communication cost by eliminating redundancy and forwarding only smaller aggregated information. Because of minimal communication leads directly to energy savings, which extends the lifetime of network, and in-network data aggregation is a key technology to be supported by WSNs. In this work, the terms used information fusion and data aggregation are used as synonyms. In this case, the use of information fusion is twofold :

1) to reduce communication load and save energy.

2) to take advantage of data redundancy and increase data accuracy in network.

In the context of wireless sensor network, data aggregation aware routing protocols should present some desirable characteristics such as: a reduced number of messages for setting up a routing tree, maximized the number of overlapping routes,high aggregation rate, and also a reliable data transmission. In order to overcome various challenges, many novel Data Routing algorithm for Network Aggregation for WSNs have been proposed which maximize information fusion along the communication route in reliable way, through a fault-tolerant routing mechanism[1].

In 2010 Gavaskar Vincent andT.Sasipraba Sathyabama University proposed Qos Routing algorithm The QoS is currently emerging field in networks, since the evolution of fast and reliable networks. In future every service may require an algorithm like this for its service. The QoS routing algorithm[2] can be applicable for any kind of network

services that require satisfaction QoS requirement of the customer who avail the service. Future networks might possibly make use of QoS routing algorithm since the hardware and software evolution that cause high speed networks in less cost. In such circumstances we need a QoS routing algorithm to reduce the resource wastage and to effectively utilize the resources. When the multimedia embedded data communication is taking place in a wide network like World Wide Web then there must be a lot of QoS requirements. The ordinary shortest path algorithm can be applicable any more since they only depend on single constraints. So in these criteria we can apply the QoS routing algorithm.

Kodilman and Lakshman proposed bandwidth guaranteed dynamic routing algorithm. Orda and Sprintson [3] considered preconception of paths with minimum hop count andbandwidth guarantees. They also provided some approximation algorithm the take certain constraints during the preconception. When there exist certain specific dependencies between the QoS measures, due to specific scheduling schemas at network routers, the path selection problem is also simplified.

In 2010 Jiao Zhang , Fengyuan Ren, Tao He , Chuang Lin gave Attribute-aware Data Aggregation Using Dynamic Routing in Wireless Sensor Networks[4]. In this paper, we take the lead in introducing packet attribute into data aggregation and propose an Attribute-aware Data Aggregation mechanism using Dynamic Routing (ADADR) which can make packets with the same attribute convergent as much as possible and therefore improve the efficiency of data aggregation. This goal cannot be achieved by present static routing schemes employed in most of data aggregation mechanisms since they construct routes before transmitting the sampled data and thus can not dynamically forward packets in response to the variation of packets at intermediate nodes. Hence, we present a potential-based dynamic routing scheme which employs the concept of potential in physics and pheromone in ant colony to

achieve our goal. The results of simulations in series of scenarios show that ADADR indeed conserve energy by reducing the average number of transmissions each packet needs to reach the sink and is scalable with regard to the network size.

A Wireless Sensor Network (WSN) consists of spatially distributed autonomous devices that cooperatively sense physical or environmental conditions, such as temperature, sound, vibration, pressure, motion, or pollutants at different locations. WSNs have been used in applications such as environmental monitoring, homeland security, critical infrastructure systems, communications, manufacturing, and many other applications that can be critical to save lives and assets.

Sensor nodes are energy-constrained devices and the energy consumption is generally associated with the amount of gathered data, since communication is often the most expensive activity in terms of energy. For that reason, algorithms and protocols designed for WSNs should consider the energy consumption in their conception. Moreover, WSNs are data-driven networks that usually produce a large amount of information that needs to be routed, often in a multihop fashion, toward a sink node,which works as a gateway to a monitoring center. Given this scenario, routing plays an important role in the data gathering process.

A possible strategy to optimize the routing task is to use the available processing capacity provided by the intermediate sensor nodes along the routing paths. This is known as data-centric routing or in-network data aggregation. For more efficient and effective data gathering with a minimum use of the limited resources, sensor nodes should be configured to smartly report data by making local decisions. For this, data aggregation is an effective technique for saving energy in WSN.

To reduce the Average Number of Transmissions (ANT), packets containing redundant information should be gathered together. However, to the best of our knowledge, although present data aggregation protocols propose sorts of strategies to make packets more spatially and temporally convergent to reduce ANT, they ignore considering whether the packets have redundant information or not. For example, in , if two or more kind of sensors, such as pressure sensors, temperature sensors, traffic sensors etc., are working in a same region. All the packets generated by the sensor nodes are transmitted along the same pre-constructed shortest path tree to the sink. Although the timing scheme proposed in ensures that packets have a high probability to meet with each other, chances are that they can not be aggregated since they contain different data sampled by different sensors.

