International Journal of Advanced Technology & Engineering Research (IJATER)
www.ijater.com

Power Utilization based Cluster Head selection for Efficient route Decision in WSN

Seema Rajurkar
M.Tech. Scholar of Computer Science & Engg.
Technocrats Institute of Technology, Bhopal
seemarajurkar17@gmail.com

Prof Dr. Vivek Sharma
Faculty of Computer Science & Engg.
Technocrats Institute of Technology, Bhopal
sharma.vivek95@yahoo.in

***Abstract*— The WSN is decentralized network and nodes are gratis to move in limited radio range for communication. The routing protocol is performing important role for communication and better routing strategy is reduces the un-necessary energy consumption and enhances the exploitation of energy. LEACH is the energy efficient protocol and this protocol is only designed for energy based routing. In this paper we proposed a new multipath routing strategy with higher energy node selection scheme for selection of Cluster Head (CH) and route establishment. Route capable sensor generate the election message and higher energy base cluster head are selected which is future provide the service to all member node within the region, multi hop technique also provide inter cluster communication and minimize the energy consumption as well as routing overhead. In this research we modify the routing strategy of LEER and provide new name as power utilization energy efficient routing (PULEER) in this method cluster head selection based on the calculation of power utilization of node and its contain energy which helps to increase the network life time. While the sensor node guaranteed to number of packet sends higher and also duration of node aliveness is longer than other sensor node, than select those node as cluster head which provide service to all member node (low energy node) and transmit data to base station through inter cluster communication or direct same cluster head to base station via mobile device. PULEER design efficient energy utilization base cluster head selection for increasing life time of the network. The network performance is measure by performance metrics like nodes alive, overhead and throughput in dynamic network.**

Keyword: - LEACH, PULEER, Routing, Clustering, Energy, MANET.

I. INTRODUCTION

Recent advances in technology have created cheap, low-power Ad-hoc wireless sensors a reality. Device networks shaped from such sensors are often deployed in a poster hoc fashion and collaborate to sense and method a natural phenomenon. As every device contains a finite battery source, a vital feature of device network is energy potency to increase the network's period of time.

Each node in a very device network is usually equipped with one or additional sensors, a radio transceiver or different Ad-hoc wireless communications device, a little microcontroller, an energy source, since in most Wireless device network applications the energy source could be a battery, energy plays a vital role in Ad-hoc wireless device network, and conserving the consumed energy of every node is a vital goal that has to be thought-about once developing a routing protocol for wireless device networks. Many routing protocols have been proposed in the literature such as LEACH [2]. Leach is considered as the most popular routing protocol that use cluster based mostly routing so as to attenuate the energy consumption; during this we discuss Associate in improvement on the Leach Protocol that any enhance the ability consumption, our protocol is anticipated to trounce Leach protocol in term of energy consumption.

In this paper describe the routing, rushing and data modification attack detection using trust management technique. The article divide multiple section in the section I describe background the MANET, section II detail describe about existing work done in field of power and cluster management methodology, section III explain about our proposed work, section IV define the proposed architecture of trust management network, in section V explain the simulation parameters, section VI Performance Parameters, section VII explain result outcomes and finally section VIII describe about conclusion of article.

II. LITERATURE SURVEY

In this section describe about various Power aware cluster head selection methodology which reduce the energy consumption and efficient route selection under WSN. Those work useful for future research contribution in the field of WSN.

G. Satya Vijaya Vagdevi, et al.[1] "LEER: Energy Efficient Routing Protocol for Low Energy Nodes in Wireless Sensor Networks" during this title we have a tendency to propose a replacement protocol LEER (Low Energy nodes Efficient Routing) which primarily focus on optimizing the energy consumption of low energy nodes. It has two alternatives namely LEER-Single hop and LEER Multihop. In this paper, we measure up to LEER with Low Energy Adaptive Clustering Hierarchy (LEACH), Threshold Sensitive Energy Efficient sensor Network (TEEN) and Pair wise Energy Efficient Routing (PEER). The performance metrics thought of are network time period, energy strength, the quantity of dead nodes per spherical and also the time until initial node is dead.

Jaeyoung Kang, et al. [2] "Enhanced Message-Passing Based LEACH Protocol for Wireless Sensor Networks" this subject proposes a distributed energy-efficient bunch protocol

for wireless sensing element networks (WSNs). Supported low-energy adaptation bunch hierarchy (LEACH) protocol, the planned LEACH-extended Message-Passing (LEACH-XMP) well improves a cluster formation rule that is crucial for WSN operations. Not like the previous approaches, a practical non-linear energy consumption model is taken into account that renders the bunch optimization extremely nonlinear and difficult. To the present finish, a progressive message-passing approach is introduced to develop associate economical distributed rule. The most edges of the planned technique are its inherent nature of a distributed rule and also the saving of machine load obligatory for every node. Thus, it proves helpful for a sensible readying. Additionally, the planned rule speedily converges to a really correct answer among much iteration. Simulation results make sure that the planned LEACH-XMP maximizes the network time period and outperforms existing techniques systematically.

