A Study on OLSR- TC Packet based Energy Efficient Routing Scheme

Pragya Sharma
M.Tech Scholar (CSE)
LNCT, Bhopal, India

Dr. Vineet Richhariya
Head of the Department (CSE)
LNCT, Bhopal, India

Abstract— Wireless Sensor network is an important area of research while working or discussing about the different communication medium today. In WSN an efficient routing protocol is require while performing the communication in between various network areas, some important parameters need to be concern while performing a routing algorithm or strategy in between the multiple nodes. A maximum utilization of resources need to concern while we can maximize the lifetime of a network routing nodes. In this paper we are going to survey about the various protocols which are already used by different techniques in WSN. The paper is going to describe about the parameter packet delivery ratio (PDR) using different techniques derived by different research paper and differentiate between them. In this paper we are going to monitor their performance and algorithms used, thus upon discussing different issues we can conclude the problems associated with techniques and the best possible solution to put our efforts to solve existing issues. Upon discussing various issues and authors specification we have come up with the working on process execution time and to work on TC packet modification procedure.

Keywords— Wireless Sensor Network, Energy Routing, OLSR.

I. INTRODUCTION

Wireless Sensor network consist of several thousand or more tiny immobile sensors, also called nodes that are densely deployed in the service area on an ad-hoc basis to sense and transmit regularly some defined characteristics of the surrounding environment. An associated base station collects the information forwarded by the wireless sensor on a data-centric basis. Sensor networks can be seen as an extreme form of ad-hoc networking with very low power devices [4]. WSNs have very limited computing capabilities change their topology quite frequently as per the need of a particular application, and are prone to failures. Main research topics are: routing of data within the sensor network, management of the nodes fault tolerance/reliability, low-power design, and medium access control [6]

Application of WSN- Wireless Sensor Network has follow applications-

1. Environmental control in office buildings.
2. Robot Control.
3. Guidance in machine control.
4. Seismic monitoring.
5. Healthcare environment

Figure 1: TC packet format of OLSR

II. LITERATURE REVIEW

In this paper[1] author describe about the work they performed in the field of WSN for increasing the network lifetime by reducing energy usability in the network routing scenario , they have investigates and performed the research to find reason behind energy depletion and how can mitigate from it. They have proposed multi metric scheme which

was integrated with the existing algorithm OLSR using their routing approach. Authors performed simulation using NS3 environment where they have shown the efficiency in the terms of packet delivery ratio (PDR) which outperform 10-20% more efficient than the existing standard OLSR technique.

Multi metric Scheme:

A routing matrix introduced along with the existing standard OLSR with which the following concept were added for reducing energy consumption at each node to get maximum output from a network in wireless sensor network communication. Packet transmission and Overhearing from the neighbour nodes are two important factor which consider for the energy efficient routing according to their work. They have utilized three routing approach namely 1. MAC queue utilization 2. Residual energy , 3. Node degree. They have changed the proactive manner of standard OLSR and TC packet format in order to make integrated routing scheme. They have used Greedy Heuristic Algorithm for the routing table computation for efficient routing scheme in Enhanced OLSR work done by them. And in future they kept a work in large network to make a network system fast due to their changes done in TC packets. Hence robustness of system can be done by proceeding the work[1].

In the field of WSN for increasing the network lifetime by reducing energy usability in the network routing scenario, they have investigates and performed the research to find reason behind energy depletion and how can mitigate from it. They have proposed multi metric scheme which was integrated with the existing algorithm OLSR using their routing approach. Authors performed simulation using NS3 environment where they have shown the efficiency in the terms of packet delivery ratio (PDR) which outperform 10-20% more efficient than the existing standard OLSR technique.

Limited energy of the sensor nodes is the main constraint in operation of the network. In this paper they have stated that various limited energy of the wireless sensor node is always arise an issue in the routing protocol with energy efficiency and they proposed that a leader selection algorithm for these routing protocol to enhance the network lifetime to a greater extent. Distance of the node from the base station, degree of connectivity of the node and trust level of the node is individually analyzed and is linearly combined with weights associated with each parameter. This gives overall potential function of a node to become a leader. The number of round after which leader selection takes place is also equated. Through simulation the algorithm is compared with traditional energy –distance based method for routing protocols LBEERA, OREC, PEGASIS and SHORT. Significant improvement of network lifetime is Obtained using this leader selection algorithm. Highest improvement of more than 8% increase in network lifetime is observed when distance of the node from the base station is given a higher linear combination weight.

