IMPLEMENTATION OF ENFORCEMENT PACKET GATHERING SEPARATION ALGORITHM FOR STABILITY OF WSN

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Abstract:
In a wireless network, packet structuring is a crucial step in managing packet transmission overload. Wireless nodes are lighter and easier to install anywhere in the network environment than wired nodes since they don't lose their connection, which causes packet drops. Nodes that span the range's border offer ineffective packet organization. Therefore, the Present Conniving Rear Enforcement Packet Gathering (CREPG) system is designed to achieve effective packet gathering while utilizing a path that uses the least amount of energy. An algorithm for degree-based link separation is used to prevent packet drops and maintain a stable routing connection. It enhances packet transport under two conditions: first, packets are transmitted only if high degree based links are permitted; otherwise, low degree based links are avoided. The energy used for packet collecting is lower. Thus, the transmission rate has increased.

Keywords: enforcement packet gathering, Degree based link separation algorithm, Wireless sensor networks, quality of service, degree based link.

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DOI: - 10.48047/ecb/2023.12.si5a.0233

I. INTRODUCTION

Secure worldwide limitation is a challenging method that enables international relationships and the production of sophisticated experimental output with expert ability position. However, many obstacles prevent the development of a reliable network for international border protection and observation. Governments work to maintain their budgetary constraints in the current financial climate, but they also make sure that expenses are kept to a minimum. As was already mentioned, all challenges are attained within very broad network constraints [1].

A large number of highly skilled boundary guards and assets are crucial. Guidance and limit guard equipment are highly expensive.

Additionally, because of the hostile landscape, terrible climate conditions, and force conflicts, it is not always rational to organize boundaries guard along the limits. WSN offers cost-effective, intelligence-driven results for keeping an eye on weak spots on the world's boundaries. A WSN is a collection of nodes managed by the reserve that analyses network conditions [2]. The number of nodes in an edge should be greatly increased by a network of unattended identity collection nodes. Additionally, the successive monitoring reduces the likelihood of losing any potential incorrect action. It is now necessary for agreement in a violent, unsafe network structure because sensor nodes have the ability to process information without human interaction, and under that circumstance, the remaining surveillance data are impractical. To get a regular packet collection at each end of the intrusion, WSNs can be readily integrated with the prior technique [3]. Sensor node boundary management and observation input is the combining of information from several networks.

Many Wireless Sensor Network applications demand a linear network topology, safeguard global boundary nodes, establish link between, and analyze route path [4]. Radio packet transmission is used to daisy connect the nodes in the linear architecture. Thin node layout, longer distance communication, and alignment of nodes along a virtual line are categories for wireless sensor network topologies. This collection of traits introduces the current challenges that cause results to be fixed. Unsuitable for local wireless sensor networks [5] is the wireless sensor network. Recent research shows network difficulties as they emerge from a restricted use perspective. For use in location-based analysis, for instance, many communication protocols are available.

II. RELATED WORKS

Gnawali O, et al., [11] proposed PDORP contain behavior of each PEGASIS-Power Efficient Gathering Sensor Information method with Dynamic source routing scheme. Additionally, a communication strategy is shown that uses a mix of the genetic algorithm (GA) and the bacterial foraging optimization (BFO) to find the most energy-efficient pathways. The proposed routing protocol's experimental results, which stand out from a hybridization approach, offer effective results with lower bit error rates, shorter packet latency, less energy consumption, and higher transmission rates that promote effective quality of service and lengthen the life of the network environment. Additionally, the Computation Model uses soft computation techniques to estimate and separate the presentation of each communication protocol.

An enhanced ant dependent method was proposed by Moeller S., et al. With the help of the network environment of the ACO-Ant Colony Optimization meta-heuristic approach, driven by typical ant features, a quality-of-service aware communication scheme is built. Sensor nodes communicate with the target node when an occurrence occurs. Packet delay, transmission rate, bit error rate, power usage, and indication force for the reliability of the intermediary nodes are used to organize the quality-of-service metrics, depending on the active topology and restricted network resources. Path predilection probabilities that meet each QoS requirement are used to compute the route selection for packet broadcasting. It is appropriate for real-time applications since it lengthens the life of nodes and lowers packet drop and delay rates. In comparison to current technique, it is a better technique.

