**A NODE OVERHAUL SCHEME FOR ENERGY EFFICIENT CLUSTERING IN WIRELESS SENSOR NETWORKS**

**ABSTRACT:**

Clustering of wireless sensor network nodes, a fundamental operation, is aimed at achieving load balancing and prolonged network lifetime. Low-energy adaptive clustering hierarchy protocol, the prominent standard, achieves these. An improved protocol, balance cluster formation, provides the additional advantage of equal size clusters, but at the cost of overlapping of clusters. This letter presents a node overhaul scheme that achieves load balancing and energy efficiency while also maintaining uniform size clusters without any overlapping. The proposed solution first forms initial clusters and later refurbishes the initial clusters based on a second best choice cluster head, wherever applicable. The results so obtained show a substantial improvement in network lifetime and node death rate as compared to other simulated methods.

**Index Terms:** Sensor networks, energy efficiency, load balancing, network lifetime, uniform size clusters (USCs).

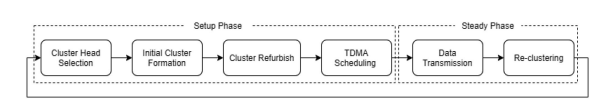
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**EXISTING SYSTEM:**

* The first proposed clustering protocol is the LEACH(LOW ENERGY ADAPTIVE CLUSTERING HIERARCHY) protocol . The operation of LEACH protocol consists of several rounds with two phases in each :Set-up Phase and Steady Phase.
* The Set-Up Phase where Cluster Heads are chosen and Cluster Formation are done. In steady state Phase the data transmission takes place between nodes to CH and CH to BS.The main idea is to choose the CH in a clustered manner at each round and then have the nodes join the closest CH to form a dynamic cluster. This network topology is built on the chosen CHs, which is inefficient due to the lack of consideration for node residual energy.  Furthermore, prioritising CH selection results in the forming of complex clusters at each round, resulting in an increase in energy overhead due to cluster formation after each re-selection phase for CHs .

**DISADVANTAGES:**

* 1. It does not guarantee the formation of equal size clusters.
* 2. LEACH disregards the BS and cluster head geographical positions, energy consumption, which reduces network lifetime
* 3. We have noticed that the cluster head missions are more than the ordinary nodes, so the cluster head consumes more energy than the others**.**
* **PROPOSED METHOD:**
* The proposed LEACH-USC approach has the following three objectives: 1) to generate clusters of uniform size 2) to achieve clusters with crisp boundaries 3) longevity of the network lifetime
* In the proposed solution, all the nodes are assigned with a cluster head as it happens in case of LEACH protocol, but there will be a few unclustered nodes because of threshold Thcluster. The idea of the cluster refurbish phase of the proposed solution is to allow extra nodes (MNs—Thcluster) of large clusters to join other clusters according to the second best choice of cluster heads,the proposed solution has uniform size clusters (USCs); thus, the approach is named as LEACH-USC), along with reduced intracluster communication.

Fig. Sequence of operations in the proposed LEACH-USC

Cluster head selection depends on the probabilistic approach as also performed by LEACH. In the initial cluster formation operation, all the nodes join the nearest cluster head. As a consequence of probabilistic cluster head selection and assigning the nodes to the nearest clusters head, clusters of different sizes exist after the completion of initial cluster formation operation like the LEACH approach.

In the cluster refurbish operation of the proposed approach, clusters will be reorganized to obtain USCs with the goal of sending the nodes from the a large clusters to the other clusters according to the second best cluster head. First, the largest cluster among all clusters has been identified, and then, the distance between the MNs of the cluster and the rest of the cluster heads are calculated. This is done in order to find second best choice of cluster heads. The k-nodes [MN—Thcluster], which have least communication distance to other cluster heads, will be assigned to respective second best cluster heads. Consequently, nodes near the cluster boundary will be assigned to other cluster heads. Algorithm explains the working of the cluster refurbish process.

**ADVANTAGES:**

* 1) Longevity of the network lifetime
* 2) To generate clusters of uniform size
* 3) To achieve clusters with crisp boundaries

**APPLICATIONS:**

1.industrial control

2.environmental monitoring,

3. military surveillance,

4.intelligent transportation systems and medical field.

5.Furthermore, it can function independently in harsh or high-risk places where human presence is not possible

6.Disaster relief operations.

7.Biodiversity mapping

8.monitoring of temperature, pressure, and humidity

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**Software & Hardware Requirements:**

**Software:** Matlab R2018a.

**Hardware:**

**Operating Systems:**

• Windows 10

• Windows 7 Service Pack 1

• Windows Server 2019

• Windows Server 2016

**Processors:**

Minimum: Any Intel or AMD x86-64 processor

Recommended: Any Intel or AMD x86-64 processor with four logical cores and AVX2 instruction set support

**Disk:**

Minimum: 2.9 GB of HDD space for MATLAB only, 5-8 GB for a typical installation

Recommended: An SSD is recommended a full installation of all Math Works products may take up to 29 GB of disk space

**RAM:**

Minimum: 4 GB

Recommended: 8