Vinay Kehar, Rajdeep Singh,[3] "Evaluating the Performance of Reactive I-LEACH"**,** In during this title we have a tendency to discuss residual energy is taken into account one among main parameter in call tree; protection mechanism is additionally accustomed maintain the balance between clusters. The situation of base station is additionally optimized in such how that base station are placed within the high node density region at runtime. Planned technique is deliberate and dead in MATLAB. Planned rule provides higher results than existing bunch protocols.

Jae-Hwan Chang et al.[4] "Flow Augmentation and Flow Redirection Energy-Conserving Routing" during this title we have a tendency to discuss two algorithms with the aim of extending the network time period via optimizing the routing from an energy consumption perspective. Their solutions area unit targeted toward networks with static or slowly ever-changing topology. They outline the matter as increasing the minimum time period of all nodes. The goal is to search out the most effective link price operate which is able to result in the maximization of the system time period.

Toh, C.-K. [5] Maximum battery life routing to support ubiquitous mobile computing in wireless ad hoc networks" " in a very power-aware routing protocol that distributes power consumption equally over nodes and minimizes the general transmission power is planned. This protocol uses the conditional max-min battery capability routing (CMMBCR) theme. It uses battery capability rather than a value operates as a route choice metric. Once all nodes on some doable routes between a source and a destination have ample remaining energy on top of an explicit price, the route with the minimum total transmission power (MTRP) among these routes is chosen.

P.Sivakumar, M.Radhika, [6] "Performance Analysis of LEACH-GA over LEACH and LEACH-C in WSN" we have a tendency to discuss a wireless sensing element network (WSN) may be a assortment of sensing element nodes that has a capability to support Sensing, Signal process, Embedded Computing, Communications and property for processing and transmit the data to way placed sink nodes through intermediate nodes with the assistance of energy source specifically batteries. However, the time period of the network are often analyzed with the offered node energy whereas transmittal an information from source to destination. Thus it's necessary to boost the time period of the network for higher performance. For the past few decades, researchers developed several new hierarchic routing protocols to boost the network time period by minimizing the node energy consumption, which incorporates Genetic Algorithm based Low Energy Adaptive Clustering Hierarchical Routing Protocol (LEACH-GA). In this paper, we analyzed a network lifetime of LEACH, LEACH-C and LEACH GA by varying its Initial Energy and Cluster Probability.

Nakul Sorout, Mahesh Singh [7] "Obtaining Security and Energy Efficiency for Leach-Clustering Protocol in Wireless Sensor Network" This title introduces a unique cryptography strategy for getting security and energy potency for LEACH-C protocol in WSN. The introduced strategy employs a hybrid technique consisting each reasonably cryptography methods like public key cryptography and secret key cryptography each. Within the introduced strategy the session secret's distributed to many nodes utilizing public key cryptography mechanism that improves network security and conjointly consumes low energy. For information aggregation plain mechanism (in-network information aggregation) is used. The introduced mechanism is compared with public key cryptography with hidden information aggregation and in network information aggregation.

Zhenfu Ma, et al.[8] "Improvement on LEACH-C Protocol of Wireless Sensor Network (LEACH-CC)" This title presents associate improvement of LEACH-C supported power, known as Low-Energy adaptive bunch Hierarchy-central affected (LEACH-CC), that balances energy distribution of network by suggests that of fixing vary of nodes being cluster head.

Hasan Al-Refai, et .al "Efficient Routing Leach (ER-Leach) Enhanced On Leach Protocol In Wireless Sensor Networks"[9] during this title, we have a tendency to introduce associate economical Routing LEACH (ER-LEACH) that may be a changed version of the documented LEACH protocol; ER-LEACH proposes important solutions to some shortcomings of the pure LEACH. ER-LEACH is predicted to perform well particularly once the quality is high and can prolong the general network time period through load equalization. OMNET++ machine are accustomed prove that ER-LEACH performs higher than LEACH protocol.

Anil Singh, Shashikala Tapaswi [10] "An Adaptative Energy Efficient Routing Protocol for MANET" This title proposes a hybrid protocol, known as Poly-Meshed routing protocol (PMRP). It's a cluster-based routing protocol. It deploys the idea of mesh tree. It decreased the management overhead whereas maintaining sturdy property and measurability. PMRP unambiguously addresses the problems of dynamic adaptation. It's a feature that permits associate increased property through a hierarchic cluster primarily based approach. It deploys virtual identifiers. The most advantage of PMRP over the assorted different MANET protocols lies in simplicity and low message complexness. The simulation results show that the PMRP perform higher in terms of Packet Delivery magnitude relation, Routing Overhead, finish to finish delay, Effects of Non-Optimality, Configurability and Energy Consumption in comparison with AODV (Ad hoc On demand Distance Vector) protocol.

