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Estimation of Routing in Wireless Sensor Networks Using NS-2

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ABSTRACT: Resilience of a network varies in an adaptive manner and consensus has to be reached involving the resources available. The internal consistency is a governing factor which is taken using Coefficient Alpha value as series of composite values across each path from source sensor to the sink. The deviations below the threshold limit indicate the path is not appropriate and source sensor has to isolate the interconnected sensor by proper scheduling. Thus the steady state stability to associate with scalability and link metrics is proposed in this work. Simulation platform has been used to validate the performance of flow level analysis across convergence time using Network Simulator-2.

KEYWORDS: Route reliability, Convergence time.

I. INTRODUCTION

Distributed Least Mean Square algorithm states that fault assessment of sensors vary along with spatial deployments and collaboration among them is needed to reduce errors. In single hop communication which occurs in a bidirectional manner calculating suitable step size variation provides network adaptability [1]. This is difficult in the case of multi hop where step size varies drastically. The Channel impulse properties of coherence time is used in determining the convergence time and rate for global decision of consensus. The convergence time derivative along the power limits is determined for each state. Thus the significance of state along its propagation parameter and interface for inter-node interaction is justified [5]. The influence of latency compensation between the old sensory data to be forwarded and the new aggregation data has been discussed. It states that a weight matrix has been used to describe the state of system with a multiplication factor [8]. Predominantly unit disc model has been used for communication which is subjected to intermittent connectivity. So in this work a propose dependant and independent set of sensors deployed within a topology to find the virtual path. This is achieved by using a Cronbach's alpha also known as coefficient alpha where the threshold limit of each path is measured upon routes to check feasibility. An alternate path is assigned or a forwarder node is removed once the reliability metric decreases.

Structure of the paper is as follows. Section 2 deals with literature survey of sensors of consensus algorithm and problem statement. Section 3 proposes an algorithm for construction of consensus. Section 4 deals results of proposed work. Section 5 concludes the overall work.

II. LITERATURE SURVEY

Spectral radius of a network with its upper bound upon growth rate including noise coefficients and failed transmissions has been discussed [2]. However, sensor nodes collision in transmissions is inevitable in upper bounds of growth rates which drift the actual calculations used. The discussion in [3], states that instead of transferring large chunk of sensory data from highly loaded sensor to less loaded sensor parallel transaction has been involved. The relationship between nodes in interpreting the local threshold for mutual transaction must be lesser than global

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threshold divided by network diameter. The limitation in [3] lies in establishing a suitable global threshold with resource failure at appropriate time is difficult. An uncorrelated model to denote the accuracy of fading and random media access is discussed [4]. It states that outage correlation function of a transmission point and a reception point is a discrimination of covariance from expectation. It uses half duplex communication for short range fading coefficients. The problem behind this approach is achieving network wide time slot for slotted aloha communication is difficult.

Possibility of network operation relaying on specific sensor nodes which are being resourcefully healthy and alleviating the non health sensors incorporating "Byzantine sensing" is discussed. The extended time of operation is achieved by considering distance and offset time which provides more flexibility [6]. Average consensus based on the demands of computation and communication is discussed with mobile wireless sensor nodes. The weight matrix ensures the convergence time matching with the topological requirements. Weight matrix is achieved by considering the best constant of weight which occurs within the convergence time [7]. The purpose of predicting the resources of energy in relation to its reporting time has been done in [11]. The inferential test has been obtained for smaller duration of time without distinction of sensors which do not constitute a virtual path towards the sink. On the air agreement to overcome capture effect has been discussed in [12]. It states that the process of voting followed by 2 phase and 3 phase commit provides superior measure on the air reducing the chaos. "Reverse time synchronization" protocol has been discussed in [14]. The approach chooses appropriate normal node without offset compensation are elected as cluster heads. Thus computational error is reduced in the scenario of reverse time stamp incorporating a medium access layer level and its time recording measurements.

2.1 Problem Definition

Repartition in a network occurs post deployment due to excessive resource usage where in individual node might or might not associate in consensus. Complex network solution lies in individual node at that instant of time to correlate whether it is involved or not to routing progress. In [9], discussion which exploits the "time event graph" in a synchronous manner has been stated with shared and unshared resources using Max algebra, Petri Nets.

