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DYNAMIC AND TERRIFIC DATA PROPAGATION IN WIRELESS SENSOR NETWORKS USING RING BASED ROUTING

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ABSTRACT - The compositions arguments relevant to routing in Wireless Sensor Networks (WSNs) are inherently different from those experienced in conventional mobile ad hoc networks. This type of routing protocols for ad hoc networks normally impose excessive requirements on panic assets of a sensor node such as storage, lifetime, bandwidth and energy; therefore, they are not suitable for WSNs. In this proposed work, approaches a novel, energy efficient data propagation protocol, referred to as Ring routing with single source shortest path algorithm. In ring routing , geographic routing is used for finding geo based network area range in sensor networks except for data dissemination from source node to sink.. And single source shortest algorithm for finding shortest path in network to achieve high data propagation and reduces energy usage. Also here anchor node selection is done by selecting it nearer to both mobile sink and source node to reduce the distance of data transfer by using distance source routing protocol.The anchor node selected here has high SNR.buffering capacity and enery. Thus it reduces the overall energy consumption in the network. Simulation results validate that the proposed framework significantly outperforms the routing mechanisms using random selection and by considering energy in the data transmission , network lifetime and delivery latency.

Keywords-[Wireless sensor networks, Ring routing, Energy efficiency, Data transmission, Path selection.]

1. INTRODUCTION

Wireless Sensor networks (WSN) can be defined as the network of establishment by self, assets-constrained efficient sensor nodes capable of sensing physical as well as natural conditions. These efficient sensor nodes communicate with each other using low power wireless data routing protocols [1]. As the correct position of sensor nodes cannot be calculated, they can be used dynamically inside inaccessible radius without any manual processes [2]. Hence, WSNs are error detection and have conceit that self capabilities. The sensor nodes have enough energy, storage as well as calculating resources which encourage the researchers to improve best framework for effective usage of these better assets-constrained nodes in sensor area networks. A sensor network is a computer network composed of a massive number of sensor nodes [3]. Usually these devices are small and low priced, so that they

can be produced and diffused in huge numbers, and so their resources in terms of data draining speed and bandwidth usage are severely restricted. There are different sensors such as pressure, thermal, microphone, etc. The sensor node is a node in the sensor network that is capable of performing some processing, gathering sensory information and communicates with other nodes in the network [3]. Routing is the process of selecting best paths in a network. To solve the problems in routing the data a various routing algorithms and routing mechanisms are used. These routing mechanisms and routing protocols have considered the characteristics of sensor nodes along with both application and architecture requirements. [4] [5] The various characteristics of wireless sensor networks are high duration, area scheduling, impartiality, routing methods and delay, maintenance, data gathering. In previous work, we used energy efficient based ring routing with geo graphical routing for area based transmissions in wireless sensor networks. Here it resulted in achieving more energy efficiency and less energy consumption. However in later work about shortest path routing is not considered, if shortest path routing is used more efficiency can be achieved, less delay and more successive rate to the existing framework. In this proposed work, a Ring routing approach with geo graphical routing is used and also uses a single source shortest path routing for finding optimized route in wireless sensor networks. This is done by approaching a novel, energy efficient data propagation protocol, referred to as Ring routing with single source shortest path algorithm. Ring routing uses a geographic routing for finding geo based network area range in sensor networks. And single source shortest algorithm for finding shortest path in network to achieve high data propagation and reduces duration delay and energy consumption.

The downtime of the work is discus as follows. In part II, provided details about related works. Then, discussed about the proposed method in part III. In part IV, the proposed algorithm through simulations is evaluated. Last, presented the conclusion for this proposed framework in part V.

