

# An Energy Efficient Congestion Avoidance Routing Using Eecs in Wireless Sensor Network

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**Abstract** - Congestion control is a strategy that is used to avoid network congestion and mitigate congestion. Wireless sensor networks are easy to generate congestion because of its constrained resource. Once network generates congestion, it would bring a lot of resources consumption. It's easy to generate congestion. So it is necessary to use congestion control to avoid congestion in wireless sensor networks. For achieving greater energy efficient and reduce congestion. We propose cluster based congestion avoidance using EECS protocol. For selecting cluster head we use weighted clustering algorithm. Simulation result shows our proposed system high throughput with congestion avoidance compared with existing system.

**Keywords**— Cluster Head, Residual Energy, Wireless Sensor Network.

## 1. INTRODUCTION

The process of dividing the entire communication network into interconnected sub-structures is called clusters. In each cluster, a particular node is elected as the Cluster Head (CH). identity; mobility; degree; density; weight etc. In the network, the CH plays the coordinator role within its substructure. All CHs communicates with other CHs and within its cluster each CH acts as a temporary base station.

CH message is sent in the network by the sensor node which has the greatest weight. The second one is the join message which is sent by the neighbor of CH if it want to join this cluster. Finally a CH must send a response accept message. The node which the greatest weight begins the procedure by broadcasting CH message to their neighbor to confirm its role as a leader of the cluster. The neighbours confirm their role as being member nodes by broadcasting a join message.

Suitable CH can reduce the utilization of energy and enhances the network lifetime. One CH per cluster must be selected during an election process, because multiple CHs within a single cluster can give rise to cluster reformation, Quality of Service (QoS), Low Energy Adaptive Clustering Hierarchy (LEACH) protocols a cluster based protocol that has involved its energy efficiency, load balancing properties and simplicity. This protocol organizes the nodes into clusters with one node from each cluster serving as a CH and the rest of the node as cluster members. Low Energy Adaptive Clustering Hierarchy (LEACH) protocol it's similar to Energy Efficient Cluster Head Selection protocol.

## 2. PROPOSED WORK

Wireless sensor network comprises large number of sensor nodes. Network divided into small cluster each cluster has a relative location based on the cluster information The network users use some mobile devices to disseminate data items into the network which is called random mobility. Cluster head is responsible for transmit the information from source to destination. Network deployment it encompasses of all process. In our project we choose only 100 nodes. Separation of cluster using weighted clustering algorithm

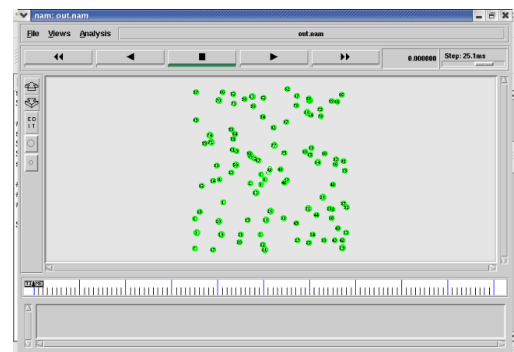


Fig 1. Initially deploy 100 nodes

Initially there are 100 nodes are deploy in the XY region The region are 2000\*1000 Using weighed clustering algorithm to separate the cluster into four groups.Each group have twenty five nodes.

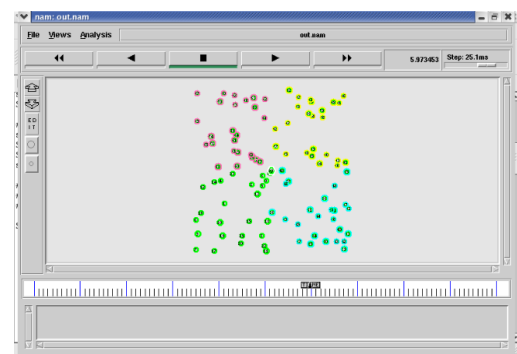
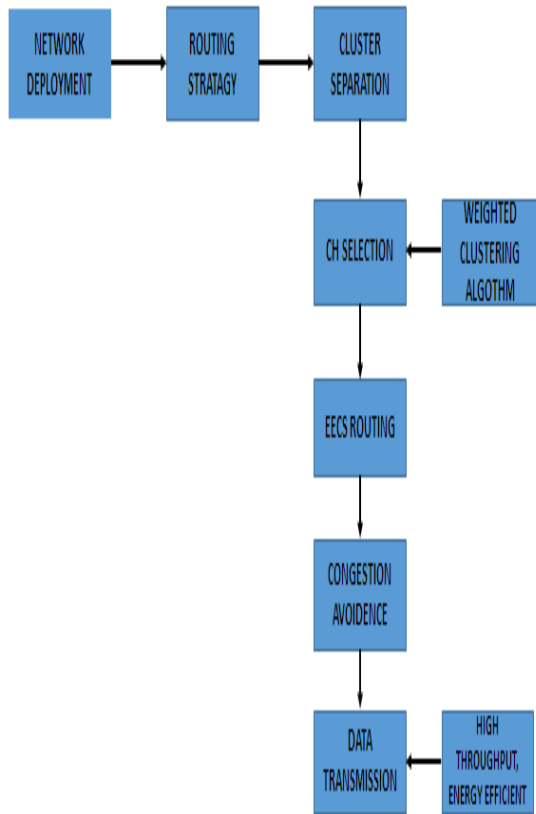


Fig 2.cluster separation

### 2.1 PROPOSED ARCHITECTURE



### 3. ENERGY EFFICIENT CLUSTER HEAD SELECTION IMPLEMENTATION

An Energy Efficient Cluster Head Selection protocol which select the cluster head depending upon the residual energy. This is accomplished by creating dynamic cluster sizes which are a function of the distance from the base station to the cluster. This addresses the larger transmission power requirements for nodes at a greater range from the base station.

