# Certain Exploration To Fix And Maximize node Lifetime In Wireless Sensor Network

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***Abstract-*** *A wireless sensor network(WSN) is a very large collection of sensor nodes which organised into different form like tree, mesh etc. This sensor nodes are work on the power source which is essential for its communication. To save the power of the network we used the scheduling technique in WSN to increase the life of the network. In sleep scheduling technique most of the nodes are put into sleep mode to increase the lifetime of the network. Sleep scheduling algorithm is very important to become a network more robust and flexible. Main aim of sleep scheduling algorithm is to live the network for long period*

***Keywords***- Wireless Sensor Network, Low- Energy Adaptive Clustering Hierarchy, Time Division Multiple Access, Sensor Nodes.

## I. INTRODUCTION

Wireless Sensor Networks (WSNs) can be defined as a self-configured and infrastructureless wireless networks to monitor physical, temperature,sound, vibration, pressure, motion or pollutants and to cooperatively pass their data through the network to a main location where the data can be observed and analysed. A base station act as an interface between users and the network. Network allows the user to retrieve required information by injecting queries and gathering results from the base station. Typically a wireless sensor network contains thousands of sensor nodes. The sensor nodes can communicate among themselves by using radio signals.

## II. RELATED WORK

In the year of 2018, Runze Wan, Naixue Xiong and Nguyen The Loc propose an energy-efficient sleep scheduling mechanism with similarity measure for WSNs (ESSM), which will schedule the sensor node into active or sleep mode to reduce energy consumption effectively. Firstly, the optimal competition radius is estimated to organise the all sensor nodes into several clusters to balance energy consumption. Secondly, according to the data collected by member nodes, a fuzzy matrix can be obtained to measure the similarity degree, and the correlation function based on fuzzy theory that can be divide the sensor nodes into different categories. Next, the redundant nodes will be selected to put into sleep state in the next round under the premise of ensuring the data integrity of the whole network[1].In the year of 2019, Jigisha Parmar, Ashishgoud Purushotham and G Usha Rani Comparing LEACH-CS to the famous LEACH-C protocol and also introduced new energy efficient sleep patterns such as crossed-ladders pattern which outperforms other methods. And they presented the new cross- layer idea, called multi-parent technique, whereby assigning multiple parents with different wakeup schedules to each node in the network, significant performance improvement is achieved. The Sleep scheduling algorithm is developed completely distributed[2].

## III. PROBLEM STATEMENT

The purpose is to find protocols that are energy efficient and support real-time traffic for environments. Wireless sensor nodes which are operated are used for detecting and collecting information from the areas where there is very little scope for manual handling to recharge or change batteries and these sensing nodes collect the data and pass them on to the network towards the sink for further actions. For a better functioning and a longer lifetime for a sensing node within the network, we need to consider its energy consumption as a major factor. The transmission mode also plays an important role in WSNs. Nodes can take single-hop or multi-hop depending upon the type of network topology chosen for communicating or transmitting data to other nodes within the network.

## IV. EXISTING SYSTEM

A suitable clustering algorithm for grouping sensor nodes can improve the energy efficiency of WSNs. Clustering requires additional overhead, such as cluster head selection and assignment and cluster construction. To prevent energy loss, one of the clustering method is used along with an isolated nodes for WSNs called Regional Energy Aware Clustering with Isolated Nodes (REAC-IN). In REAC-IN, Cluster Heads(CH) are selected based on weight and

performance. Weight is determined according to the residual energy of each sensor and the regional average energy of all sensors in each cluster. To prolong network lifetime, the regional average energy and isolated node sends its data to a CH node in previous round it is determined with the help of the sensors distances and the sink distances respectively. Recent studies revealed that in comparison with clustering algorithms REAC-IN performs well.

***Drawbacks of the existing system:*** REAC-IN method is used for power transmission which is not efficient.

## V. PROPOSED SYSTEM

The main goal of the proposed system is to lower the energy consumption required to create and maintain clusters to improve and to achieve the efficiency in prolonging the lifetime of sensor networks. The clustering method is a very efficient method which prolongs the lifetime of a network. By applying the clustering method, some nodes consume energy unnecessarily because of environment in which the collected data of the sensor nodes easily overlap and some sensor nodes are in an active mode by putting them into sleep mode energy consumption will be reduced. In this paper, we proposea Clustered Multi-hop Routing Algorithm which reduce unnecessary data transmission among nodes by excluding the duplication of data. By implementing this clustering method data loss caused by link failure problem is prevented and thus the data is collected reliably. By analysing the performance, this method reduces the energy consumption, increases the transmission efficiency, and increases the lifetime of the network when compared to the existing clustering methods.

***Objective of the proposed system:*** Objective of the proposed system is to reduce the energy consumption and to increase the transmission efficiency without data loss and to prolong network lifetime.

***Block diagram of the proposed system***

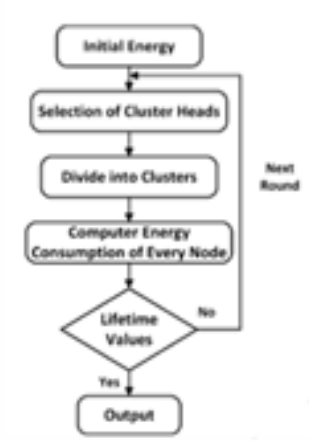


Fig 1:Block diagram of the proposed system

## VI. SYSTEM MODEL

The clusters used for transmitting the data limits the number of nodes that transmit to BS avoiding transmission to short distances. In the first-order model, different assumptions about the radio characteristics, like energy dissipation in the transmitting and receiving nodes, path loss exponent and so forth, will change the advantages of different protocols. Assume a model where theradio dissipates 50 nJ/bit to run transmitter or receiver circuitry. Further, it requires 100 pJ/bit/m2 for transmit amplifier to achieve an acceptable. Parameters used here are slightly better than the current state of the art in radioed sign. On the basis of location of various nodes, this algorithm identifies the clusters and cluster heads(CHs). The CHs are chosen based on their unique connected nodes, maximum number of neighbor nodes, and the residual energy. After identifying the CHs, data transmission from a specific node is done using CHs till it reaches BS. Each CH combines the collected data from its connected nodes and performs the data aggregation and it reduces the amount of data to be transmitted. Data which is aggregated is sent to the BS through the intermediate CHs.