2. RELATED WORKS

There has been a great deal of research work related to routing in ad hoc and wireless sensor networks. A few representative protocols for traditional ad hoc networks include AODV, DSR and WRP. This frame works are used to determine the shortest path, usually expressed in number of hops. [5]This is achieved by typically maintaining a routing table, which may require periodical or on-demand flooding to discover new routes or to repair broken ones. Reduction of hopes resulted in reducing the distance and thus improves the reduction of energy usages. These protocols are unstructured for wireless sensor networks, mainly these that for more than decentralized nodes. [1]Hierarchical routing represents a large family of routing frame works; Manjeshwar and Agrawal, 2001; Basic idea of these protocols is to select members, normally refers group heads, to assume specific responsibilities, such as forming clusters and creating routing backbones. Routing information are exchanged and maintained only by these nodes. As such, these protocols can scale to large network sizes. However, if nodes are mobile, the cost of maintaining a cluster-based architecture can become prohibitive, as mobility may frequently disrupt cluster membership. [7] GRAB extends the work in Ye et al. In this protocol, a ‘credit’ field is added to the cost field. Nodes whose cost is less than the sum of the budget and the credit are allowed to forward received packets. The addition of credit increases the number of nodes participating in data forwarding. Consequently, it is more robust than the original scheme. GRAB, however, still relies on periodical refreshment to handle excessive packet losses due to link or node failures, making it unsuitable in mobile sensor networks. [8][9]EAR (Shah and Rabaey,) and

Ben Hamida and G. Chelius is a variation of DD. In DD, lowest energy paths are always used. EAR shows that probabilistically using suboptimal paths can help in prolonging the lifetime of the network. [10][11] ReIn Form and Zhao, X. Yang achieves robustness through multiple paths. A sender decides how many copies of a packet to be sent out based on the distance, between itself and the sink, and the error rate of the channel. It chooses the next hop with a bias towards nodes with less hop numbers toward the sink. However, ReIn Form uses the number of hops to the sink as the routing performance metric. [6][12]This limits significantly its applicability to WSNs with mobile nodes. M. E. Keskin & Safdar, F. Bashir, Z. Hamid,[5] achieves better energy consumption in this works.

3. PROPOSED SYSTEM

In this proposed work, Ring routing protocol is used with anchor node selection nearer to both sink and source.The anchor node is selected using distance source routing protocol has high SNR, buffering capacity and energy .The fig 1 shows the overall system process.Also uses a single source shortest path routing for finding optimized route in wireless sensor networks. It is an energy adaptive data forwarding protocol, referred to as Ring routing with single source shortest path algorithm. In ring routing geographic routing is used for finding geo based network area range in sensor networks.

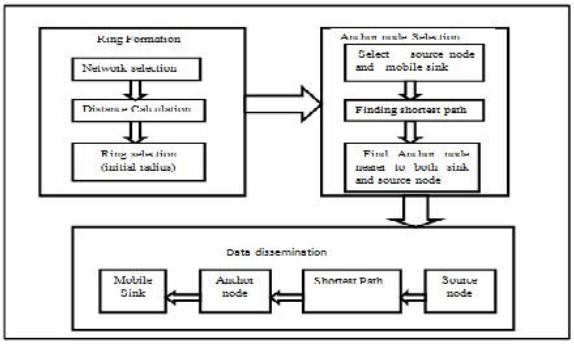


Figure 1- Proposed System process

And single source shortest algorithm for finding shortest path in network to achieve high data propagation and reduces energy usage.

3.1 Initialization

In this modules ,initialization process is explainedand is shown in fig 2 below. That is used to initialize the nodes in network topology. For this a network topology and topography is used for our network animator window (nam window). Creation of nodes are shown through syntax in network animator window. Then by using that nodes are created in two types like random and fixed motions.

In random motion fixed a range for X and Y, after fixing the particular range then the nodes are randomly generated in that range of nam window. In fixed motion we give X and Y dimension position for all nodes then all the nodes are fixed in that particular dimension. Sensor nodes are aware of their own positions. The position information may be based on a global or a local geographic coordinate system defined according to the deployment area. In this process first fixed a network center for ring formation, this center based on network area coverage, geographic routing is used here only for calculating distance mainly to select the coverage and are in the coverage then start the slection of network center for ring formation.