Yang S., et al., [13] proposed assignation end choosing with split hierarchy method is applied to discover the best data packet broadcasting route. Target nodes either accept the gathered packets or, if they are not within the range of the meeting edge, choose one of their closest neighbors to relay packets from the rendezvous end to the target node. The current approach reduces indicator overload while enhancing problems with triangular communication. Here, the sink serves as a medium and organizes the sensor node data packets. The results of the experiments show that the current scheme successfully combines the target velocity with the least amount of traffic and delay while differentiating with intelligent agent-based routing technique. It also increases dependability and transmission rate while increasing the number of sources.

Du W., et al., [14] proposed optimization issues of how to reduce the entire communication resource usage of specified data packet delivered from the sender node to the target node in the energy-constrained Wireless sensor network. In particular, describe the problem based on the lower cost flow scheme and obtain the higher jump for the information quantity in terms of the number of packets that are profitably broadcast from the sender node to the target node. The explicit methods to find the best routes with their best knowledge of the number of packets, and then achieve the lowered entire transmission rate for the specific number of data packets. Normal experiment shows enhanced significant packet broadcasting when compared to the current technique.

Ren, Fengyuan, et al., [6] present Recent scheme that nodes broadcast its data packet among multihop route of minimized length by involvement nodes the vision to maintain data when holding the target node upcoming near that exempt huge sensor nodes from forwarding data packets. This method attempts to maintain energy levels while making sure that no data is lost due to storage overflow. The challenge of employing an LP-Linear Program to maximize the longevity of wireless sensor networks with limited store capacity and regulated mobile sinks. It determines the sink node specific times at every conceivable place, followed by the data delivery rate between nodes with the size of the buffered packets. When compared to the current design, it results in a longer network lifespan. Additionally, it permits the creation and broadcast of additional data to the target node.

III. OVERVIEW OF PROPOSED SCHEME

Since they sense the surroundings and transfer the information to the target node, sensor nodes in wireless networks are constantly active in a specific setting. The target node, which organizes packets among different channels suited for communication, is the destination node. The node occasionally causes an assault because it cannot obtain a better connectivity path. It has an impact on the entire transmission; any packets forwarded to that node will result in packet loss.

The proposed enforcement packet collecting (CREPG) approach is made to gather perfect data packets from accessible sensor nodes while consuming the least amount of energy possible for each packet transfer. To achieve a better connection between the sender and target nodes, nodes must be connected. In order to reduce packet loss and ensure a stable connection, a degree-based link separation technique is first used to analyses the node degree. Maximum node degree-based links are chosen because they have the potential to achieve better packet transmission rates while using less energy.

