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*North Asian International Research Journal*

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NAIRJC JOURNAL PUBLICATION

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**ISSN NO: 2454 -7514**

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## ENHANCING THE PERFORMANCE OF THE SENSOR NETWORKS VIA IMPLEMENTING MODIFY CLUSTER BASED SCHEME

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**Abstract**—Each sensing node can be in dynamic, idle or sleep modes. In active mode, vitality is devoured by a node while transmitting or accepting information. In idle mode, energy devoured by a node is just about the same as in active mode. While in sleep mode, the nodes shutdown the radio to spare the vitality. In early stage, sensor nodes elected as Cluster Head that absorb more energy as compared to other cluster members [3], due to their long range or multi hop transmissions to the sink node, and may lead to an irregular energy consumption of sensor nodes in the Wireless Sensor Networks. The Maximum Residual energy named MDC with LEACH protocol has introduced by the earlier work [1] and improves the residual energy but still the data has overlapped with each other and our aim to route the data efficiently and reduces the overhead. This problem will be reduced by selecting appropriate cluster heads so that when transmitting the data then there is possibility to select higher energy saver cluster and every data routes through that cluster head. This problem is

focusing by this proposed work.

**Keywords**— WSN, LEACH, MDC, Cluster Head.

### I. INTRODUCTION

Wireless sensor network (WSN) is a wireless computer network comprising of spatially appropriated independent gadgets utilizing sensors to agreeably screen physical or natural conditions. In addition a sensor system may need to develop the checked range and needs to expand number of hubs now and again. This needs a very versatile answer for guarantee sensor system operations with no issue. The sensor system produce information when environment changes. Therefore the traffic pattern changes drastically every now and then. Information gathered by neighboring sensor hubs are frequently entirely comparative which makes conceivable to the advancement of routing and aggregation strategies that can decrease redundancy and enhance vitality effectiveness. This beneficial component can be abused to add to a vitality proficient information gathering and aggregation technique.

Numerous new applications are being created on account of this new idea of miniaturized scale detecting and remote systems administration of these brilliant sensors. A potential's portion various utilizations of WSNs are as per the following: habitat monitoring, military, physiological monitoring, precision agriculture, forest fire detection, nuclear, chemical and biological attack detection and transportation. WSNs can change data gathering in an assortment of circumstances.

### ***LEACH Protocol***

LEACH depends on a conglomeration (or combination) strategy that joins or totals the first information into a littler size of information that convey just significant data to every individual sensor. LEACH partitions the a system into a few group of sensors, which are developed by utilizing localized coordination and control just to decrease the measure of information that are transmitted to the sink, additionally to make directing and information spread more versatile and vigorous. LEACH utilizes a randomize revolution of high-vitality CH position instead of selecting in static way, to allow to all sensors to go about as CHs and maintain a strategic distance from the battery consumption of an individual sensor and dyeing rapidly.

The operation of LEACH separated into rounds having two stages each to be specific:

- (i) Setup stage to arrange the system into groups, CH advertisement, and transmission plan creation.
- (ii) Consistent state stage for information total, pressure, and transmission to the sink.

## **II. LITERATURE REVIEW**

Muhammad Arshad, Mohamed Y. Aalsalem, Farhan A. Siddqui discussed wireless Sensor Networks operated on the network Layer of the OSI Model and responsibility of delivering messages and creates best routes for transmitting data throughout the network. The authors has introduced the clustering concept that solves the issues of hot spot and aim of this research is evaluating and validating the Mobile Data Collector-based routing protocol maximum residual energy LEACH) with a Novel Application Specific Network Protocol for Wireless Sensor Networks routing protocol.

Sai Prakash S K L V, Kondapalli S Rami Reddy focuses on two sink node selection algorithms corner node method and the center node method and their impact on the tree formation. Once the sink node is selected by one of the above two approaches, level based connectivity tree formation is used for constructing the tree in the network. In this level based connectivity, levels are assigned to the nodes based on the distance from the sink node as well as the level of its branch node.

Aboobeker Sidhik Koyampambil Mammu, Ashwani Sharma, Unai Hernandez-Jayo, NekaneSainz detailed overview of Clustering through formation of hierarchical WSNs that helps in efficient use of limited energy of sensor nodes and hence improves network lifetime. During information collection phase CH gathers information from all of its cluster members and after its aggregation forwards to the next adjacent CH and last to the sink node. The conventional problem could be avoided by efficient rotation of CH nodes and provided a major breakthrough in cluster based data collection in WSNs.

