Enhanced Network Lifetime by Dynamic Routing for Delay Differentiated Services in WSN

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Abstract

Applications running on the same Wireless Sensor Network (WSN) stage ordinarily have diverse Quality of Service requirements. The major networking performance parameters are lowering Delay, high data honesty and data security. However, in any condition these three requirements simultaneously can't satisfy. In this paper, based on the concept of material science, i propose IDDR and Diffie Hellman, IDDR is a multi-way Dynamic Routing Algorithm, determine this contention. By developing a a virtual half and half potential field, IDDR isolates packets of applications with various QoS requirements according to the weight assigned to every packet, and routes them towards the sink through different paths to enhance the data loyalty for integrity-sensitive applications as well as reduce the end-to-end delay for delay-sensitive ones. Diffie Hellman is used for distributing key from sink to all for increasing data security; i prove the IDDR plus Diffie Hellman are stable for above requirements. Simulation results demonstrate that a proposed technique provides extended performance for Data loyalty and Delay Differentiated Services with prolonged network lifetime.
Keywords: Wireless Sensor Networks, Data Honesty, Delay Differentiated Services, Dynamic Routing, Potential Field, Caesar Ciphers and Diffie-Hellman

I. INTRODUCTION

Dynamic Routing mechanisms in the Internet have normally has based on shortest-path routing for best traffic effort. This causes traffic congestion, particularly if bottleneck joins on the shortest path surely restrict the effective bandwidth between the source and the destination. Dynamic routing means building up the routing efficient when source sent the root request that time follow the packet delivery ratio, IDDR protocol. WSNs, which are utilized to senses the physical elements in the area, will play an important role in the future networks. Due to the diversity and complexity of applications running over WSNs and the QoS ensure in such increasing the networks gains consideration in the research community. As a one of the part of a data base, WSNs should be able to support different applications over the same platform. Different applications may have different QoS necessities. WSNs have two essential QoS prerequisites less Delay and more Data honesty, in a system with light load, both necessities can be promptly fulfilled. However, a heavily loaded network will suffer congestion, and then expands end-to-end Delay.

Wireless Sensor network is the vibrant and emerging research area in the field of system due to its expanding application over the whole globe. Some of its application fields are zone observation, home security, brilliant spaces, natural checking, and target tracking.

Wireless Sensor Network comprises of sensor hubs that will be distributed in offered region to sense or screen the physical or natural conditions like Temperature, Pressure, and Sound and so on. A distributed system is a system in which parts situated on networked computers communicate and facilitate their activities by passing messages. There are two types of distributed networks; Dense Network and Sparse Network. A dense system is a system in which the quantity of connections of every hub is near the most extreme number of hubs. A sparse network, by complexity, is associated by a low number of connections only. Sensor Network under consideration are those systems that are densely distributed.

These sensor hubs sense the nature and collect the data. These collected data will be transmitted to the destination utilizing wireless means Sensor hubs are only hubs which is comprised of radio handset, Micro-Controller and Battery. Radio Transceiver comprises of an inherent receiving in antenna or an externally connected antenna. Small scale Controller is the one that will interface between the energy source and sensing device. Now the third component is the energy source, usually battery is used as a energy source to sensor hubs. Since these sensor hubs are conveyed over remote areas, furthermore these sensor hubs are generally by little battery and also frequent recharging of battery is also not possible. This work goal to continuously enhance the fidelity for high-integrity applications and decrease the end-to-end delay for delay-sensitive applications, even when the system is congested.

II. RELATED WORKS

Most of the QoS provisioning conventions proposed for traditional ad hoc networks have large overhead created by end-to-end way revelation and resource reservation [2], [3], [4], [5], [6].Thus, they are not suitable for resource-constrained WSNs . Some components have been intended to give QoS benefits particularly to WSNs. Here we mainly focus on the metrics of delay and reliability.