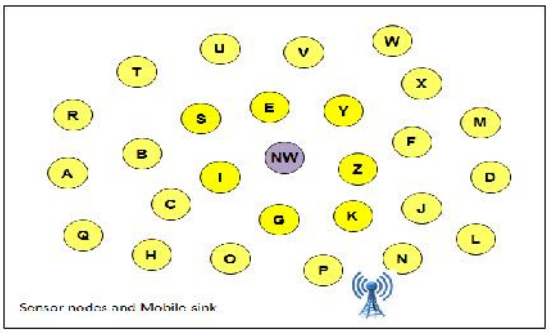


Figure 2- Initial node formation

3.2 Ring Formation

Ring Composition is dependent on the location information of the nodes, which is known to contain some incorrectness based on the developed technology. Distance analysis to determine the successful ring construction likelihood under varying degrees of

localization error.The given below diagram shows the routing design and fig 4 shows the ring formation concept. Then we find center range in network and form ring having some nodes in ring connection this refers as ring nodes. Ring is formed by taking an initial radius of the network and nodes that are close to this radius will form the ring nodes. Main condition is that ring can be of any shape ,they are selected in greedy manner as per the conditions but it should reach the starting node itself. Then the ring formation gets completed.

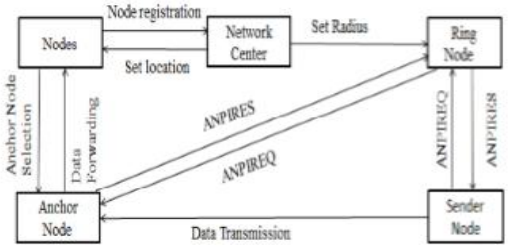


Figure 3- Ring Routing System Design

These nodes are selected based on the distance of the node from the network authority. This analysis is used for successful ring construction.

After the construction of the ring, nearby node selection is process to mention nearby ring nodes of each normal node. Ring formed can be any shape. It will not be in a accurate ring shape. The nodes are selected in a greedy manner. Ring nodes acts its role only for a particular period of time.This step is crucial for the regular nodes to be able to access the ring. Ring formation is based on the position of finding the nodes, which contain some inaccuracy based on the utilized technology.

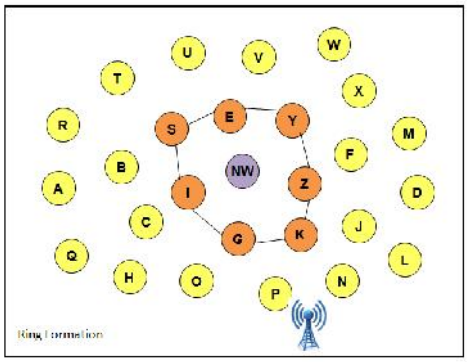


Figure 4- Ring formation design.

3.3Anchor node selection

Initially, contiguous node nearer to both sink and source is selected as AN by using distance source routing protocol.In this protocol mainly two process takes place:

1)Route discovery:Selecting a best route between the source nodes and mobile sink

2) Route maintenance:This contain checking of malicious nodes or whether any break occurs there.

After this process it selects a node as AN that have high buffering capacity, energy and SNRthat is shown in fig 5 below. Before the mobile sink avoids the consultation range of the AN, a new AN is selected nearer to both the source nodes and mobile sink and it informs about the the location to old AN . Since now the later AN knows about the current AN, it can relay any data which is formed for it to the current AN.

The new AN relays messages directly to the mobile sink.[9] After a ring node receives an ANPI packet, it disseminates this data by sharing an AN location information packet to its randon direction wise nearby ring nodes. Each ring node receiving an ANPIS packet relays it to the nearby ring node in the correct radius coverage until the two ANPIS packets sent in the random direction in same ring.

Upon selection of a current AN, it shares an AN Position Information (ANPI) data in the coverage of the nearby ring nodes. If the A N is exterior to the ring, it sends the ANPI packet to the network center, and if it is present inside of the ring, it sends it data towards a point which be inherent in the opposite direction of the network center. The source node sends an AN Position Information Request (ANPIREQ) packet in the direction of the ring. The ring node receiving the ANPI REQ packet generates an AN Position Information Response (ANPIRESP) packet which include the current AN's position and sends the data to the source node. There are several packet types which contain the AN position information. Ring Routing uses this ability to its advantage. All intermediate nodes

fetch AN locations from these data and use it for transfers their own packet to the AN.