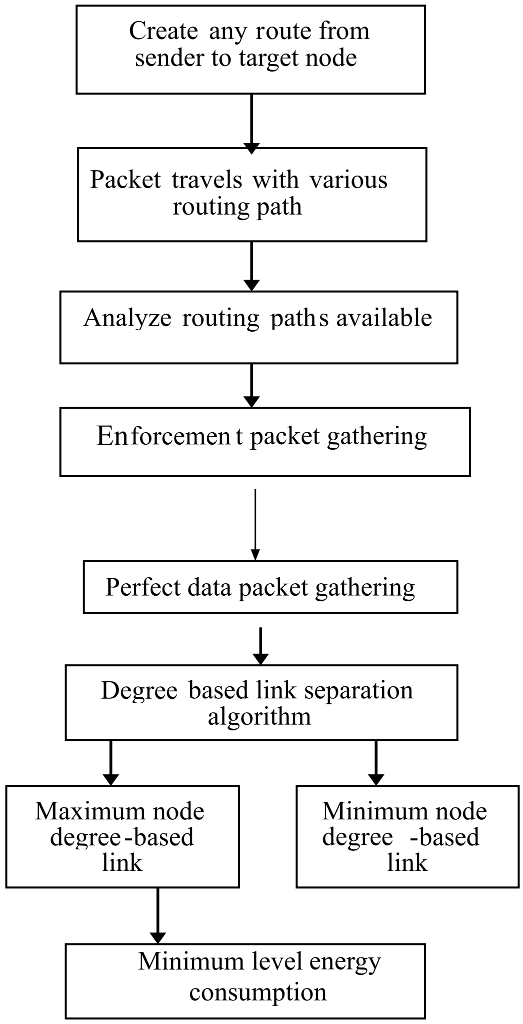

Figure1: Flow Diagram of enforcement packet gathering

Figure 1 illustrates how the suggested enforcement packet gathering method is built to accomplish successful routing from the sender node to the target node using reliable connectivity with support from the Degree based link separation algorithm. It filters out the connections with the highest and lowest node degrees for a given link. The transmission rate and packet delivery ratio are improved.

3.1 Establish any Route from sender to target node

When the sender node notices a change in the intermediate node it is watching, it must broadcast packets to the destination node. When using an on-demand communication strategy, the path is sometimes only discovered during the broadcast of the data packet. As a result, the sender node initiates a transmission ant for each request among its intermediate nodes using the information from the previously well-read packets [7]. Request checks the current connection capability and whether any relay node connections have a poor connection range before changing them in the buffer in order to sustain the load of the previously stay nodes. When the target node receives the request, the familiar node changes into the node that is mentioned in the reply packet message [8]. The best node of the aforementioned nodes, which is typically in the opposite direction as the transmitting node, is taken into account for determining the optimum route. D p stands for data packet transmission, S stands for sender node, and EC stands for efficient connection.

$$S = D_p * EC \text{ - (1)}$$

Information such as energy level and frequency-based coverage range are obtained from the reply message at the sender node and intermediate nodes. In order to determine the likelihood that the Route Favorite will reach the destination node, quality of service metrics are utilized. The source node begins to make any necessary route-specific adjustments for broadcast to its intermediary node [9]. The target node's best following hop is added to the routing table, and packet broadcasting is started along the designated path.

$$D_p = \iiint Pack \text{ - (2)}$$

Packet is beginning to broadcast through pathways that are more pheromone-sensitive and impenetrable. When a gathering is formed, overloading the system may result in higher packet delay, and moving the nodes to different locations may result in path damage. Identifying connection damage is necessary before engaging in communication. A missing nearest neighbor node from each equivalent buffer is rejected while a node is moving [10]. If a damaged connection is encountered when broadcasting data, a different path with the highest route favorite potential is selected. Less hops are not the only factor to consider when choosing a route; additional quality of service restrictions also favor the chosen route. Due to the damage being done to each current path to the target node, urgent circumstance path initialization is now required [9]. Additionally, sender broadcast request packets are waiting in line to reach the target node.

$$\iiint Pack = \{Pack | Time\} \text{- (3)}$$

$$Time = \grave{e}(pack) - (4)$$

3.2 Conniving rear enforcement packet gathering

Route holding procedure is disturbed with energy consumption and packet drop. Various sender strength holds various quantity of energy for its routes, depending on a calculation of the amount of packet from that sender node. Energy taken for an examination route and a support route are dissimilar for communications. The communication path is the main route, and the support route is a security of the normal route. Trustworthy broadcasting is providing subsequent to a route is built among the target node and the sender node.

$$2 * Time = 2\grave{e}(pack) - (5)$$

$$D_p = 2\grave{e}(pack) - (6)$$

All nodes should maintain the present sent data in its store awaiting it obtains the equivalent reply from a target node. Suitable to the restricted recollection of sensors, the sender is not capable to supply each the broadcasted packet for a probable rebroadcasting; consequently, while route damage is identified, relay node should broadcast the whole packet reverse to the unique sender node. On one occasion a route is damaged suitable to any a node else connection broken, failure report is created also transmit to the two incurables of the damaged route. Previous route should reject from the storage buffer of the target and the sender node. Retained energy for the damaged route is removed, with each packet broadcasting among the target and that sender node should control to various present route. DL is a degree based link separation.

$$EC = DL^{max} * DL^{min} \text{- (7)}$$

Route identification is started from source to target node, not from relay nodes which available in intermediate area. Efficient route identification with the equivalent support path identification in network. While the target node accepting an interest which takes an unidentified target, and sender node else while the previously well-known communication route is damage. The packet transmission initiates at the target node forwarding a process path request to intermediate nodes. A service path request packet takes the data of the sender, with a route buffer onto that relay node operates in reverse direction. The node count is restricted is construct with time slot support.