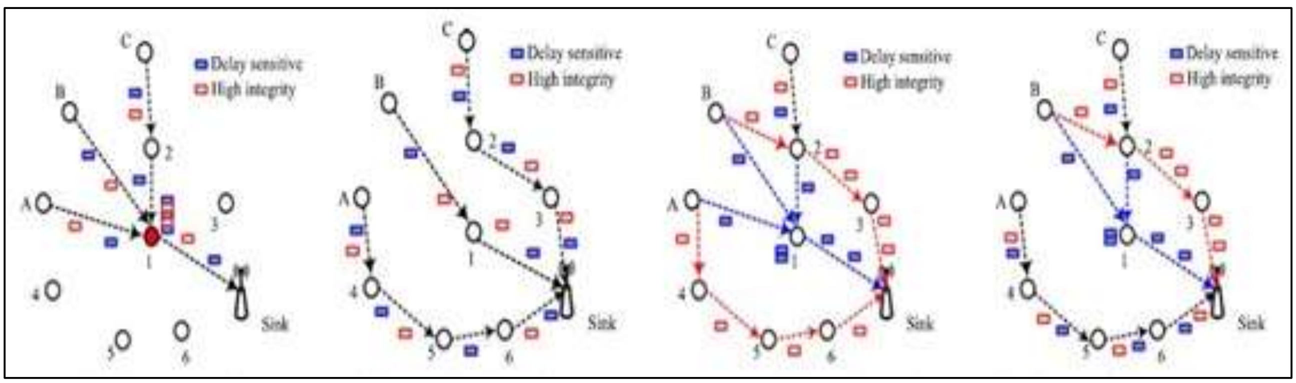
A. Providing Real-Time Service

The sense of speed and the speed of the exploitation of the RAP missed deadlines approach [7] It is proposed to set up a table to reduce the ratio. However, it should be a global communications network topology. The deadlines implicit in the early first (EDF), mainly in real time in the medium access control protocol used to provide the service. It is implicit rather than relying on the preferences of many other protocols will be used to control the packets. Geo-speed feedback control and do not know will not be shipping a new combination of quality service delivery across the network to maintain the desired speed .in the world of real performance information to encourage two hip neighborhood policy guidance proposed gradient.

B. Providing Reliability Services

Adaptation and Clearance System (AFS) the importance of reliability to control the behavior of working to determine the orientation of the package. Tracks ReInforM countries The concept of the package is used to dynamically control the number of the required reliability. However, AFS and each ReInforM need to know the nature of the World Wide Web. LIEMPO In this way the network dynamically routes are active during the operation, management mechanism is used to monitor the quality of the tracks o perceived quality, which controls the rate of traffic on the tracks injection. However, it is estimated that the active tracks and adjust the rate of the traffic service and active nodes, the rate does not consider the effects of the ability to buffer.

C. Motivation of IDDR



(a) (b) (c) (d)

Fig. 1: Motivation of IDDR

a)Actions of SPT b)Actions of multipath routing c) Actions of the IDDR without hotspot shortest path d) Actions of IDDR with hotspot shortest path

Fig. 1 illustrates a small part of a WSN. Suppose hub 1 is a hotspot and there are both high-integrity packets and delay-sensitive packets from source nodes A, B and C. A commonly used routing algorithm will choose the optimal path for all the packets. For example, the standard shortest path tree (SPT) routing will forward all of them to hub 1 as shown in Fig. 1a.This will cause congestion and thus lead to many high integrity packets loss and large end-to-end delay for delay sensitive packets. A multipath routing algorithm as shown in Fig. 1b can utilize more paths to avoid hotspots. However, the low delay and high throughput are hardly met simultaneously. The reasons are

- Delay-sensitive packets occupy the limited bandwidth and buffers, worsening drops of high-integrity ones.
- High-integrity packets block the shortest paths, compelling the delay-sensitive packets to travel more hops before reaching the sink, which increases the delay.
- High-integrity packets occupy the buffers, which also increases the queuing delay of delay-sensitive packets.
- To defeat the above disadvantages, we plan to outline a component which permits the delay-sensitive packets to move along the shortest path and the packets with fidelity requirements to avoid possible dropping on the hotspots. In this way, the data integrity and delay differentiated services can be provided in the same network. Motivated by this understanding, we propose the IDDR scheme, a potential-based multi-path dynamic routing algorithm.

