

# Using Clustering Method in Cross Layer Operation Increasing Energy Efficiency and Throughput in WSN

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## Abstract

*In wireless detector network one among the higher importance for perform a degradation performance is that the management packet recognitions to overhead and also the degradation of packet delivery. In cross layer network operation clump is that the effective recognitions to handle the overhead of management packet and that finally to create an improved life of a network. In a very scalable network all overheads square measure extreme vital. The clump is consistently suffered from the cluster head failure which needs to be solved by effective manner in a very giant network. To generate an enhanced moderate life interval of network the cluster head is select for supported the battery lifetime of nodes. In multiple layers use best the overhead and at last use the clump to limit the higher known overheads. Thus in wireless sensors network energy consumption and throughput is improved. The planned pattern performed in 2 layers of network that's transport layer and network layer. In network layer the clump operation is performed. The simulation end result demo that the mixing of 2 layers bring down the usage of the energy consumption, improve the throughput and conjointly avoid the collision evasion of the wireless sensor network.*

## Keywords

*Clustering, energy efficiency, throughput, cross layer design.*

## I. Introduction

Wireless sensing element network consist of spatially distributed autonomous sensor to watch environmental condition like pressure, temperature, sound etc. sensing element nodes will sense and discover events within the region and communicate knowledge back to the bottom (base) station (BS). wireless sensing element network has become most space fascinating space of analysis. Sensing element nodes square measure equipped with tiny batteries which will store at the most I J. Limiting the transmission vary and power consumption square measure the necessary constraints offered for communication, and thus it's advantages to place so as the sensors into clusters. Clustering in cross layer network is one in all the necessary mechanism to boost the energy consumption of sensing element network life. In clump, whole sensing element network spilt into cluster of clusters. Cluster head is chosen supported the battery lifetime of a node. Cluster head gather and combination the information and send it back to the single of science. The advantage of cluster is to gather knowledge from neighbour node is operationally additional convenient then perspective unit's contact a part, clump technique is completed within the network layer. In transport layer, nodes square measure regular on the idea of what quantity time they're active. A clump based generally routing protocol discussed to as base station organised dynamic clump protocol, utilize aa high energy base station setup cluster heads and execute dissimilar energy reasonable task and thereby increasing the life of a network. A cross layer network process procedure that considers the physical and data link layer to maximise the life of a network. The model assumes that the matter of network is convex form wherever  $G(P, h(n_i))$  is that the network graph,  $P$  is that the quantity of information required from node  $i$  to point the detected event within the preparation space. The deployed nodes square measure static and this model has not been tested for wireless sensing element network.

The remainder of this paper is organized as follows. Section 2 describes related work on cross layer network operations. Section 3 describes about proposed work and implementation. Section 4 describes performance analysis.

## II. Related Work

QoS routing protocol [1] to propose Associate in Nursing Energy economical and QoS aware multipath routing protocol that maximizes the network lifespan through equalisation energy consumption across multiple nodes, uses the construct of service differentiation to permit delay sensitive traffic to succeed in the sink node at intervals an appropriate delay, reduces the tip to finish delay through spreading out the traffic across multiple ways, and will increase the output through introducing information redundancy. EQSR uses the residual energy, node offered buffer size, and S/N (SNR) to expect the most actual succeeding hop through the ways construction part. Based on the concept of facility differentiation, EQSR protocol services a queuing model to handle each time period and non-real-time traffic. By suggests that of simulations, we tend to assess and compare the performance of our routing protocol with the MCMP routing protocol.

In Cross-Layer for Solving Hidden Device Problem in IEEE 802.15.4 [2] a cross-layer detection and allocation (CL-DNA) theme to unravel the HDP for IEEE 802.15.4. Upon the prevalence of frame collision, we tend to propose a specially designed rule within the PHY layer to estimate the device addresses additional accurately from the corrupted frames. The dubious addresses of the device square measure then verified through a waterproof procedure in our style. The verified hidden devices square measure then arranged to conserved time periods for communications. In every of the terribly first works that adopt a cross-layer technique to unravel the HDP for IEEE 802.15.4. Numerical results found by mathematical study and simulation tests display that CL-DNA significantly decreases the possibility of the HDP and considerably improves the system performance of IEEE 802.15.4.

## III. Proposed Solution

The cross-layer procedure model improve the overheads in more than one layer and finally using clustering will scale back the important overheads recognized and their by way of the power consumption, throughput and collision avoidance of wireless

sensor network is elevated. The proposed model operates on three layers of network i.e., Datalink layer, network layer Transport Layer and Clustering is applied within the network layer and time slot is utilized at mac layer.

Low-energy Adaptive Clustering Hierarchy (LEACH) protocol for sensor networks is which minimizes energy dissipation in sensor networks. It is vitally noted hierarchical routing algorithms for sensor networks which make clusters of the sensor nodes centred on the bought sign strength. The 5% of the total quantity of nodes turns into the cluster head which act as router to the sink. Vigour consumption is much less as transmission will handiest be accomplished by way of cluster head.

