Energy Efficient Link Delay Aware Routing In Wireless Sensor Networks

Pullagura Mahesh[1], Nageswara Rao Putta[2], P.Rameswara Anand[3]
[1] Dept of CSE
[2]Associate Professor, Dept of CSE
[3]Professor, Dept of CSE
[1, 2] Swetha Institute of Technology & Science, Tirupathi, Andhra Pradesh-517561
[3]Jigjiga University, Ethiopia

Abstract- *the main aim of this paper is to reduce energy consumption in wireless sensor networks. Wireless sensor nodes suffered with some sudden changes in link quality and node status. By the variation of link quality and node status the end-to-end delays of each sensor node varying. We know that if we want to extend lifetime of this nodes it's very difficult because the sensor nodes are supplied with limited energy only. To avoid this kind of problems, this paper proposes a routing metric, called predicted remaining deliveries (PRD), which combines parameters, including the residual energy, link quality, end-to-end delay, and distance together to achieve better network performance.*

Keywords- predicted remaining deliveries, Wireless Sensor Networks,

I. INTRODUCTION

A Wireless Sensor Network consists of many sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to pass their data through the network to a main location. The more modern networks are bi-directional, also enabling *control* of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications. In this section we are discussing about some previous existing systems.

Annlin Jeba S.V, Gnana King D.R [1] proposed a novel routing mechanism based on the combined effort of the routing metrics link quality, residual energy and authentication. Forwarding node selection is based on weighted approach. By using this method we can increases packet delivery ratio, decreases energy consumption and end-to-end delay.

Chendra sathish kumar [2] described that the purposes of PRD are to balance the energy consumption of the sensor nodes and extend the network lifetime, as well as controlling the end-to-end delay. Large-scale simulations are conducted to evaluate the performance of PRD.

Sai Krishna Mothku [3] explained that a delay- and energy-aware fuzzy-based routing protocol is proposed to take an efficient routing decision in a heterogeneous sensor network. A node's residual energy, link quality, free buffer, and distance (proximity) are considered as the fuzzy input variables. ,e network performance has been measured with different combinations of fuzzy input variables proposed routing protocol reduces the packet dropping rate, and this leads to reduction in delay and energy consumption.

Amit Kore, Dr. Manoj Ranjan Mishra [4] proposed that main aim of this paper is to design and develop an algorithm to achieve secure routing in the IoT environment. Initially, the IoT nodes will be worked for the environment, which will be subjected to the trust computation. As a mark of trust computation, trust will be computed for all the working IoT nodes. Once the trust computation was completed, the IoT nodes will be subjected to perform the Cluster Head (CH) selection, where the CH will be selected using the Leach protocol.

G.M.Nishibha, Mrs.Manchu.M [5] An Energy efficient Delay Aware Lifetime balancing EDAL protocol was proposed in wireless a Sensor network which is promoted by flourishing techniques developed for open vehicle routing Problems with time deadlines. Their proposed system EDAL solves the problem of high energy Consumption in sensor networks by balancing the loads in nodes. The centralized heuristic algorithms generate routes that connect all nodes with minimal total path cost, under the constraints of packet delay requirements.

Ambika, Prof Jyoti .Neginal [6] Proposed a novel link-delay aware energy efficient routing metric called PRD for the routing path selection tailored for WSNs deployed in harsh environments, where the networks are exposed to extremely long end-to-end delay and unbalanced energy consumption among sensor nodes.

II. OVERVIEW OF THE PROPOSED SYSTEM

In this section we are discussing about architecture of the proposed system which is shown in Fig.1. Flowchart for the proposed system shown in Fig.2

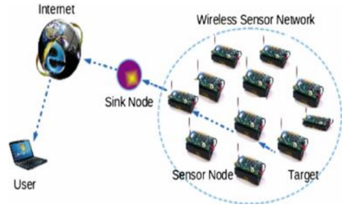

Fig.1 Proposed System Architecture

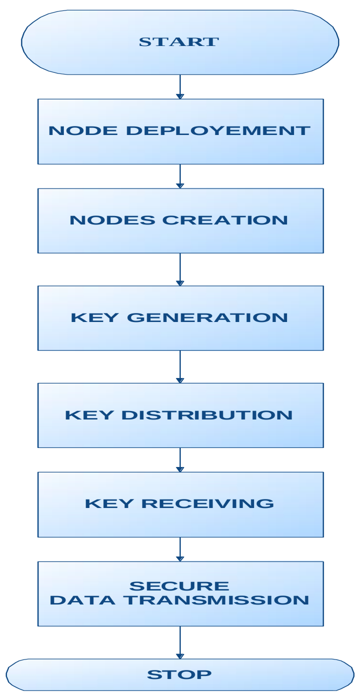

Fig.2 Flowchart for the Proposed System

III. IMPLEMENTATION OF THE PROPOSED SYSTEM

Our proposed system is implemented using 4 modules those are

- Network Model
- Neighbor discovery
- Energy Consumption Model
- Routing Mechanism

Network Model

In this system we develop the Network Model. The model of one WSN is described. The network studied is a directed acyclic graph (DAG) A large number of homogeneous sensor nodes are randomly deployed in a circular sensing area with the radius *R*. The total number of sensor nodes is *N*.