### III. EXPERIMENTAL TESTED

LEACH can be depicted as a blend of a group based building design and multi-hop routing. The term cluster-based can be clarified by the way that working of sensors utilizing the LEACH convention depends on group heads and bunch individuals. Multi-hop routing is utilized for inter-cluster correspondence with group heads and base stations. LEACH is a self-sorting out, versatile grouping convention that uses randomization to appropriate the vitality stack equally among the sensors in the system.

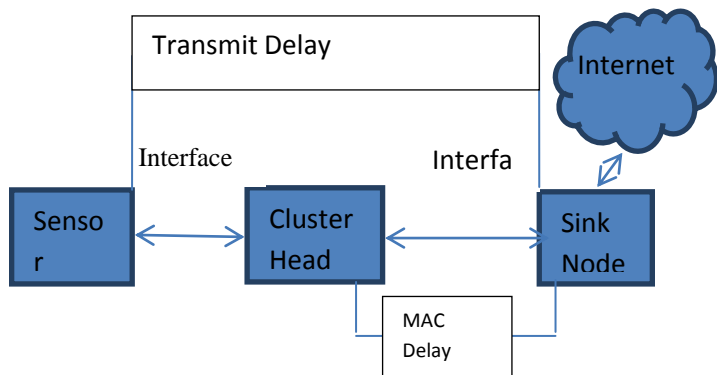
This choice is made by the sensor nodes and picking an irregular number somewhere around 0 and 1. On the off chance that the number is not as much as a

limit  $T(n)$ , the hub turns into a cluster-head for the present round. Mathematical statement gives the value for threshold [20].

$$T(n) = \begin{cases} \frac{P}{1 - P * (r \bmod \frac{1}{P})} & \text{if } n \in G \\ 0 & \text{otherwise} \end{cases} \quad (3.1)$$

Where  $P$  = the coveted rate of cluster heads,  $r$  = the present round, and  $G$  is the arrangement of hubs that have not been cluster-heads in the last  $1/P$  rounds. Utilizing this threshold, every hub will be a cluster-head sooner or later inside of  $1/P$  rounds.

In the Fig 1, the author is using three Sensor nodes namely Sensor node that act like an ordinary node, Cluster head node is the leader from one group but in another group formation need to elect another Cluster node for communication to sensor nodes and other cluster nodes that actively participates to its own nodes. Sink Node is a base station node that provides services to the cluster heads and Internet service providers. The sink node has tendency to select the cluster head node. The above said formation of flowchart is applied in our network scenario for selecting multi-channel technique and reducing the overlapping of data or path/link problem.



**Fig. 1 Proposed Approach Working**

To evaluate the performance of LEACH protocol and simulations was performed on a flat grid type network topology, thus sensors are randomly deployed in an area of 800\*800m. Number of nodes which are deployed in the network is taken to be 40 and repeating 5000 rounds for 40 nodes. At each of the node, energy consumption during transmission is 0.1 joule. In one round, the author is selecting one cluster head (CH) with higher value by using LEACH i.e. Low Energy Adaptive Clustering Hierarchy protocol and Omni-directional antenna type is selected.

**TABLE I: SIMULATION PARAMETERS OF NS2 SIMULATOR**

Parameters	Values
Area	800*800
Number of nodes	40
Initial Energy	100 joules
Protocol	LEACH protocol
Energy consumption during transmission	0.1 joule
Antenna type	Omni-directional
MAC type	802.15
Network topology	Flat grid