They have worked with three major parameters in designing the protocol as listed below.

1. Distance of the node from the node from the sink.
2. Degree of the node
3. Trust level of the node.

Finally they have concluded stated that node from the base station, degree of connectivity of the node and trust level of the node coupled with its instantaneous energy determines the potential of a node to be a leader. They have mentioned for future work can be done to calculate or acquiring an optimal value for linear combination values at which the network lifetime enhancement is maximum.[2]

In this paper they discuss and evaluate the performance of OLSR protocol on the basis of MPR count ,"HELLO" message sent ,routing traffic sent and received, total TC message sent and forward, total hello message and TC traffic sent are analysis. OLSR is a proactive link state routing protocol, in this a node is immediately able to route (or drop) a packet. Link-state routing algorithms choose best route by determining various characteristics like link load, delay, bandwidth etc. Link-state routes are more reliable, stable and accurate in calculating best route and more complicated than hop count. In this routing each node expand a spanning tree and each node can obtain the whole network topology. Periodic message is broadcast over the network to update the topological information of each node. MPR is used to minimize the flooding of broadcast packet in the network by reducing duplicate retransmission in the same region. In this paper, MANET routing protocol in the OLSR were performance analyzed. The performance of OLSR protocol through a network different size carried out a comparative analysis of the performance and found it had better performance in all aspects in a network. The performance of OLSR which can be achieved by Hello Traffic Sent (bit/sec), Total TC message sent (TTMS) and Total TC message forward (TTMF), Total hello message and TC traffic sent (bit/sec), Routing traffic received (pkt/s), Routing traffic sent (pkt/s), MPR Count.[3]

In wireless sensor network many of the routing schemes are developed to find lowest energy path for increasing the lifetime of the network. In this paper they take the view always using lowest energy path may not optimal from the point of view of network lifetime. They propose a new scheme called "Energy aware routing" uses suboptimal paths to provide substantial gains. It is a reactive routing and destination initiated protocol where the consumer of data initiates the route request and maintains the route. Multiple paths are maintained from source to destination.

However, diffusion sends data along all the paths at regular intervals, while energy aware routing uses only one path at all times. But due to the probabilistic choice of routes, it can continuously evaluate different routes and choose the probabilities accordingly.

The protocol has three phase

1. Setup phase or interest propagation
2. Data Communication phase or data propagation
3. Route maintenance [4]

In paper [11] Kirchi P. proposed a technique in which OLSR modification is made and investigated in order to improve or lower the cost. They have presented a recursive based localization technique over the adhoc network which is composed and made up of wireless sensor network. According to their algorithm some nearest node using localization method can be found itself. They have presented the work using DV schema and OLSR technique.

In research [12] Marimuthu and Mohanapriya proposed a paper on OLSR modification and working with MANET system which resist to DOS attack and effectively process the data in communication system. Such that in the paper they worked on vulnerabilities of a pro-active routing protocol called optimized link state routing (OLSR) against a specific type of denial-of-service, a trust based technique to secure the OLSR nodes against the attack.the work is to detect whether a node is advertising correct topology information or not by verifying its Hello packets, thus detecting node isolation attacks, their routing security with 45% increase in packet delivery ratio and 44% reduction in packet loss rate when compared to standard OLSR under node isolation attack.

In Paper [13] Boushaba, fez, fez described an enhancement of OLSR which is MP-OLSR (Multipath Optimized Link State Routing Protocol), in their according in order to find multiple paths, MP-OLSR uses the multipath Dijkstra's algorithm. The algorithm obtains considerable flexibility and scalability by using the cost functions, route recovery and loop detection mechanisms in order to improve MANETs performances.their algorithm overcome several drawback and a hybrid approach using Weighted Round-Robin (WRR) scheduling algorithm to MP-OLSR for supporting heterogeneous multiple paths with different hop count. And, we proposed also a Fuzzy Logic Controller (FLC) to adapt the cost functions as function of hop count metric. The parameters improved by them were PDF, end to end day.