Incorporating Consensus in wireless network [10] has been stated with the theme of "Asynchronous time model". In the model a node randomly chooses and broadcast its state of time to its neighbours. The other nodes in its communication range update to synchronous the broadcasted node time coordinates based on the distance. The remaining nodes within the terrain do not alter its state values. However, the work is applicable for unidirectional model and is applicable for small or medium scale networks. In [13], multi hop controller determines the consensus based on time of convergence, accuracy and clock offset values. The work relies on switching to single hop communication when consensus is achieved where route determination is not done. The discussion of accumulation of synchronization errors to reduce clock skew is stated with optimal reference time across hops [14]. However ranking the nodes with hops and reinitiating the monitoring process leads to increase in overhead.

III. PROPOSED SYSTEM

In section 3 the inter route reliability is examined with static sink positioned. The proposed approach indicates the combination of consensus and its time interval for quicker converge of reporting data with valid routes.

3.1 Route estimation based on coefficient alpha in wireless sensor networks (RECAWSN)

Initially, each set of sensors are grouped within its terrain and after a report interval the flow level analysis is measured. The flow level analysis measure has been stated with equation 1 as below.

$$\alpha = \frac{N \times \overline{co}}{\overline{av} + (N-1) \times \overline{ac}} \qquad (1)$$

Notations for equation 1

The "N" denotes the number of nodes the average covariance between a pair of nodes is denoted as $\overline{co}$ and the average variance is $\overline{av}$.

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Thus for each data transfer from sensors is calculated and rated once the value states decreasing an alternate route is preferred by transferring control packets.

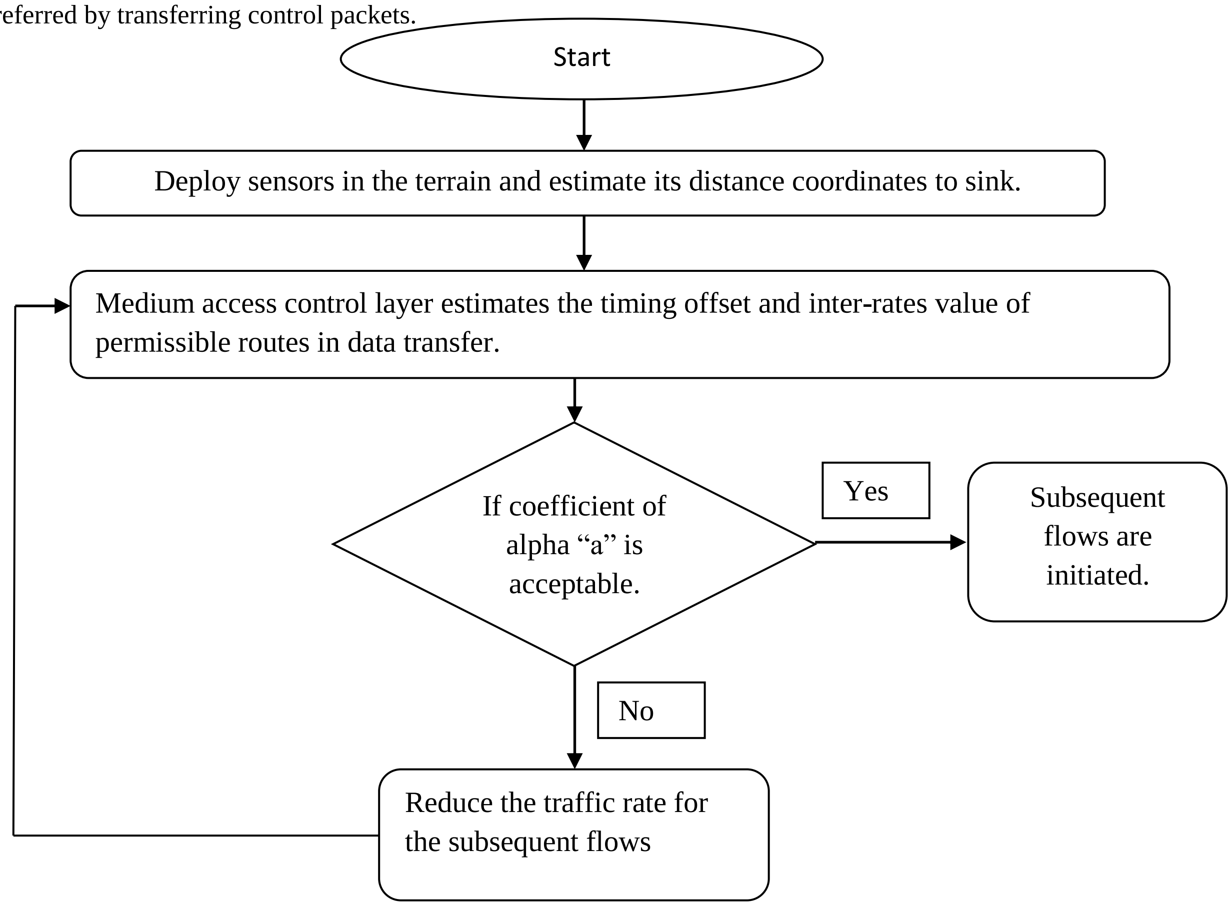
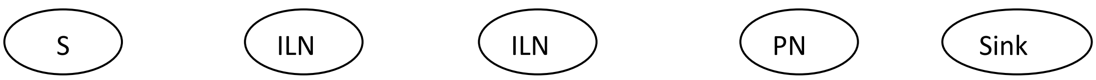