Neighbor discovery

In this module a Node deployment, where the node can be deployed by specifying the number of nodes in the network. After specifying the number of nodes in the network, the nodes are deployed. The nodes are deployed with unique ID (Identity) number so that each can be differentiated. And also nodes are deployed with their energy levels.

Energy Consumption Model

A simplified energy consumption model is applied for the communication energy consumption. The transmitter consumes energy for running the radio electronics and the power amplifier, while the receiver dissipates energy for operating the radio electronics. Both the free space channel model and the multipath fading channel model are applied

Routing Mechanism

In this module, the node distance is configured and then the nodes with their neighbor information are displayed. So the nodes which is near by the node, is selected and the energy level is first calculated to verify the secure transmission.

IV. RESULTS AND DISCUSSIONS

In this section we are discussing about the results of the proposed system. The Fig.3 shows that we entered a value at energy

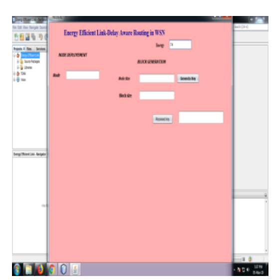

Fig.3 we entered value to the energy

- Next enter the no. of nodes. Here we are using 4 nodes as shown in Fig.4

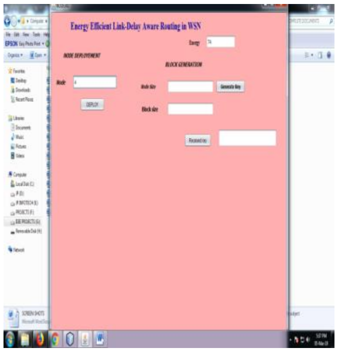

Fig.4 Enter node value as 4

Click on the deploy option shown in Figure. There by it displays node deployed as like Fig.5

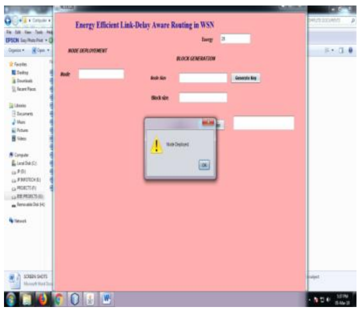

Fig.5 Node Deployed

- 4 nodes are created like Fig.6

Fig.6 4 nodes are created

- Enter the node size and block sizes for all the 4 nodes. Next click on generate key. It generates key. The received key will be displayed at received key box. Next enter the distance. It shows available no. of nodes as shown in the Fig.7

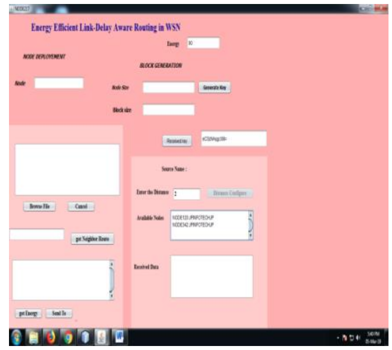

Fig.7 displaying available no. Of nodes

- Next data will be sending to the respective nodes as shown in Fig.8

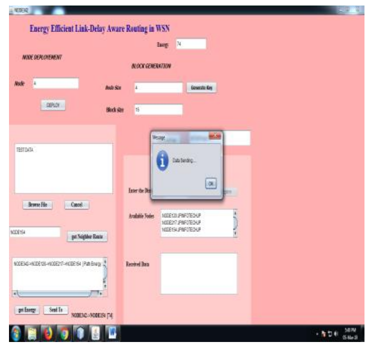

Fig.8 Data sending

CONCLUSION

Energy Efficient Link Delay Aware Routing In Wireless Sensor Networks Implemented Successfully**.** PRD captures the predicted remaining deliveries within one unit of delay, which reflects the ability of each sensor node to forward packets.

REFERENCES

[1] Annlin Jeba S.V, Gnana King D.R.,"Combining Trust with Authentication Information for Routing in Wireless Sensor Networks", IJSRNSC Volume-6, Issue-5, October 2018, E-ISSN: 2321-3256

[2] Chendra sathish kumar, Janarthanam N S, Vijay Kumar B, Kamesh M, "Energy Efficient Link-Delay Aware Routing Using Predicted Remaining Deliveries in Wireless Sensor Networks", International Journal of Innovative Research in Science Engineering and Technology, Vol. 8, Issue 3, March 2019

[3] Sai Krishna Mothku and Rashmi Ranjan Rout, "Adaptive Fuzzy-Based Energy and Delay-Aware Routing Protocol for a Heterogeneous Sensor Network", Journal of Computer Networks and Communications Volume 2019.

[4] Amit Kore, Dr. Manoj Ranjan Mishra, "A Review on Joint IOT and WSN Security for Achieving the Less Energy Consumption", International Journal of Scientific & Technology Research Volume 9, Issue 02, February 2020 ISSN 2277-8616

[5] G.M.Nishibha, Mrs.Manchu.M, Energy Efficient And Delay Aware Routing Method For Wireless Sensor Networks, International Journal Of Advanced Research Trends In Engineering And Technology (IJARTET) Vol. 3, Special Issue 10, March 2016

[6] Ambika, Prof Jyoti .Neginal, Energy Efficient Link-Delay Aware Routing in Wireless Sensor Networks, International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 8, Issue 6, June2019, ISSN: 2278 – 1323