III. PROBLEM IDENTIFICATIO

On studying the current scenario and work already done by the authors we analyzed that there is still need some issues to be resolved which is given by the authors. There are some problems identified as TC packet modification process needs to enhance such that it can give same performance on large network. TC packet modification is reducing the slow process due to extra operation in greedy algorithm. Optimization process is required where packet transfer topology and algorithm need to investigate.

IV. PROPOSED WORK

The proposed work can be done in following steps to resolve slowdown process:
1. TC packet modification and multiple topology need to be apply and we will monitor PDR using different topology and techniques.
2. Finally we will conclude and optimize our algorithm using efficient topology which outperform good result in case of packet delivery ratio.

V. CONCLUSIONS

In this Paper we have discussed review about the various techniques were used by different author for energy consumption and depletion scenario and various techniques used by them. Different author proposed their work and simulation using Network simulator in order to demonstrate the algorithm in wireless sensor network. We have investigated the latest paper about the energy depletion and mitigation in which author have given the integration of three efficient point which enhanced the power of OLSR and improved the PDR by 5-10%. furthermore we have come to analyse we still need to improve the communication cost while maintaining the same performance in the current algorithm, thus our further work will be on to working in the area of time consumption in the communication with wireless sensor Network.

REFERENCES
[1] Evripidis Paraskevas, Kyriakos Manousakis, Subir Dasand John S. Baras in paper "Multi-Metric Energy Efficient Routing in Mobile Ad-Hoc Networks"2014 IEEE Military Communications Conference.
[2] Joy deep Banerjee & Mrinal Kanti Naskar, Utpal Biswas in paper "Leader Selection in Wireless Sensor Networks An Energy Efficient Approach" 2014 International Conference on Control, Instrumentation, Energy,and,Communication(CIEC).
[3] Kuldeep Vats, Monika Sac deva, Dr. Krishan Saluja, Amit Rathee in paper "Simulation and Performance Analysis of OLSR Routing Protocol Using OPNET" 2012, IJARCSSE.
[4] Rahul C. Shah and Jan M. Rabaey" Energy Aware Routing for Low Energy Ad Hoc Sensor Networks"F29601-99- 1- 0169 entitled, "Communication/Computation Pico nodes for Sensor Networks".
[5] Sonali Sen Baidya and Abhishek Baidya "Energy Conservation in a wireless Sensor Network by an efficient Routing Mechanism" 2015 International conference on communication, Information & Computing Technology.
[6] Charu Gupta and Pankaj Sharma "Implementation of Energy Aware Routing Protocol for Mobile Ad Hoc Networks" 2013, IJARCSSE.
[7] N. Kumar and Dr. C. Suresh Gnana Dhass "Power Aware Routing Protocols in Mobile Adhoc Networks, 2012 IJARCSSE.
[8] Nguyen Duy Tan and Nguyen Dinh Viet "Sleep scheduled and Tree –Based Clustering Routing Protocol for Energy –Efficient in Wireless Sensor Networks" 2015, International Conference on Computing & Communication Technologies.

[9]   Shital Vaibhavraj gharge and Srinu Dharavath "Virtualization of Wireless Sensor Network with Efficient Power Saving Scheme" 2015, International Conference on Communication, Information & Computing Technology(ICCICT).

[10]   YI Gao & Wei Dong "COPE: Improving Energy Efficiency with Coded Preambles in Low Power Sensor Networks" 2015, IEEE Transaction and Industrial Informatics.

[11]   Kirci, P. ; Dept. of Comput. Eng., Istanbul Univ., Istanbul, Turkey; Chaouchi, H. ; Laouiti, A." Wireless Sensor Networks and Efficient Localisation", IEEE 2014.

[12]   Marimuthu, Mohanapriya ; Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu, India ; Krishnamurthi, Ilango," Enhanced OLSR for defences against DOS attack in ad hoc networks " IEEE 2013.

[13]   Boushaba, A. ; LIM Lab., Sidi Mohamed Ben Abdellah Univ., Fez, Morocco ; Benabbou, A. ; Benabbou, R. ; Zahi, A.," An enhanced MP-OLSR protocol for MANETs ",IEEE 2014.

[14]   Boushaba, A.; Benabbou, A.; Benabbou, R.; Zahi, A.; Oumsis, M.," Optimization on OLSR protocol for reducing topology control packets " IEEE 2014.