Kanakala,Venugopal Reddy Ananthula, et al. [11] "Energy-Efficient Cluster Based Routing Protocol in Mobile Ad Hoc Networks Using Network Coding" during this title, we

tend to take into account the problems of energy economical communication in MANETs using network secret writing. Network secret writing is a good technique to boost the performance of wireless networks. COPE protocol implements network secret writing idea to cut back range of transmissions by commixture the packets at intermediate nodes. we have a tendency to incorporate COPE into cluster primarily based routing protocol to more scale back the energy consumption. The planned energy-efficient coding-aware cluster based routing protocol (ECCRP) theme applies network coding at cluster heads to scale back variety of transmissions. We tend to additionally modify the queue management procedure of COPE protocol to more improve secret writing opportunities. We have a tendency to conjointly modify the queue management procedure of COPE protocol to more improve secret writing opportunities. We have a tendency to conjointly use associate energy economical theme whereas choosing the cluster head. It helps to extend the life time of the network. We have a predisposition to measure the performance of planned energy economical cluster primarily based protocol using simulation. Simulation results show that the planned ECCRP rule reduces energy consumption and will increase life time of the network.

Arun, Parbhat Verma,[12] "Improvement of Energy efficient leach protocol in WSN" In this paper we in attendance leach protocol and we use heterogeneous nodes for data transmission through the optimal path flanked by cluster heads (CHs) and the base station (BS). In LEACH, Non-Cluster head Nodes choose to link a cluster head based on Received Signal Strength (RSS) of receiving packets from CHs. LEACH protocol and enhanced LEACH and multi-level LEACH protocols like MLEACH protocol, DD-LEACH protocol and TL-LEACH protocol is contrast.

K.Prasanth, P.Sivakumar [13] "Cluster Structure Based Energy Efficient Improvement for MANET" This title presents a secure and energy-efficient geocast forwarding for MANET supported a stratified clustered structure with reduction of packet dropping from the base station(BS) and access point(AP), all nodes placed in one or additional geocast regions. Our protocol consists of 2 major elements that area unit protects from attackers and permit overall energy savings. initial of all the hierarchic formation supported cliques and an idea of information aggregation permits US to make a sturdy, quick and secure foundation for routing of knowledge, Next geocast diffusion itself is solely offer information forwarding and reduced an exploration introduce the network that's a step of causation data(s). Our protocol performs higher in terms of less broadcast rounds overhead than the one in. For security a three-tier general framework is employed, that let utilize of any try wise key pre distribution arrange as its indispensable element. To decrease the compensation caused by copy attacks we have a tendency to cover reinforced the authentication device between the sensing element nodes and also the stationary access node (AP) within the planned framework. Through The analysis is completed discrimination network machine a pair of (NS2) it's a packet level machine with trace level analysis.

Rajwinder Kaur, et al.[14] "Enhanced Inter Cluster Data Aggregation based RN-LEACH Protocol using Hybrid PSO-GA"In this title has projected a novel rendezvous nodes based LEACH (RN-LEACH) by using the hybrid PSO-GA depended inter cluster data aggregation. The hybrid PSO-GA based technique has enhanced the path selection between the sink and cluster heads to reduce the energy expenditure of cluster heads in an optimistic manner.

Santhi G, Soundararajan N, et al.[15] "An Energy Efficient Cluster Based Routing and Localization in MANET for Emergency Scenario" A localization technique with few anchor nodes within the sensing element network that is aware of its position and assists the unknown nodes in characteristic their positions is mentioned during this title. bunch the sensing element nodes helps in localization of the sensing element nodes and it's evidenced to be one among the most effective ways to cut back the energy consumption within the wireless sensing element network since it reduces the time delay, the transmission distance and time. The planned work is compared with AODV routing rule and located economical than it.

K. Pavai, D. Sridharan, et al. [16] "Energy and Link Quality Based Routing for Data Gathering Tree in Wireless Sensor Networks Under TINYOS - 2.X planned ELQR as associate energy aware link quality expert, that takes into consideration the residual energy jointly of the issue before choosing the route. In CTP the node with higher link quality is chosen as parent most of the time and is that the one that is concerned in most of the communication, that drains out such smart link quality nodes and leads to network disconnection. So as to avoid this drawback, a routing protocol is planned to balance the traffic load among the doable routes. this can be done by having residual energy as a choice think about the routing tables and this info is changed between the neighboring nodes.

III. Proposed Energy Based Approach

As many researcher design protocol in Wireless Mobile Sensor Network and minimize the energy utilization of the network in that contrast cluster base region creation is one of the major energy efficient technique.