### 1. Set Up Phase

In LEACH, nodes take self-reliant choices to type clusters via using a distributed algorithm without any centralized manage. Right here no lengthy-distance conversation with the base station is required and distributed cluster formation may also be accomplished without realizing the detailed place of any of the nodes within the community. In addition, no international communique is required to installed the clusters. The cluster formation procedure must be considered that nodes are cluster-heads roughly the same quantity of time, assuming the entire nodes begin with the equal amount of vigour. Subsequently, the cluster-head nodes should be unfold throughout the network, as this will likely decrease the space the non-cluster head nodes have got to send their information. A sensor node chooses a random number,  $r$ , between 0 and 1.

### IV. Performance Analysis

An test set up has completed using community Simulator 2 version 2.29 (ns-2). The power constraint is an essential element for wi-fi sensor networks, Leach Protocol is used for the simulation. NS-2 is a tool that provide rich environment for simulation of wi-fi sensor community layers. Following are details of the experimental setup and accumulated result.

#### 1. Experimental Setup

The performance analysis of cross layer protocol with adaptive retransmission is presented in this section. Simulation is accomplished on Characteristic simulator for finding out the electricity effectiveness of network. Right here clustering technique is used on the basis of LEACH protocol. Cluster head is decided on based at the battery lifestyles of node. It senses the sending power and processing electricity of every node with time. If the energy of the node is less than five, it is disabled from the cluster which it belongs. In order that electricity can be advanced and cluster can ship the data to base station without difficulty without losing so much of electricity and there by increasing the life of a community. The simulation carried out by deploying 60 nodes in simulation environment.

#### 2. Simulation results

Simulation carried out and results are obtained.

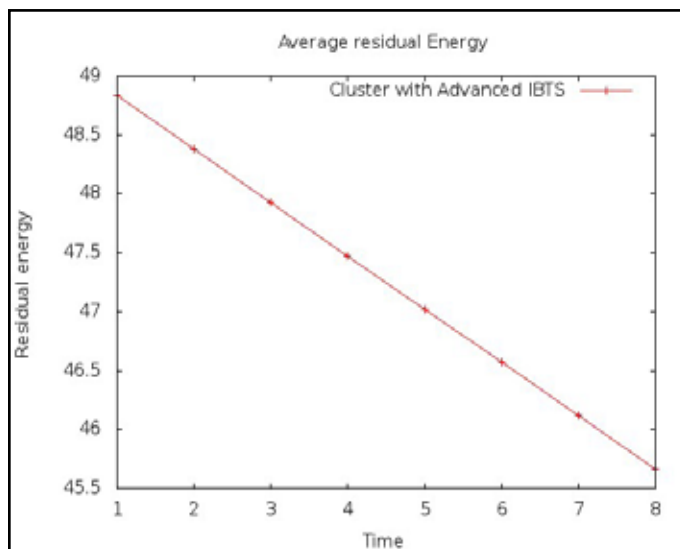


Fig. 1: Residual energy vs time

Figure 1 shows the residual energy. Lifetime of wireless sensing element network system is assessed as far as alive sensor hubs over the time period and leftover vitality of sensor system.

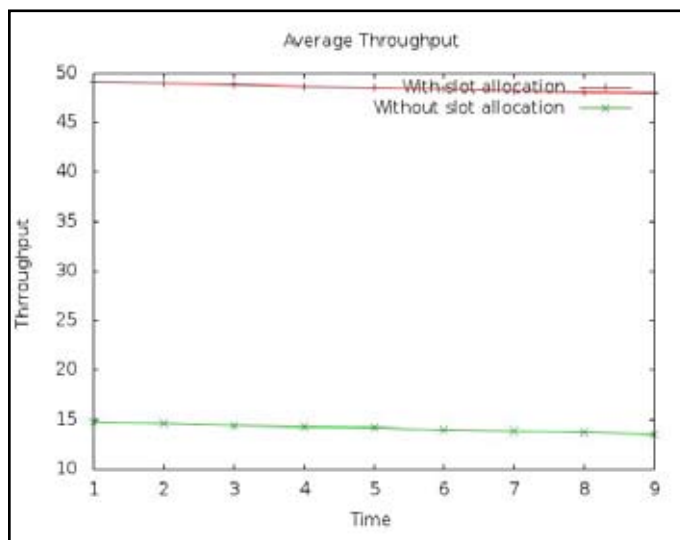


Fig 2 : Throughput vs Time

Figure 2 shows throughput vs time with and without the time slot allocation. With time slot allocation the shown in red in colour and without time slot allocation shown in green colour.

### V. Conclusion

Packet delivery degradation and manage packet overhead are the most important problems arise in move layer community operation mannequin of wi-fi sensor networks. To be able to diminish these disorders clustering mechanism is proposed in move layer network operations and thereby raises the lifetime and throughput of network and avoid the collision in network. Here, cluster head resolution is based on the battery life of nodes.

### References

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