As appeared in Fig. 1c, the high-honesty bundles don't pick hub 1 because of its vast line length. Some other unmoving or under stacked ways, for example, way 2 ! 3 ! Sink and4! 5 ! 6 ! Sink, are utilized to reserve and course these parcels effectively in order to shield them from being dropped in the hotspot. Then again, IDDR gives delay-touchy parcels need to proceed in the briefest way to accomplish low postpone. Moreover, if the activity on the briefest way is substantial, IDDR can likewise choose different ways for the deferral delicate parcels, for example, way: A! 4! 5! 6! Sink appeared in Fig.1d,the join from hub 1 to the sink is busy to the point that hub An or B will sidestep hub 1 and send parcels to the sink along other under-used ways to evade bundles being dropped.

III. SYSTEM ARCHITECTURE

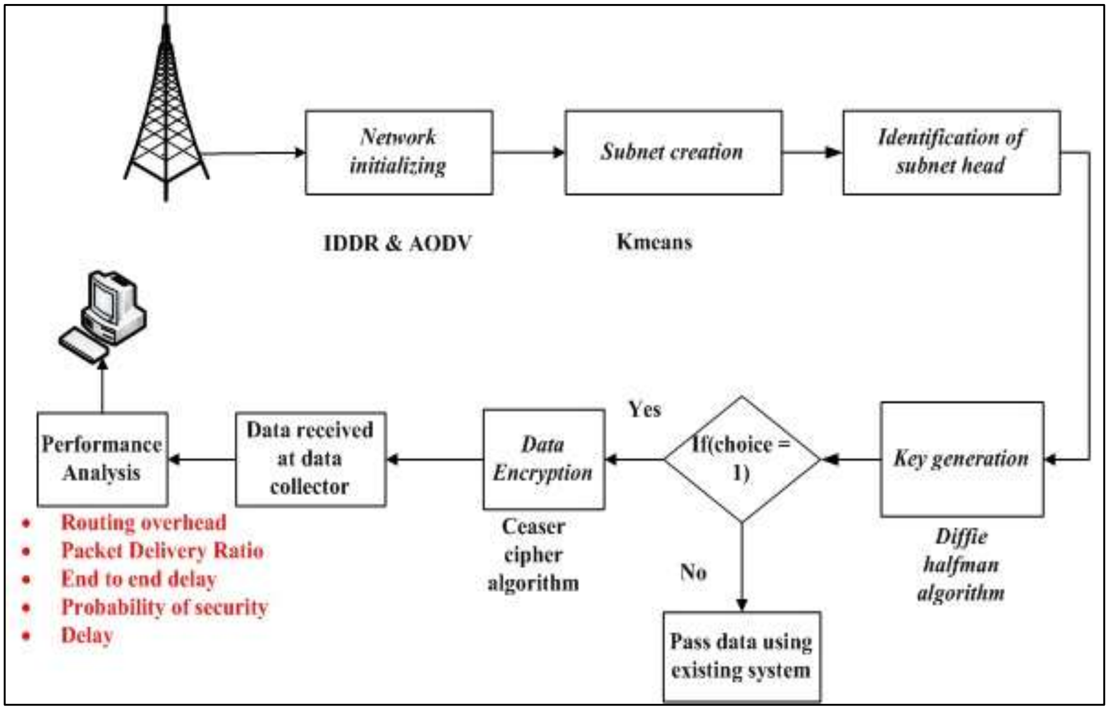


Fig. 2: System Architecture

A. Module Description:

1) Network Initialization

Here Network can be instated with some number of centers say (N =20), close by the zone of 100*100, center can be depicted using xloc and yloc with early on center properties, here starting essentialness of the center point is 100j, moreover center points can be perceived using Unique identity number and work can be done on 802_11 Mac type with random waypoint mobility Model.(this is created the network)

2) Subnet Creation

The Main Objective of the project is to provide better service for delay reduction and prolonged network lifetime for reduction in energy consumption, here by using kmeans techniques for sub network creation it‟s possible to assign different cluster heads based on network.