*Step 1.* The nodes are randomly deployed in the region to be sensed. The BS is given in the id of zero and it is manually located on the network field.

*Step 2.*Calculate the set of neighbor nodes and the number of neighbor nodes for the nth node on the basis of the transmission range as depicted;

The function named *neighbor info* returns all the neighboring nodes of a node .

The distance between a given sensor and is given by; set of neighbor nodes IDs within the transmitting range ().*neighbor info* function is repeated for all nodes and the BS.

*Step 3.* BS always behaves as the CH. CH selection (CHS) process starts from BS. BS transmits the CH selection message (CHS_msg) to all the nodes. Nodes having residual energy more than the threshold energy are eligible to become CH.

*Step4.F*unction *unique _neighbor_info* returns the unique nodes connected to a node. The unique nodes are the ones which are not connected to any other nodes in the ()th hop

*Step 5.* Consider the unflagged elements of Neighbours.

*Step 6.* Steps 3 to 5 are repeated until all the nodes are covered by elected CH. All nodes should have a path upto BS through single or multiplehops based on the distance of the node .

*Step 7.* After the clustering process, if in the process of transmission of data, one of the CHs is die out, then the CH at the previous hop comes to know about it since the data from the head CH did not reach it. Suppose the CH at the hop diesout; In such a case the clustering algorithm is repeated after ()th hop for the entire network.

*Step 8.* If the residual energy of the CH becomes less than that of the threshold energy, then the CH selection process needs to be reinstantiated. If the residual energy of the CH at ()th hop is less than the threshold; then the clustering algorithm is repeated after ()th hop for that particular path.

*Step 9.* Once the routing path is established then the data is transmitted through the multi hop. Each CH combines the collected data from its connected nodes.

***Flow chart of the proposed system***

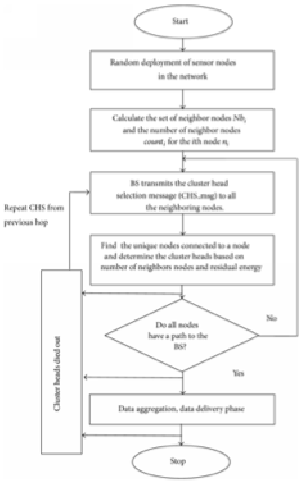


**Fig 2: Flow chart of the proposed system**

## VII. SIMULATION RESULTS

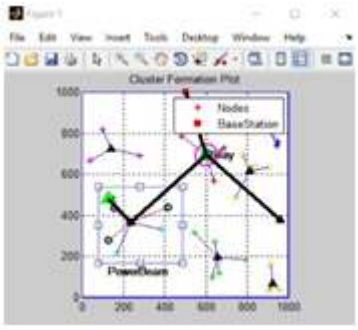


**Fig 3: Node creation**

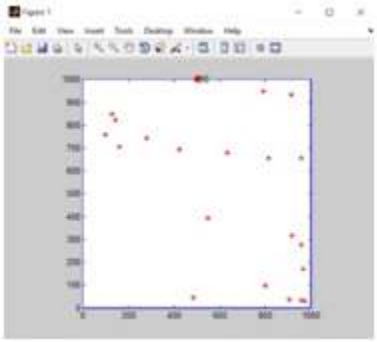

**Fig 4: Cluster formation**

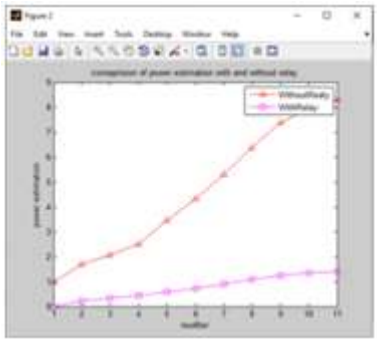


**Fig 5: Cluster formation plot**

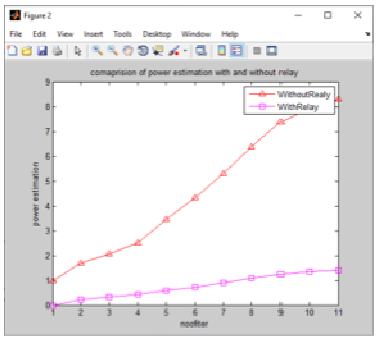


**Fig 6: Power estimation**

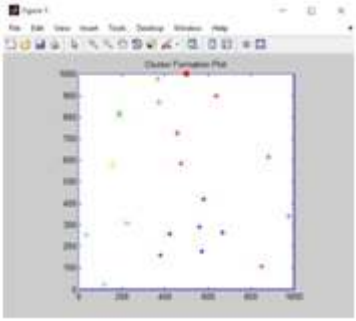

Fig 7: Total power consumption

## VIII. CONCLUSIONS

For extending the lifetime of wireless sensor networks, in this paper an energy efficient cluster-based routing algorithm is proposed to increase lifetime of wireless sensor networks.MHC selects the cluster heads according to the two parameters the remaining energy and node degree. The organisation need to be power productive and stable, and have a longer lifetime. ourdevice reduces electricity usage, assembles the transmission efficiency.

## IX. ACKNOWLEDGEMENT

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