Route request is broadcasted, its restriction is reduced, and the request packet is unwanted whether the boundary attain minimum previous to decision the destination node.

$$DL^{min} = \min_{d} L \text{- (8)}$$

Remains over energy for relay nodes is reasonably are separated into two groups, engaged energy and present energy. A logical energy usage separation in relay node makes a conniving rear enforcement packet gathering by destination node. Energy is engaged when route group for service else for support routes. Consequently, network energy is not present for more time except it is unrestricted. It considers the present energy at the node as an alternative of the residual energy at the node while choosing routing node to design a route.

$$DL^{max} = \max_{d} L \text{- (9)}$$

Packet dropping is a normal process and has wide convention in wireless sensor network, a path identification else Path finding. The result is to merge the communications velocity with the present energy for intermediate relay nodes. Consequently, route request packet transmission latency is launched, with is a key constituent of REAR. While an intermediate relay node accepts a route request, it does not transmit the packet to its intermediate node frequently.

Algorithm for enforcement packet gathering

Step1: Initiate node deployment
Step 2: for each establish routing path
Step3: Broadcast data packet along those path.
Step 4: $if\{\,node == loss\ packet\}$
Step 5: node link is damaged
Step 6: $else\ if\{\,node == transmit\ packet\}$
Step 7: node link is safe and stable.
Step 8: Perform packet broadcasting
Step 9: End if

3.3 Degree based link separation algorithm

Maximum degree-based link node has a more energy, so it active in long period of time. It provides the perfect and efficient communication and it has more possibility to obtain stable connection from sender node to target node.

$$S = 2\grave{e}(pack) * \{\max_{d} L * \min_{d} L\} \text{- (10)}$$

Algorithm for Degree based link separation algorithm

Step 1: Analyze node link connectivity
Step 2: for each establish link connection to all neighbor nodes.
Step 3: $if\ \{link\ degree == maximum\}$
Step 4: Establish effective communication from sender to target node.
Step 5: $else\ if\ \{link\ degree == minimum\}$
Step 6: not perform effective communication.
Step 7: nodes are rejected.
Step 8: end if
Step 9: Reduce energy consumption
Step 10: End for.

Nodes in a wireless sensor network are prepared to conduct communication since they have a greater link degree capacity. Every packet transmission slot uses less energy and the transmission rate is increased. The optimal path is chosen in a wireless network.

IV. PERFORMANCE EVALUATION

Simulation Model and Parameters

Using the Network Simulator tool, the proposed CREPG is simulated (NS 2.34). In our scenario, 100 mobile nodes move for 32 milliseconds in a square area measuring 820 x 620 meters. Every mobile node moves randomly and at a variable speed throughout the network. The transmission range across all nodes is the same at 250 meters. To control network traffic, CBR Consistent Bit Rate offers a constant rate of packet transmission. In wireless sensor networks, the AODV Ad hoc on Demand Distance Vector Routing protocol is utilized to achieve flawless communication.

Simulation Result: Comparing the proposed CREPG Scheme to the current PPDC [10] and NBMS [5], Figure 2 demonstrates how efficiently the proposed CREPG Scheme gathers packets with the aid of maximum capacity nodes.

Degree-based link separation schemes, such as maximum degree based link and minimum degree-based link, are used in the CREPG approach to separate the nodes. It chooses the most effective routing route for sending communications from sender to target node. It improves packet transfer rate while using less energy.