3) Key Generation

Security is an most valuable parameter for networking, because of relay node selection while transmitting data from source to destination, here for key generation Diffie Hellman algorithm is used for secured data. The Diffie-Hellman protocol is a method for two computer users to generate a shared private key with which they can then exchange information across an insecure channel, before receiving data authentication can be done from destination nodes.

4) Data Transmission

After applying security algorithms, next step is to transmit data from source to destination, here based on distance network can be chosen for all users, and data transmitted one after the another based on authentication, if users found to be unknown, for the proposed scheme, we are denying to access the data, data received only in case of successful authentication.

5) Performance Analysis

Here based on network performance the following networking performance parameters can be measured, that is routing overhead, probability of security, average delay and packet delivery ratio, and improvements can done for all parameters by choosing an efficient techniques, hence increased network lifetime of the network.

IV. DESIGN OF PROPOSED METHOD

A. *Design of Potential Fields*

A potential-based routing paradigm has been designed for conventional wire line networks. Regardless, it didn't attract sweeping thought as a result of its huge management overhead. It is quite expensive to build an exclusive virtual field for each destination in traditional networks where numerous destinations might be distributed arbitrarily. On the contrary, the potential-based routing algorithmic much suitable for the many-to-one traffic pattern in WSNs. In some extraordinary applications and circumstances, more than one sink may exist. In any case, for the most part the information driven WSNs only require hubs to transmit their sampling data to one of them. Therefore, in this work, i fabricate a unique virtual potential field to customize a multipath dynamic routing algorithm, which finds proper paths to the sink for the packets with high integrity and delay requirements. Next, the potential-based routing algorithm for WSNs with one sink is described. It is straight forward to extend the algorithm to work in WSNs with different sinks.

1) *Packet Weight*

Packet header contains a 8-bit weight to represent the level of delay sensitivity. The bigger is the weight, the more delay-sensitive is the packet. IDDR uses the weight values to build different potential fields with different slope as follows.

$$\alpha^1 = \alpha \ \frac{\text{Packet Weight}}{0\text{xff}}$$

0xff maximum of the 8-bit weight.α' higher weight depth potential field so packet with larger weight out of shortest path light ones with smaller weight. They will immediately occupy most of the buffer along the shortest paths. The backlog filled by the heavy packets will further reject the light ones. IDDR will find other nodes and paths to cache the light packets to improve their throughput, while the shortest paths are used to forward the heavy ones to decrease their end-to-end delay.

2) *Design of IDDR Algorithm*

Consider a WSN with different high-integrity or delay-sensitive applications. Let c be the identifier of different applications .In summary, the main procedure of the IDDR algorithm at node i works as follows

- If the queue at node i is not empty, then $\alpha^{(c)} = \alpha \ \frac{packet\ weight\ of\ p}{0\text{xff}}$ is computed for packet p at the head of the queue.
- let $W_{i,b}(t)=\{(Q_i(t)+\alpha^{(c)}D_i(t))-(Q_b(t)+\alpha^{(c)}D_b(t))\}$
- Node i send packet p to node b^*.

3) *Experimental Evaluation*

As long as the external and internal access rate as the last segment of the network capacity has proven to be stable IDDR. In this section, we either high security or can provide differentiated data services, using experiments will assess whether the delay.

