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Reactive and Bootstrapping Beem Algorithm For 3d-Clustering in Wireless Sensor Network

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Abstract: A wireless sensor network of spatially shared out self-directed sensor for observing materialistic otherwise atmospheric situations, like sound, warmth, stress, so on as well as to cooperatively go by their data via network to the central location. A WSN is the network of hundreds or thousands nodes having low price, short powered, extremely little sensor nodes by processing ability. It had the potential of sensing extremely dynamic, rapid changing physical factor. This proposed protocol improves Existing protocols and consider parameters such as alive nodes, Remaining Energy, First Node Dead Evaluation, Tenth Node Dead Evaluation, Last Node Dead Evaluation, Improvement ratio in stable period, Improvement ratio in network lifetime for evaluating the performance of proposed protocol. This improvement results in increased lifespan of network.

Keywords: WSN, Threshold Sensitive Energy Efficient Sensor Network (TEEN), Low Energy Adaptive Clustering Hierarchical (LEACH).

I. INTRODUCTION

A Wireless Sensor network is a set of sensors, deployed in a sensor field to monitor specific characterization of the environment to measure those characteristic and collect the data related to the phenomena in which sensors are small devices with limited resources such as limited battery power, low memory, little computing capability, very low data rates, low bandwidth processing, variable link quality [11]. In WSNs we have to look at the network topology from a different perspective, from a neighborhood point of view. In these topologies, the number of neighboring nodes determines the number of receivers and hence results in more overall power usage, even though the number of transmissions decreases. Thus, there is a fundamental trade-off between decreasing the number of transmissions and increasing the number of receptions.

ADVANTAGES OF WSN

1. Reduce your cabling costs. The cost of integration, maintenance as well as the cabling weight induces non negligible constraints that can be more costly than the price of cabling alone.
2. Radio transmission technology optimized for harsh industrial environment.
3. Wireless sensor networks include spatially allotted autonomous instruments that employ sensors to check environmental or physical conditions.
4. It can be accessed through a centralized monitor.

II. RELATED SURVEY

Amer O. Abu Salem et al. 2019 [1]: WSNs that stand for wireless sensor networks and include many low-cost and low power-sensing tools, local processing, and the capacity of wireless communication face some problems in two aspects: the lifetime of the network and its energy. Therefore, the aim of this paper is to overcome these limitations through enhancing the LEACH (low energy adaptive clustering hierarchy) protocol, the protocol of cluster routing, in which, LEACH is extended by identifying a cluster head according to the lowest degree of distance from the base station in order to decrease power consumption in cluster head nodes and in the whole network. **Christos Panagiotou et al. 2018 [3]:** WSNs as adopted in current smart city deployments, must address demanding traffic factors and resilience in failures. Furthermore, caching of data in WSN can significantly benefit resource conservation and network performance. However, data sources generate data volumes that could not fit in the restricted data cache resources of the caching nodes. This unavoidably leads to data items been evicted and replaced. **Lina Xu et al 2017 [5]:** This review reveals that QoS aware clustering demands more attention. Furthermore, there is a need to clarify how to improve quality of user experience (QoE) through clustering. Understanding the users' requirements is critical in intelligent systems for the purpose of enabling the ability of supporting diverse scenarios. User awareness or user oriented design is one remaining challenging problem in clustering. **Anisha Somani et al 2016 [7]:** have present a comparison between the implementation of heterogeneous Low Energy Adaptive Clustering Hierarchical (LEACH) and Threshold Sensitive

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Energy Efficient Sensor Network (TEEN) protocols in three dimensional spaces of a WSN. A node dies in the network when it doesn't have sufficient energy.

III. PROBLEM STATEMENT

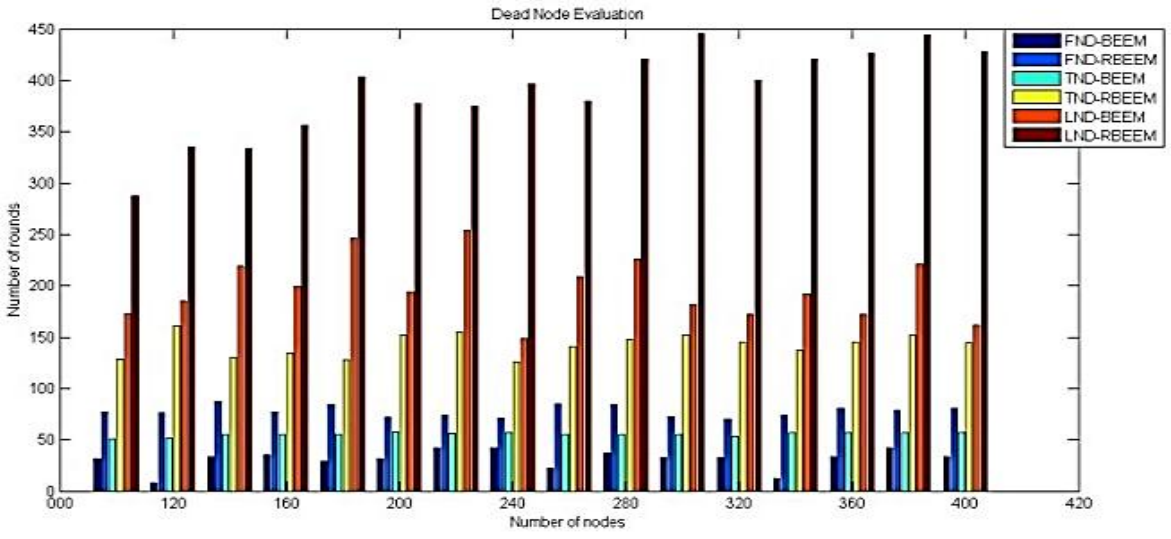
The major problem in wireless sensor network is the battery consumption. To increase lifetime of the sensor networks, technique of clustering is to be applied. Traditionally in LEACH protocol the cluster head selection was done on the basis of the probability. So to change cluster head after each round was a problem. After this new approach of clustering has been proposed in which the concept static threshold value has been used. CH selection in a very first round will be done on the basis of probability. But during reclustering residual energy of a CH will be checked. If that residual energy is greater than predefined static threshold then that will continue as cluster head in next round also. But if CH has less energy than the static threshold then the further CH selection was done randomly. However, in case the all sensor nodes energy becomes less than the predefined static threshold value, then it creates problem.