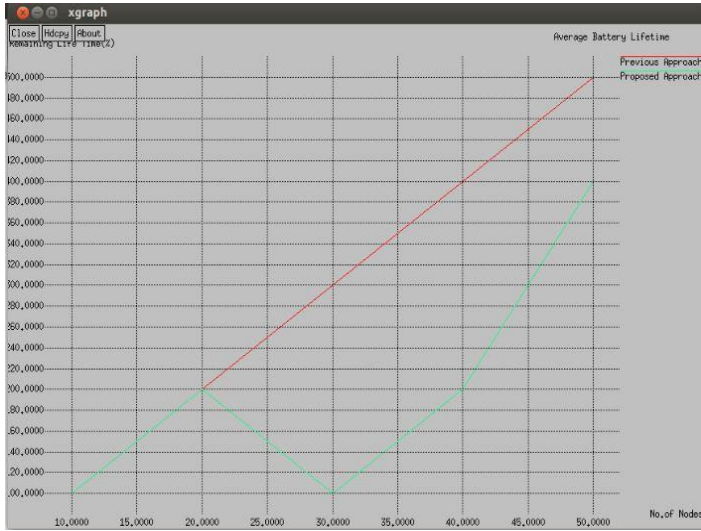
#### IV. RESULT DESCRIPTION

##### A. Energy Consumption or Battery Life

This result specifies the performance of the remaining battery lifetime of WSNs when LEACH protocol deploy on the network. The positive results found in the fig 2, in each fluctuated line the graph was reenergized and improves the performance.

**TABLE II BATTERY LIFETIME CONSUMPTION**

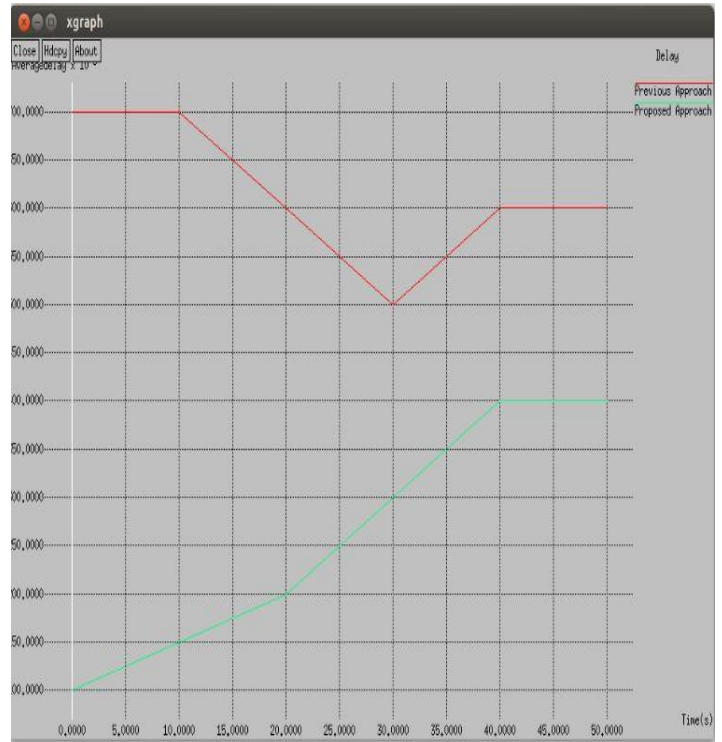
Average Battery (%)	Previous Work	Proposed Work
Minimum	200	100
Average	250	200
Maximum	500	400



**Fig 2 Energy Consumption or Battery Lifetime**

**B. Delay**

The delay refers to the transmission of packet from sender to receiver node and it is directly proportional to the energy. In the Fig 3, the delay consistently decreases when the number of nodes increases because the routing table information stored on each node when they communicate over the wireless scenario.



**Fig 3 Delay in WSN**

**TABLE III DELAY COMPARISON**

Delay (ms)	Previous Work	Proposed Work
Minimum Delay	0.004	0.001
Average Delay	0.005	0.003
Maximum Delay	0.007	0.004

**C. PDR (Packet Delivery Ratio)**

Packet Delivery Ratio defined the number of packets transferred from the source site and these packets parallel receive by the receiver end. In the fig 4, the number of packets received by the previous and proposed and it is almost 100 % delivery of packets but if the author analyze that the previous approach send more than 100 % packets then it assumes that the malicious activity happen in the networks or more number of packets still not received by the receiver end. Therefore, chances of congestion happen in the network and resultant chances of packet drops remains in the network.

TABLE III PDR COMPARISON

PDR (%)	Previous Work	Proposed Work
Minimum	0.4 %	0.6%
Average	1%	0.95%
Maximum	1.4%	1.1%



Fig. 4 PDR in WSN

## V. CONCLUSION AND FUTURE WORK

Analysis of complete work is simulated in virtual environment and 40 sensor nodes are deployed in wireless sensor network in an area of (800m, 800m).LEACH protocol is applied for cluster head selection in this paper because of its less complexity nature and low energy consumption. In this paper,

proposed approach is applied to route the data from source to base station and also to reduce network interferences. In future, proposed technique will be tested under various other network interferences like Rayleigh fading, slow fading and fast fading.

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