Figure 1, The Functional diagram is shown for proposed work in coefficient alpha.

The figure 1 shows the estimation of routes with reliability factor associated with the timing offset and traffic rate determination in RECAWSN.



The three types of nodes are source (S), interlinking node (ILN) and penultimate node (PN) to sink. This is shown in figure 2. The flow within the route is being described in four levels. The first between source and interlinking node, second between interlinking nodes and third between interlinking node and penultimate node.MAC level timers interrogates and finds alternate path if the “coefficient alpha” decreases altering the source and interlinking node traffic rates.

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IV. SIMULATION RESULTS

The proposed work calculates the connectivity of a node if the communicating distance between them is less than 70 meters.

Parameter used	**Value**
Total area of Deployed sensors	700 × 700 m^2
Total Count of sensors	100 to 200
Total Count of sink	4
Position coordinates of sink	(100,100) (200,200) (300,300), (400,400) and (500,500)
Antenna	Omni-directional Antenna
Total simulation duration	1500 s

Table 1, Parameters incorporated for simulation study.

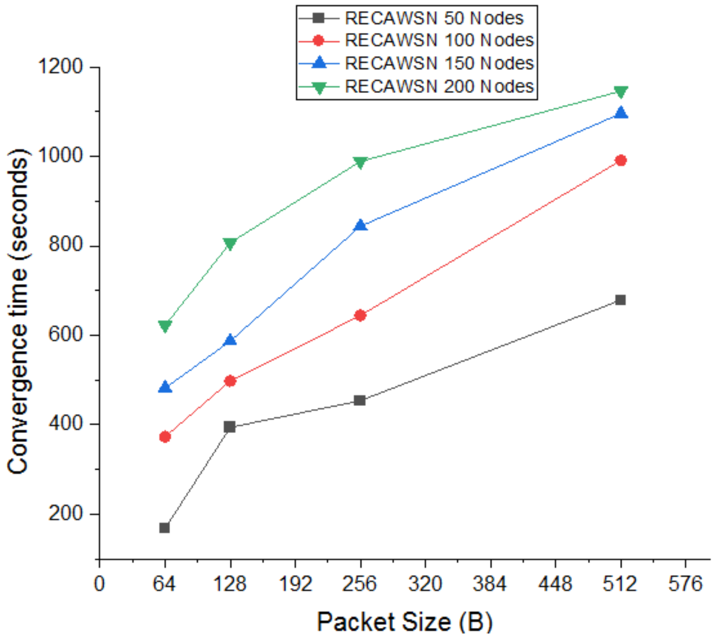

Figure 3. Packet size versus Convergence time.

The figure 3 shows the convergence time versus packet size the protocol scalability has been examined by increasing the count from 50 to 200.

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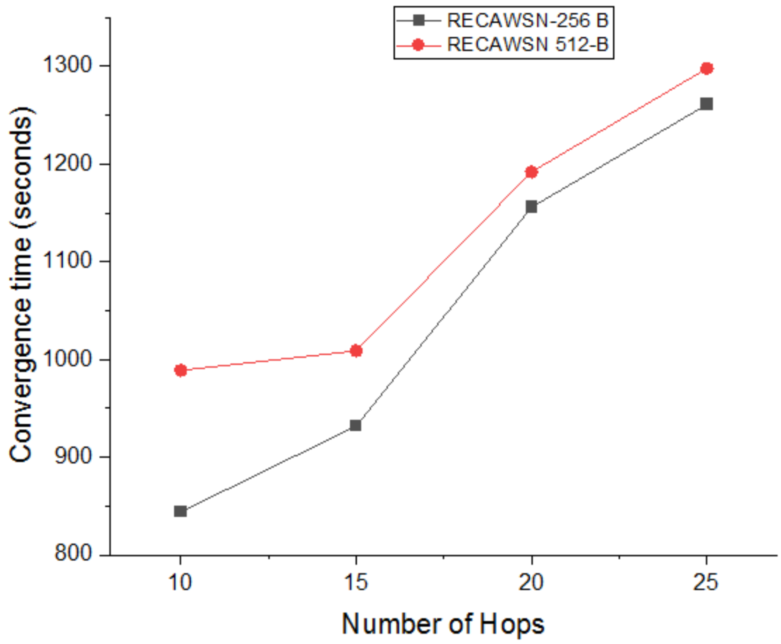

Figure 4. Number of hops versus Convergence time.