Low energy adaptive cluster head (LEACH) one of the popular WSN protocol which manage to form cluster and select the cluster head for route selection between source to base station through mobile device. LEACH protocol use time division multiple access to select cluster head based on higher energy, but those work further enhance through low energy efficient routing (LEER) which is two types, single and multiple hop based routing. In single hop condition source device directly communicate through base station but that increase overhead and wastage the energy another side multi hop routing method LEER classify sensor node classify in two category such as route capable and non capable. Route capable sensor generate the election message and higher energy base cluster head are selected which is future provide the service to all member node within the region, multi hop technique also provide inter cluster communication and minimize the energy consumption as well as routing overhead. In our propose work we modify the routing strategy of LEER and provide new name as power utilization energy efficient routing (PULEER) in this method cluster head selection based on the calculation of power utilization of node and its contain energy which helps to increase the network life time. While the sensor node guaranteed to number of packet sends higher and also duration of node aliveness is longer than other sensor node, than select those node as cluster head which provide service to all member

node (low energy node) and transmit data to base station through inter cluster communication or direct same cluster head to base station via mobile device.

PULEER design efficient energy utilization base cluster head selection for increasing life time of the network, for that work achievement, initially we deploy the mobile sensor node, define antenna type, routing protocol and Mac standard after that create sender and receiver node. Next phase is a cluster head selection, for that case we generate the election message that contain the energy of itself and pass to the next hop, that packet received by the new hop and compare with energy of all other node with self if their energy is higher than the other than, that node win as cluster head else maximum energy contain node in the table as cluster head. After cluster head selection, cluster head node broadcast wining message to all other sensor node, next phase is a routing phase in that case sender sensor generate the route request packet and search the path from sender to receiver and cluster head takes the decision as maximum energy contain as well as minimum power consumption sensor node as a routed nodes and select the path. After the path selection we send the data from sender to receiver via mobile node to base station and create the output files name as trace file and NAM (network animator file) with the help of trace file we retrieve the energy utilization of each sensor node, cluster head information and transmission and receiving energy use by nodes as well as node position, packet delivery ratio and throughput etc.

Informal description of Algorithms

Low energy adaptive cluster head (LEACH) routing is capable to communicate within sensor network and its enhances by Low Energy Efficient Routing (LEER) technique. In this algorithm elect the cluster head based on per packet power utilization based method and calculate their estimate life time. That method is more efficient as compare to LEER protocol and minimize the energy consumption from the WSN network. In the below Power utilization based low energy efficient routing (PULEER) are design and simulate through network simulator-2.

Algorithm: Power utilization based cluster head selection for efficient routing in WSN

Input:

WSN: sensor field
BS: base station
M: mobile node
$S_{n:}$ Sensor nodes
P_i: initial energy of i^{th} node
Th_i: threshold energy 10 joule
P_{ui}: per packet energy utilization
P_{tx}: Transmission Power
tx_{time}: Transmission time second
P_{rcv}: receiving power
P_{idle}: idle power
$idle_{time}$: Idle transmission
Ch: Cluster head
Ψ: radio range 550m^2
Rp: AOMDV routing protocol
T_x: transmitter node

Output: Alive node, PDR, end to end delay, energy utilization, residual energy

Procedure:

S_i under sensor field
S_i generate election message
If S_{n-1} in Ψ && $S_{n-1} \geq Th_i$ **Then**
    Receives S_{n-1} receives election message
    Calculate each node self P_{ui}
    $P_{ui} = (P_{tx} * tx_{time} + P_{rcv} * rcv_{time} + P_{idle} * idle_{time})$
    Compare P_{ui} of all S_n
        If P_{ui} of S_i higher **Then**
            S_i select as cluster head
            S_i broadcast CH message to all S_n
        S_n join with S_i for future communication
        End if
End if
S_k want transmit data to BS
    If S_k is Ψ of S_i(CH) **Then**
        S_i call AOMDV (Source Id, BS id, Packet)
        While S_l(Ch) || M in ψ **do**
        Forward route packet to S_l or M node
        S_l or M send route packet to BS
        BS create reverse path to S_i
    S_i apply search to send acknowledge packet to S_k
        End do
        S_k as T_x generate data (S_k, BS, data)
        If S_i is Ch of S_k **Then**
            Data forward (S_i)
            S_i responsible to send data (S_k, BS, data)
        Else
            No Cluster head found
            Election message generate by S_k
        End if
    End if

IV. Proposed Architecture

In this section design the working architecture for low energy based reliable communication service discover, proposed work are divided into three architecture i.e. internal (NS-2) module, middle level (interaction and scenario generator) and external module for output analysis. Very first we initialized the mobile sensor node and configure the initial parameter and call internal module of E-LEACH, efficient low energy adaptive hierarchical clustering provide TDMA (time division multiple accesses) based cluster head selection process. For the execution of E-LEACH, any of the mobile nodes generate the election message and broadcast the packet in the network, while the election message receives by the all neighbour node, elect cluster head based on higher energy, low mobility and maximum connective position. Cluster head are responsible for member living, joining and energy information etc. cluster head also provide the route information from source to receiver, based on energy and mobility. TDMA manage the new cluster head selection while previous cluster head energy is low. In the last section generate the output file and extract the result of number on member node in each cluster, live node information, throughput, packet delivery ratio and overhead. Our proposed architecture is deploying that following manner.