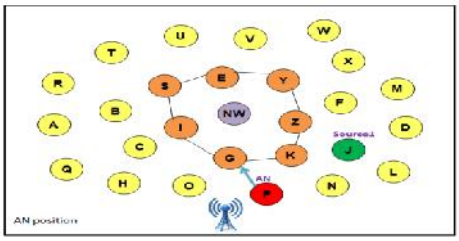


Figure 5- AN selection

3.4 Finding shortest path

In this framework presented about the finding of shortest path for reducing energy usage and delay, here an approach named as single source shortest path algorithm to find shortest path in sensor networks.

Suppose when a weighted graph is given, and when asked to find a low cost path from some vertex v to each other vertex in G, viewing the weights on the edges as distances. This problem is called a single-source shortest paths problem, in short SSSP. There is an interesting approach for solving the SSSP based on the greedy method design pattern. The main idea in applying the greedy method pattern to the SSSP an algorithm using this design pattern is known as Dijkstra's algorithm.

Assume that all edges in the graph have non-negative weights. Let v be a source vertex and let D[u] represent the temporary distance in G from v to u, where initially D[v] = 0 and D[u] = +, for v to u. Initially all entries in array D are temporary, but after each stage of the algorithm one entry in D becomes fixed.

Given: weighted graph, G, and source vertex, v

Compute: shortest path to every other vertex in G.

• Route weight is sum of edge weights along path

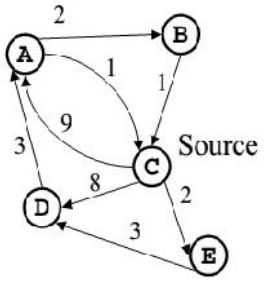
• Shortest path has smallest length among all possible paths.

3.5 Single-source shortest-paths

Given: Weighted digraph, single source s. Distance from s to v: length of the low cost path from source to vertex.

Goal: Find distance (and shortest path) from s to every other vertex. Given a graph G = (V, E) and a "source" vertex S in V, find the low cost paths from S to every vertex in V.

Data dissemination.



In this module explains about the data transmission process from source node to AN and to mobile sink after receiving the response from ring nodes that is shown in fig 6 below. When a response is send to request of source node, then the source node receives that response that contain the location information. If the source node get the response from the a ring nodes , it will knows the position of the AN and can now send its message directly to it by geographic forwarding. But by that process it may take long distance and effect the system in form of delay ,lifetime and energy usage. So to overcome that shortest path algorithm is used. [4] By using this hop count get reduced thus by improving lifetime, reduce delay and energy usage too. If data reaches an old AN, that means that the AN has lastly organized by the time data has arrived at the final AN, the follow-up technique for share data to the AN.

In above discussion an optimized path is obtained by using low cost path algorithm .After that this optimized path source is used to send data to mobile sink via anchor node. First anchor node get data from source then AN send data to mobile sink.

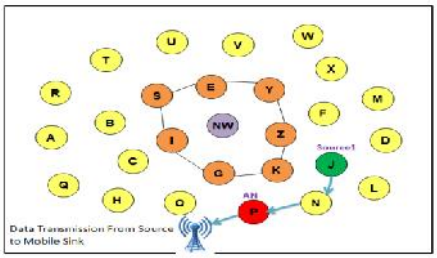


Figure 6- Data transmission

4. PERFORMANCE EVALUATION

Our proposed Ring Routing frame work has the best process in all networks. Proposed works given better results than previous work for transmission speed. This methods tends to reduce energy consumption constantly by the following reasons. Ring employs transmission of sink information along the ring nodes to give AN location information to source nodes, since the anchor node is selected nearer to both sink and source nodes this AN modifications caused to reduce data transmission speed and distance leads to improved number of dissemination and thus exalted energy consumptions. In previous process the anchor node is selected near to mobile sink only. As a result of this the data from source node has to travel long distance that need more energy and delay may occur. Also final data dissemination from source node to sink is through shortest path. This also helps in energy consumption.

In this section, the performance of our protocol is compared with the existing method in terms of Lifetime, dealy and energy consumption.