The entire simulation duration all sensors have the same holding time. However, the allocation of bigger packets may not appropriate for all flows. Hence inter relating packet size to convergence time is done in Figure 4.

V. CONCLUSION

In RECAWSN the function of source in forwarding and diverging across optimal in wireless environment is associated with a reliability and MAC layer timer. RECAWSN segregates the channels according to the flow and alter the traffic to converge according to match with reliability value. Thus the steady state stability of a route in deterring the next flow is done once the reliability metric becomes less than the defined threshold. The limitation of this work is incorporated in homogenous sensors without mobility and Cronbach's is confined to only unidimensional analysis. Further research would incorporate works involving heterogeneous sensors with mobility models.

REFERENCES

1. Mateos, G., Schizas, I. D., & Giannakis, G. B. (2009, January). Closed-form MSE performance of the distributed LMS algorithm. In 2009 IEEE 13th Digital Signal Processing Workshop and 5th IEEE Signal Processing Education Workshop (pp. 66-71). IEEE.
2. Muniraju, G., Tepedelenlioglu, C., & Spanias, A. (2019). Analysis and design of robust max consensus for wireless sensor networks. IEEE Transactions on Signal and Information Processing over Networks, 5(4), 779-791.
3. Guyeux, C., Haddad, M., Hakem, M., & Lagacherie, M. (2020). Efficient distributed average consensus in wireless sensor networks. Computer Communications, 150, 115-121.
4. Schneider, D., & Frey, H. (2020, July). Analytical Derivation of Outage Correlation in Random Media Access with Application to Average Consensus in Wireless Networks. In 2020 IEEE 31st Annual International Symposium on Personal, Indoor and Mobile Radio Communications (pp. 1-7). IEEE.

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5. Scutari, G., & Barbarossa, S. (2008). Distributed consensus over wireless sensor networks affected by multipath fading. IEEE Transactions on Signal Processing, 56(8), 4100-4106.
6. Chang, J., & Liu, F. (2021). A Byzantine Sensing Network Based on Majority-Consensus Data Aggregation Mechanism. *Sensors*, *21*(1), 248.
7. Kenyeres, M., & Kenyeres, J. (2020). Average consensus over mobile wireless sensor networks: weight matrix guaranteeing convergence without reconfiguration of edge weights. Sensors, 20(13), 3677.
8. Adachi, R., Yamashita, Y., & Kobayashi, K. (2020). Distributed estimation based on weighted data aggregation over delayed sensor networks. IFAC Journal of Systems and Control, 14, 100109.
9. Baccelli, F., Cohen, G., Olsder, G. J., & Quadrat, J. P. (1992). Synchronization and linearity: an algebra for discrete event systems.
10. Aysal, T. C., Sarwate, A. D., & Dimakis, A. G. (2009, October). Reaching consensus in wireless networks with probabilistic broadcast. In 2009 47th Annual Allerton Conference on Communication, Control, and Computing (Allerton) (pp. 732-739). IEEE.
11. Anand, J. V., & Titus, S. (2017). Energy efficiency analysis of effective hydrocast for underwater communication. International Journal of Acoustics & Vibration, 22(1), 44-50.
12. Al Nahas, B., Duquennoy, S., & Landsiedel, O. (2017, November). Network-wide consensus utilizing the capture effect in low-power wireless networks. In Proceedings of the 15th ACM Conference on Embedded Network Sensor Systems (pp. 1-14).
13. Shi, F., Tuo, X., Ran, L., Ren, Z., & Yang, S. X. (2019). Fast convergence time synchronization in wireless sensor networks based on average consensus. IEEE Transactions on Industrial Informatics, 16(2), 1120-1129.
14. Zhang, D., Yuan, Y., & Bi, Y. (2020). A Design of a Time Synchronization Protocol Based on Dynamic Route and Forwarding Certification. Sensors, 20(18), 5061.