Large scale dense Wireless Sensor Networks (WSNs) will be increasingly deployed in different classes of applications for accurate monitoring. Due to the high density of nodes in these networks, it is likely that redundant data will be detected by nearby nodes when sensing an event. Since energy conservation is a key issue in WSNs, data fusion and aggregation should be exploited in order to save energy. In this case, redundant data can be aggregated at intermediate nodes reducing the size and number of exchanged messages and, thus, decreasing communication costs and energy consumption.

In 2013 Leandro Aparecido Villas, Azzedine Boukerche, Heitor Soares Ramos, Horacio A.B. Fernandes de Oliveira, Regina Borges de Araujo, and Antonio Alfredo Ferreira Loureiro , propose a novel Data Routing for In-Network Aggregation, called DRINA [5], that has some key aspects such as a reduced number of messages for setting up a routing tree, maximized number of overlapping routes, high aggregation rate, and reliable data aggregation and transmission. The proposed DRINA algorithm was extensively compared to two other known solutions: the Information Fusion-based Role Assignment (InFRA) and Shortest Path Tree (SPT) algorithms. Our results indicate clearly that the routing tree built by DRINA provides the best aggregation quality when compared to these other algorithms. The obtained results show that our proposed solution outperforms these solutions in different scenarios and in different key aspects required by WSNs

## III.OBJECTIVE

Here propose a novel Data Routing algorithm for In-Network Aggregation for WSNs. Algorithm was conceived to maximize information fusion along the communication route in reliable way, build a routing

tree with the shortest paths that connect all source nodes to the sink while maximizing data aggregation.

## IV.PROPOSED METHODOLOGY

The proposed methodology for work is as shown in Figure 1. This is a new design approach for data aggregation in wireless sensor network with reliable routing protocol.

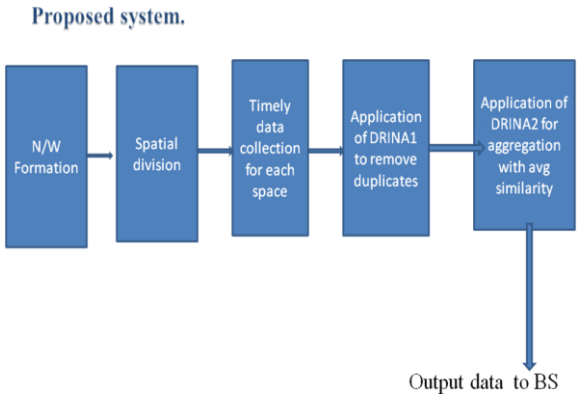


Fig 1:Routing approach

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### A..NETWORK DATA AGGREGATION

In the context of wireless sensor network, in-network data aggregation refersto the different ways intermediate nodes forward data packets toward the sink node while combining the data gathered from different source nodes. A key component for network data aggregation is the design of a data aggregation aware routing protocol. Data aggregation requires a forwarding paradigm that is different from the classic routing, which typically involves the shortest path "in relation to some specific metric" to forward data toward the sink node. Differently from the classic approach in data aggregation aware routing algorithms, nodes route packets based on their content and choose the next hop that maximizes the overlap of routes in order to promote innetwork data aggregation.

A key aspect of network data aggregation is the synchronization of data transmission among the various nodes. In these algorithms, a node usually does not send data as soon as it is available since waiting for data from neighboring nodes may lead to better data aggregation opportunities. This in turn, will improve the energy consumption , performance of the algorithm and save energy. Periodic simple aggregation. Requires each node to wait for a predefined period of time while aggregating all received data packet and, then, forward a single packet with the result of the aggregation. Periodic per-hop aggregation. Quite similar to the previous approach, but the aggregated data packets are transmitted as soon as the node hears from all of its children in the network. This approach requires each node to know the number of its children. In addition, a timeout may be used for the case of some children's packet being lost. Periodic per-hop adjusted aggregation. Adjusts the transmission time of a node according to this node's position in the gathering tree. Note that the choice of the timingstrategy strongly affects the design of the routing protocol as well as its performance.

## V. CONCLUSION

In this paper we have studied the various reliable routing protocol for data aggregation in wireless sensor network and clustering.We also studied various challenges in wireless sensor network regarding hierarchy of the network.

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