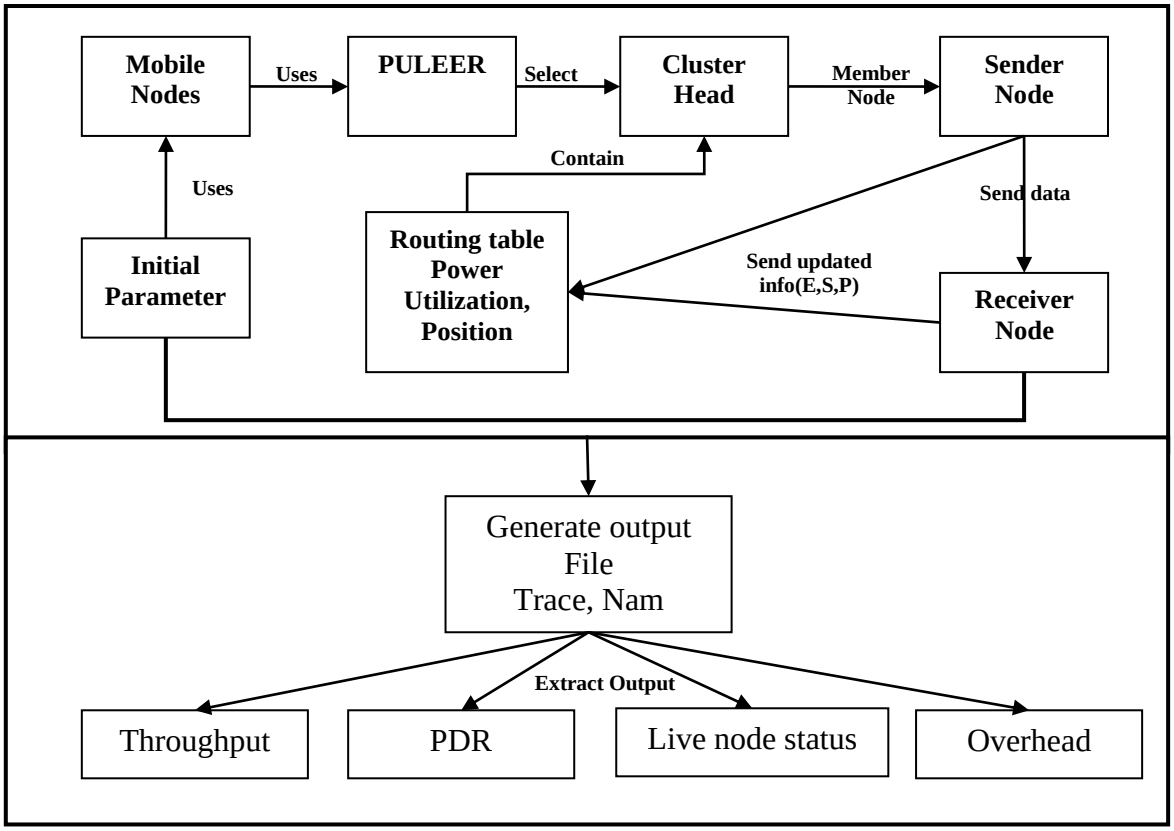

Figure1: Trust implementation Architecture

V. Simulation Parameters

Table 5.1 are represents the following simulation parameters to make the scenario of routing protocols. The detailed simulation model is based on network simulator-2 (ver-2.31)[17], is used in the evaluation. The NS instructions can be used to define the topology structure of the network and the motion mode of the nodes, to configure the service source and the receiver etc.

Table 1 Simulation parameters will uses for simulation

Parameters	Value
Network Area	1000*1000
Network Type	WSN
Nodes/Devices	100
Physical Medium	Wireless
Simulation Time	100 seconds
Energy Depletion	Signal Strength and distance based
Protocol	LEACH, TEEN, LEER, PULEER
Traffic Type	CBR, FTP
Number of Connection	20
Propagation radio model	Two ray ground
Rate	Random
Maximum Round	1000

VI. Performance Parameter

There are following different performance metrics have been considered to make the comparative study of these routing protocols through simulation.

1) Routing overhead: This metric describes how many routing packets for route discovery and route maintenance need to be sent so as to propagate the data packets.

2) Average Delay: This metric represents average end-to-end delay and indicates how long it took for a packet to travel from the source to the application layer of the destination.

3) Throughput: This metric represents the total number of bits forwarded to higher layers per second. It is measured in bps

4) Packet Delivery Ratio: The ratio between the amount of incoming data packets and actually received data packets.