Research Goal

1. To study and analyze the existing *threshold concept* for cluster head selection in traditional LEACH.
2. The first phase will be setup phase consists of *bootstrapping and clustering.*
3. Implementation of proposed technique based on *dynamic clusteri*ng to enhance the life time performance and reducing the energy consumption in the network.
4. All sensor nodes and gateways undergo bootstrapping process where BS *assigns unique IDs to all nodes*. After that, all sensor nodes and gateways broadcast their IDs within their communication ranges.
5. The second phase will be steady state phase, in this phase gateways collects the data from their *clusters, fuse and directly transmit* to the base station.
6. To *compare the results* of existing technique with proposed technique called Robust LEACH in terms of throughput and network Lifetime.
7. The comparison will also be drawn among the existing and Optimal reactive BEEM using the following parameters:-
   a) Alive nodes
   b) Average consumed energy
   c) Packets sent to Cluster head
   d) Packets sent to sink
   e) Improvement ratio in stable period
   f) Improvement ratio in network lifetime

IV. SIMULATIONS AND RESULTS

A bar graph below represent the comparative analysis of number of nodes dead at each round of existing as well as planned set of rules. Value of the FND (Stage in which 1st nodule Die), TND (Stage in which 10th Node Died) and LND (Stage in which Final Nodule Died).



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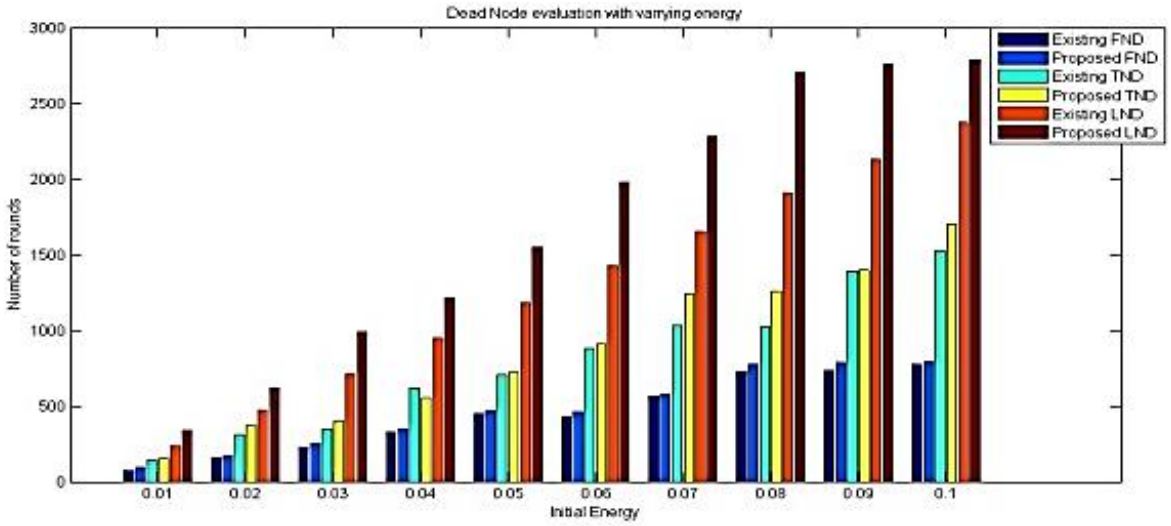
FND is relevant to level number on which 1st nodule of the system runs-out of power. The epoch from 1st level to the level number on which 1st node died is known as stability epoch. System becomes unsteady after the decease of 1st nodule.



This was obvious as of Bar graph that 1st nodule dies afterward into projected set of rules as compared to Existing set of rules. Planned set of rules improves Stability Period by 20% than existing protocol.

V. CONCLUSION

In this paper we have improve the 3D terminology with reactive principle as hard threshold and soft threshold which reduce the number of transmission between the sink and cluster head which will increase the lifetime of battery hence improve the network lifetime. The first phase will be setup phase consists of *bootstrapping and clustering.* Implementation of proposed technique based on *dynamic clusteri*ng to enhance the life time performance and reducing the energy consumption in the network. We further add the waiting node criteria through which load on cluster head is balanced and reduce the energy consumption. This proposed protocol improves Existing protocols and consider parameters such as alive nodes, Remaining Energy, First Node Dead Evaluation, Tenth Node Dead Evaluation, Last Node Dead Evaluation, Improvement ratio in stable period, Improvement ratio in network lifetime for evaluating the performance of proposed protocol. This improvement results in increased lifespan of network.

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