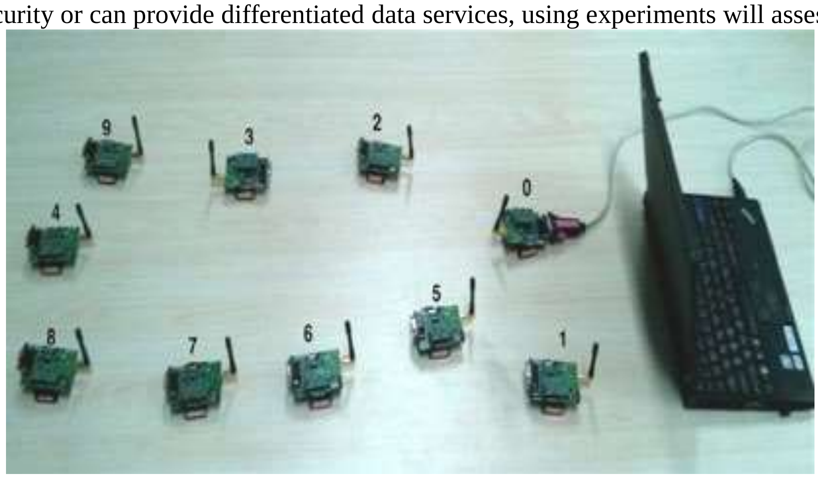


Fig. 3: Test bed. Hub 4 and 8 generate packets with weight of 200 and0, respectively. Hub 1 is used for synchronization of clock. Hub 9 generates background traffic along the shorter path. The others are the intermediate hubs.

V. SIMULATION RESULTS AND ANALYSIS

This segment gives the element investigation of the recreation results. Proposed convention is assessed against the current convention MintRoute. Different parameters like queue length, packet drop, packet delivery ratio, energy consumption in the hub are considered to evaluate the results and we will explain them with the help of graphs. The simulation is conducted for 52 hubs and based on MintRoute papers the values are taken and compared.

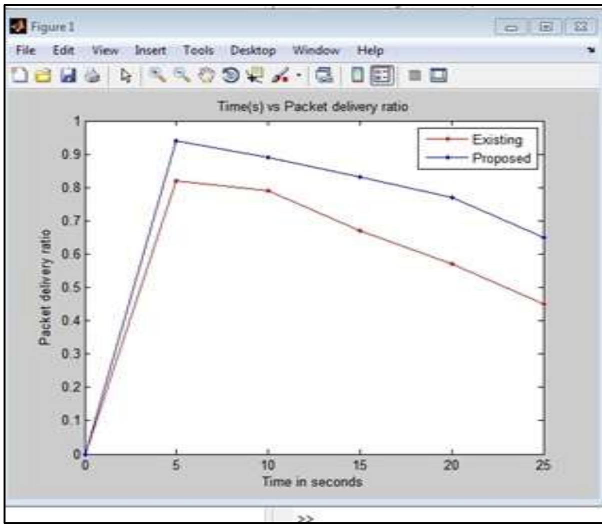


Fig. 4: Packet delivered versus time

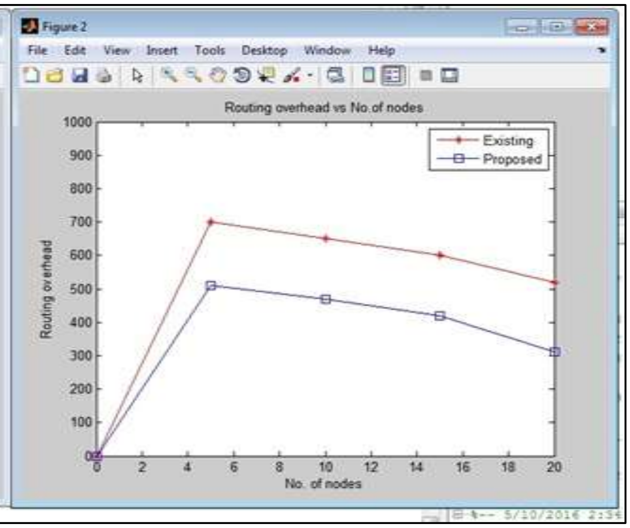


Fig. 5: Routing overhead versus nodes

A. Packet Delivery Ratio

The packet delivery ratio is number of packets successfully received by the sink hub. The graph in the Figure 4 represents packet delivered versus time. From the graph it's confirmed that proposed method have better packet delivery ratio compared to MinRoute. All packets are delivered in the proposed system as we can see in the graph..