VII. Simulation Results

In this section evaluate the simulation result in terms of data receive, drop, delay, PDR and overhead. All those result comparative analysis in normal AODV, routing-rushing attack and data modification attack scenarios.

a) Alive Node Analysis

The number of node alive more time in network is shows the exchange of data is possible. The data retransmission is

consumes larger amount of energy by that the proper utilization of limited energy resource is affected.

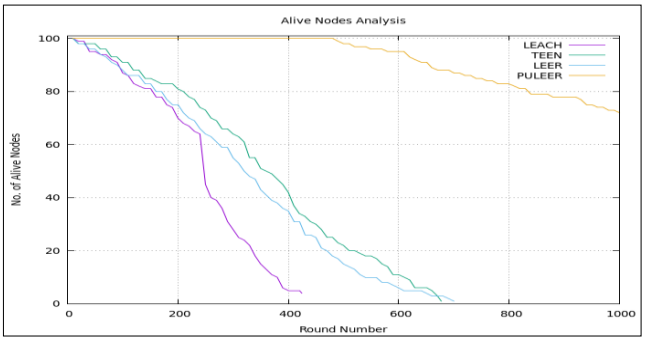

Figure 2: Nodes Alive Analysis

This graph represents the alive nodes analysis in case of proposed PULEER and rest of protocols at simulation time of 1000 seconds. In this graph we clearly notice the smooth depletion of energy from initial energy to energy remain in nodes after the end of simulation time. It means the proposed scheme based routing selection strategy are maintained the reliability in network.

b) Normal Routing Load Analysis

The routing packets flooded by sender in network for finding destination. The routing protocols are established route in between sender and receiver before data delivery. The number of routing packets quantity is represents the possibility of retransmission of data packets in network. The number of routing packets flooding quantity in PULEER is about 5% but LEECH, TEEN and LEER protocols the performance is more than 5%. Packets are flooded in network that consumes needless energy in network. The minimization in routing load provides better results in terms of energy utilization and better performance.

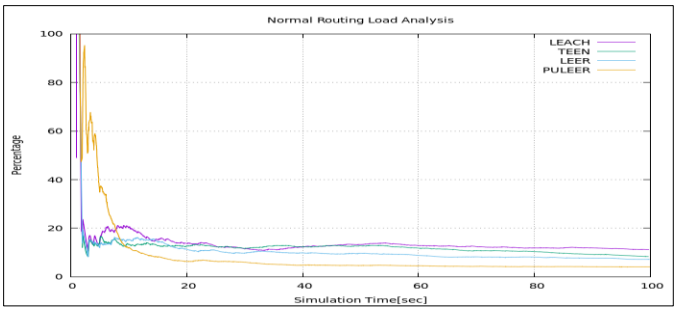

Figure 3: Normal Routing Load Analysis

c) Packet Delivery Ratio Analysis

The performance of data packets receiving in term of percentage of data with respect to send is measured through PDR performance metrics. The better data receiving percentage in proposed PULEER is improving the routing performance and provides efficient energy consumption of mobile nodes. The normal LEACH, TEEN and LEER is not able to provide efficient energy consumption. The PULEER approach is utilizes the energy of mobile nodes as compare to normal leach. The proposed approach is reduces the possibilities of retransmission by that packets drooping is minimizes and receiving enhanced in network.

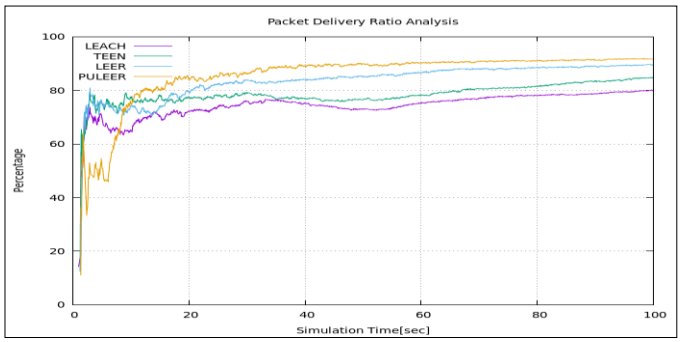

Figure 4: PDR Analysis

d) Average Energy Consumption Analysis

The particular node selection in routing is enhancing the possibility of link breakage but proposed approach selects the nodes according to their higher energy level. This graph shows the Average Energy Consumption analysis of LEACH, TEEN, LEER and proposed modified LEACH or PULEER. The better performance shows that the number of cluster formation in case of PULEER protocol and the number of members in this protocol is bonded strongly. The proposed better routing approach is saves the lot of energy of sensor nodes because of that the energy consumption is minimum.