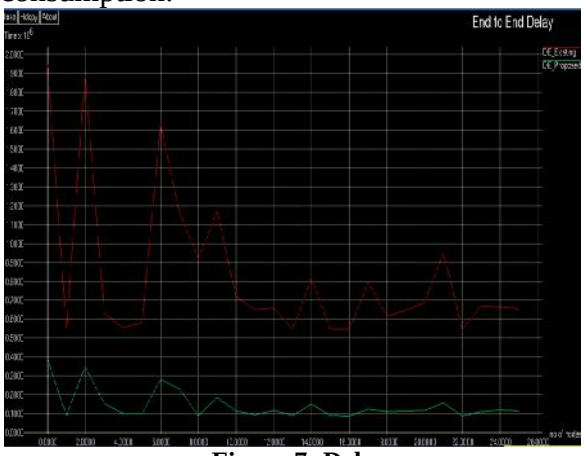


Figure 7- Delay

Above graph shows the comparison of existing and proposed ring routing scheme in terms of Delay. In this figure, the performance of proposed framework is decreased delay ratio level as compared to previous routing framework.

In the proposed technique less time duration is taken for sending and receiving data packets, when transmission occurred. So this resulted in achievement of less amount of delay and improved delivery ratio.

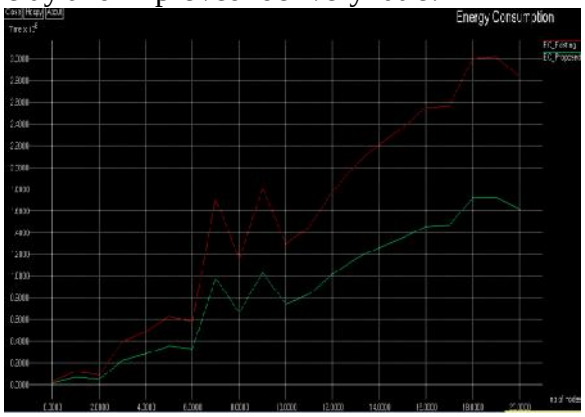


Figure 8- Energy consumption

Above graph shows the comparison of previous technique and proposed routing framework in terms of Energy consumption. In this figure, the performance of proposed technique is better energy consumption level as compared to previous scheme.

Here energy consumption of wireless sensor networks is reduced. In this technique energy usage level is less compared to previous energy usage level.

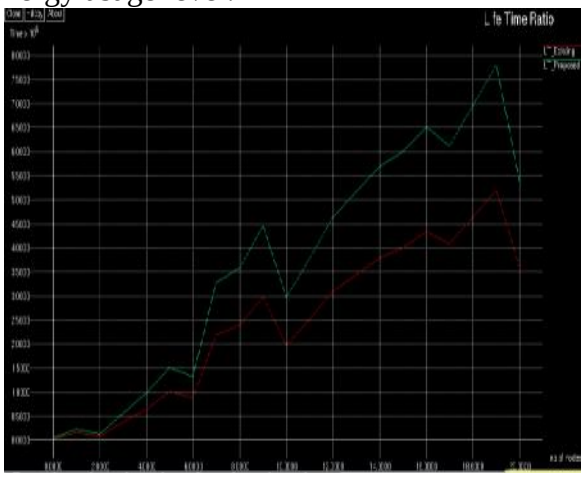


Figure 9- Lifetime

Above graph shows the comparison of existing method and proposed routing framework in terms of Network Lifetime. In this figure, the performance of proposed method gave best result in lifetime ratio level as compared to previous methods. Table 1 shows the simulation parameters for the proposed method.

Parameter	Value
Area of deployment	1000×1000 m
Number of sensor nodes	70
Propagation type	Two ray ground
Antenna type	Omnidirectional
Channel	Wireless channel

Table 1- Simulation parameters

CONCLUSION

In this proposed work, energy efficient data propagation protocol, referred to as Ring routing with single source shortest path algorithm is used. In ring routing geographic routing is used except for data transmission from source node to sink.And anchor node is selected by using distance source routing protocol. It helps to find geo based network area range in sensor networks. And single source shortest algorithm for finding shortest path in network to achieve high data propagation and reduces energy usage. Simulation results provided better performance comparing to previous process such as less energy consumption ratio, network lifetime , Delay and delivery latency. In future this ring routing in ca be applied to large networks with multiple directions routing and sinks and then checking the performance.

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