B. Routing Overhead

Fig 5 demonstrates the overhead created by the occasion or MUI clock with various MUI values. We can see that the overhead is somewhere around 0.5 and 4 percent, which is worthy. As the MUI gets to be bigger, the overhead of Timer Caused diminishes, while the overhead of Event Caused increments.

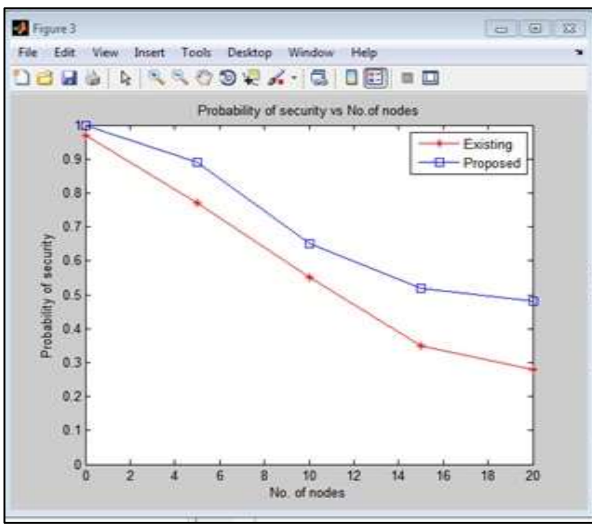


Fig. 6: Probability of security versus nodes

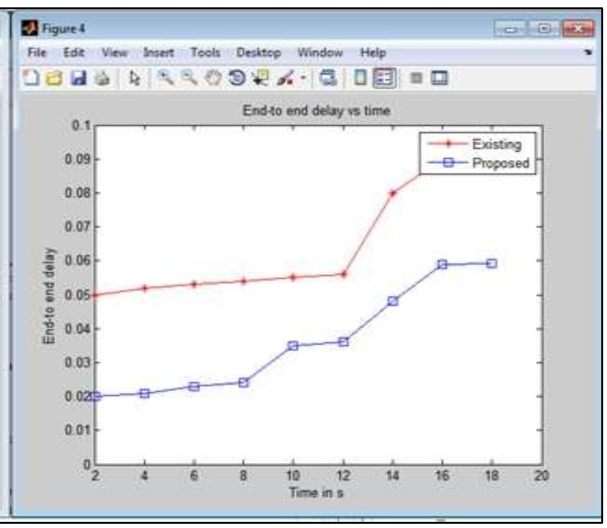


Fig. 7: End to End Delay versus time

C. Probability of Security

The security of the proposed system has increased in system network compared to existing system as shown in fig 6

D. End to End Delay

Fig.7 shows the end-to-end delay with standard deviation. The end-to-end delay of App 1 decreases as a increases. IDDR allows the packets with larger weight to choose shorter paths. In addition, IDDR also employs the priority queue to further decrease the queuing delay of delay-sensitive packets.

VI. CONCLUSION

This work goals to simultaneously improve the fidelity for high- honesty applications and decrease the end-to-end delay for delay-sensitive ones, even when the network is congested. The proposed system naturally avoids the conflict between high integrity and low delay, the high-integrity packets are stored on the under loaded paths along which packets will suffer a large end-to-end delay because of more hops and the delay-sensitive packets travel along shorter paths to approach the sink as soon as possible. The proposed IDDR protocol is an energy efficient, likelihood of security and highly reliable routing overhead protocol that prolongs the network lifetime, and then by using Caesar ciphers algorithm data integrity is achieved i.e., data decryption and encryption is done by Caesar ciphers algorithm.

In future we require enhance the throughput of data transmission and reduce the routing overhead.

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