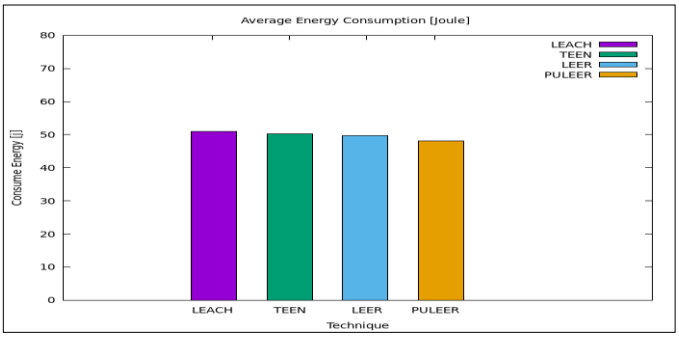

Figure 5: Average Energy Consumption Analysis

e) Average Residual Energy Analysis

The packets receiving are better and retransmission is controlled by selecting the route through proposed PULEER approach. Then sensor nodes that contain enough amount of energy is provide appropriate connection in between sender and receiver.

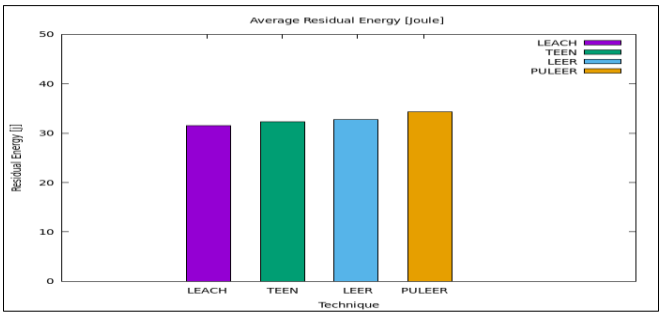

Figure 6: Average Residual Energy Analysis

The energy utilization of nodes is improves if the possibility of link breakage is reduced and the proposed PULEER energy approach is established strong link in WSN. The proposed energy efficient scheme ignores the shortest path routing procedure but initiate multi-hop approach in between source to destination. The energy utilization of rest of protocols is not better as compare to proposed approach

f) Average End to End Delay Analysis

The number of packets per unit of time is reached or not is measured through delay metrics but if the in this graph the throughput performance of LEACH, TEEN, LEER and PULEER is measured. The PULEER delay is minimum about 240 (ms) but the performance of LEACH is about more than 400 (ms). The better more delay in network is shows the more energy consumption of nodes and the receiving is also less. The delay performance of TEEN and LEER is also much more as compare to PULEER. The more delay in network is shows the overhead and less packets receiving.

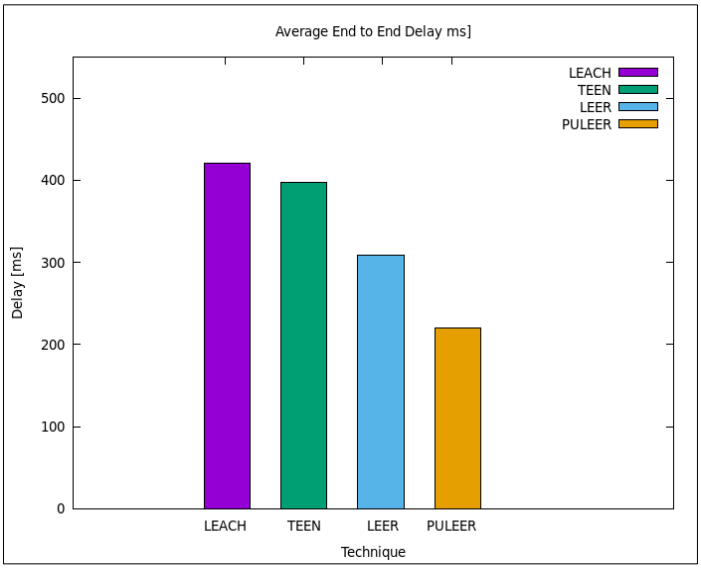

Figure 7: End to End Delay Analysis

g) Overall Performance Analysis

The LEACH is energy efficient protocol that minimizes the energy consumption in routing but proposed is modified the routing performance of LEACH .i.e. proposed LEACH. The performance of normal LEACH and proposed LEACH is mentioned in table 2. The Routing load and dropping of data is minimizes by that the packets receiving as respect to sending is maximizes that also improves the PDR performance.