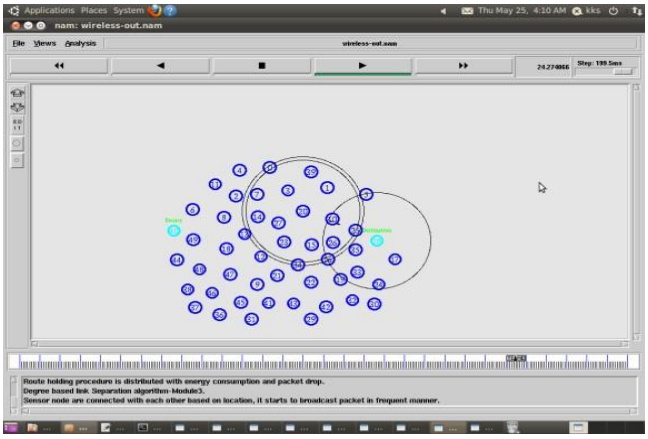

Figure 2: Proposed CREPG Outcome

Performance Analysis

In simulation to analyzing the following performance metrics using X graph in ns2.34.

End to End Delay: Figure 3 shows end to end delay is estimated by amount of time used for packet transmission from source node to destination node, each node details are maintained in routing table. In proposed CREPG method end to end delay is minimized compared to Existing method PPDC and NBMS.

$$\textit{End to End Delay} = \textit{End Time} - \textit{Start Time}$$

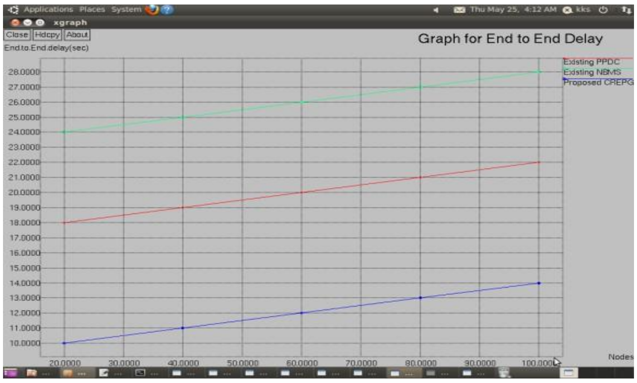

Figure 3: Nodes vs. End-to-End Delay

Network overhead: Figure 3 illustrates how to decrease network overhead by using degree-based link separation to keep the maximum number of degree-based nodes in the network apart while sending a packet to the receiver node. In comparison to the PPDC and NBMS methods now in use, the suggested CREPG approach has less network overhead.

$$\textit{Network overhead} = (\textit{Number of Packet Losses/Received}) * 100$$

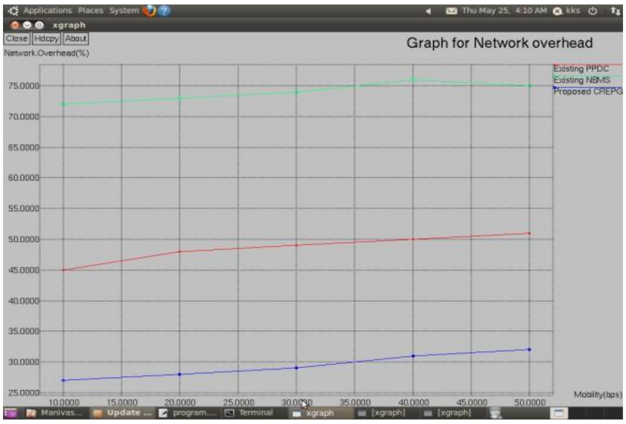

Figure 4: Graph for Mobility vs. Network overhead

Packet Delivery Ratio: Figure 4 illustrates how the number of packets received is calculated as a ratio to the number of packets sent at a certain speed. Node velocities vary, while simulated mobility's are set at 100. (bps). Compared to the PPDC and NBMS methods that are already in use, the proposed CREPG approach improves packet delivery ratio.

$$\textit{Packet Delivery Ratio} = (\textit{Number of packet received/Sent}) * \textit{speed}$$

V. CONCLUSION

Wireless nodes don't always keep the same energy, making it challenging to control traffic flow from source to target node routing. Broken intermediate node links result in packet drops for a specific routing path. It decreases transmission rate and increases energy consumption. In order to gather data packets from the source over an efficient routing method, the suggested Conniving rear enforcement packet collecting (CREPG) technique is used. To separate the nodes with maximum degree-based link separation and lowest degree-based link separation, it has a degree-based link separation method. In addition to improving packet delivery ratio, it lowers energy usage and packet drop.

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