Table2: Summary Table

Parameter	LEACH	TEEN	LEER	PULEER
SEND	5279	5333	5948	6776
RECV	4229	4525	5329	6213
PDF	80.11	84.85	89.59	91.69
Average e-e delay(ms)	420.84	396.79	308.65	219.58
No. of dropped data (packets)	1050	808	619	563
Average Energy Consume	50.91	50.2	49.69	48.12
Average Residual Energy	31.55	32.27	32.78	34.35

VIII. CONCLUSION

The energy or power in mobile nodes is restricted and it is necessary to utilize it efficiently for better network life time. In this research we proposed a modified version of LEACH protocol in MANET. The proposed scheme is selected the reliable nodes is term of higher energy level by that the strong link is established. The reliable selection of nodes are reduces data drop possibility due to energy deficiency. In this research we modify the routing strategy of LEER and provide new name as power utilization energy efficient routing (PULEER) in this method cluster head selection based on the calculation of power utilization of node and its contain energy which helps to increase the network life time. In PULEER protocol the number of nodes live in network are remains more, it means the nodes are ready for further communication in WSN. After cluster head selection, cluster head node broadcast wining message to all other sensor node, next phase is a routing phase in that case sender sensor generate the route request packet and search the path from sender to receiver and cluster head takes the decision as maximum energy contain as well as minimum power consumption sensor node as a routed nodes and select the path. The LEER protocol is not provides the efficient routing by that the unnecessary energy consumption is identified that degrades the life time of network. LEER protocol use time division multiple access to select cluster head based on higher energy, but those work further enhance through low energy efficient routing (LEER) which is two types, single and multiple hop based routing. In single hop condition source device directly communicate through base station but that increase overhead and wastage the energy another side multi hop routing method LEER classify sensor node classify in two category such as route capable and non capable.

REFERENCES

[1] Vinay Kehar, Rajdeep Singh, "Evaluating the Performance of Reactive I-LEACH", IEEE, 2014.
[2] Jennifer Yick, Biswanath Mukherjee, Dipak Ghosal . Wireless sensor network survey. Elsevier Science 2008.
[3] Jae-Hwan Chang and LeandrosTassiulas “Energy Conserving Routing in Wireless Ad-hoc Networks” Army Research Laboratory under the Federated LaboratoryProgram, Cooperative Agreement DAAL01-96-2-0002.

[4] Suresh Singh and Mike Woo et al. "Power-Aware Routing in Mobile Ad Hoc Networks" Department of ECEOregon State University Corvallis, OR 97331
[5] Toh, C.-K. "Maximum battery life routing to support ubiquitous mobile computing in wireless ad hoc networks "jun - 2001,**Volume:** 39,Issue:**6Page(s):** 138 – 147, Communications Magazine, IEEE
[6] Zhang, B. "Localized power-aware routing for wireless ad hoc networks" Communications, 2004 IEEE International Conference, **Volume:6Page(s):**3754 - 3758 Vol.6
[7] Arun M, Jeban Chandir Moses "SURVEY ON CLUSTERING ALGORITHM IN SPARSE MANET" International Journal of Computer Science and Management Research Vol 2 Issue 2 February 2013.
[8] Richa Agarwal ; Amit Kumar Gautam "A Probability based Energy Efficient Clustering Protocol in Wireless Sensor Network" International Journal Of Advance Computer Technology | Volume 1, Number 1,.
[9] Hasan Al-Refai, Ali Al-Awneh, Khaldoun Batiha, Amer Abu Ali, Yehia M. El. Rahman "Efficient Routing Leach (Er-Leach) Enhanced On Leach Protocol In Wireless Sensor Networks" International Journal *Of* Academic Research Vol. 3. No. 3. May, 2011, I Part.
[10] Anil Singh, Shashikala Tapaswi "An Adaptative Energy Efficient Routing Protocol For Manet" Journal Of Networks, Vol. 9, No. 12, December 2014.
[11] Srinivas Kanakala,Venugopal Reddy Ananthula, and Prashanthi Vempaty "Energy-Efficient Cluster Based Routing Protocol in Mobile Ad Hoc Networks Using Network Coding" Hindawi Publishing Corporation Journal of Computer Networks and Communications Volume 2014, Article ID 351020, 12 pages.
[12] Mrs.J.Nandhini, D.Sharmila " Energy Efficient Routing Algorithm for Mobile Ad-hoc Networks – A Survey" International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-3, July 2013.
[13] K.Prasanth, P.Sivakumar "Cluster Structure Based Energy Efficient Improvement for MANET" International Journal of Scientific & Engineering Research, Volume 5, ISSN 2229-5518 Issue 5, May-2014 103.
[14] Ankita Singh Kushwah, Nitin Manjhi "A Review of Cluster Formation Schemes in MANET" International Journal of Application or Innovation in Engineering & Management (IJAIEM) Volume 3, Issue 4, April 2014.
[15] Santhi G, Soundararajan N, Yasar Arafath T, Manibalan T "An Energy Efficient Cluster Based Routing and Localization in MANET for Emergency Scenario" International Journal of Emerging Technology and Advanced Engineering Volume 5, Issue 3, March 2015).
[16] K. Pavai, D. Sridharan, S.A.V. Satya Murty A. Sivagami, "Energy And Link Quality Based Routing For Data Gathering Tree In Wireless Sensor Networks Under Tinyos - 2.X," International Journal Of Wireless & Mobile Networks, Vol. 2, No. 2, Pp. 47-60, 2010.
[17] The ns Manual for practice is available at link http://www.isi.edu/nsnam/ns/doc.