Cluster Head Selection based on the no of nodes in high residual energy for each Cluster .Data Transmission from Source to Destination for Cluster Head with each Cluster Most of the existing clustering algorithms use only one metric: Power, lower-id, highest degree, mobility, node connectivity to elect cluster head. Weight based cluster algorithms use combination of degree; mobility; number of members and node stability.

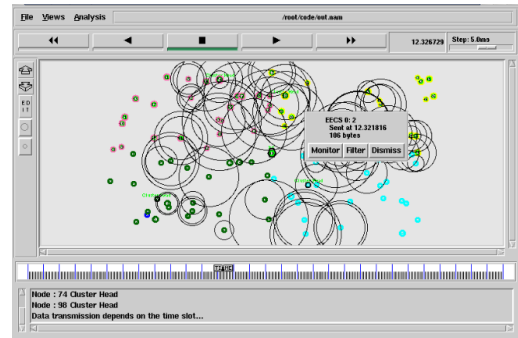


Fig 3: Energy Efficient Cluster Head Selection Implementation.

To improve the energy efficiency of TDMA scheduling for intra-cluster communications. Many sensor nodes, which are members of a cluster, may not have data to transmit to the cluster head all of the time, simply because no change in environmental variables or the lack of requests from a sink. When no data is sent from a sensor node to cluster head during the node's slot in the TDMA schedule, the cluster head will be effectively wasting energy listening and waiting for sensor data.

### 4. CLUSTER HEAD SELECTION

Throughput: Throughput is the rate of successful message delivery over a communication channel.

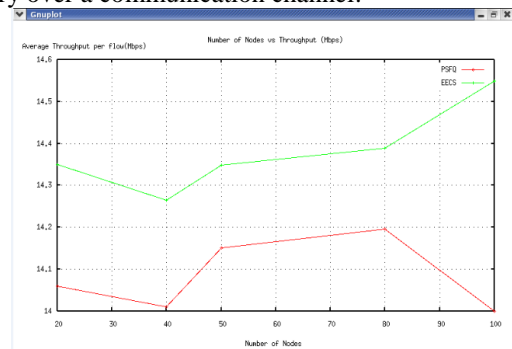


Fig 5: Throughput

Packet Delivery ratio : packet Delivery ratio (PDR) as a metric to select the best route, transmission rate or power.

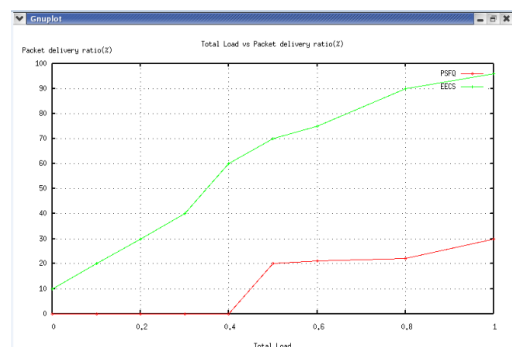


Fig 6: Packet Delivery ratio

ENERGY CONSUMPTION

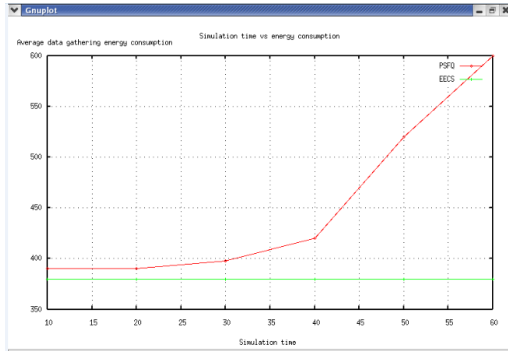


Fig:7 energy consumption

Delay : We compare our system delay with existing system. The prior work have high delay than our system.

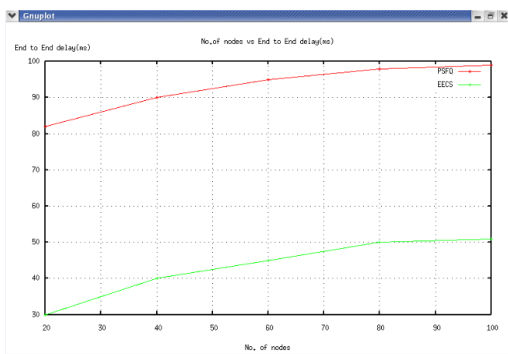


Fig 8: Delay

6.CONCLUSION

In this project,our proposed Energy Efficient Cluster Head Selection (EECS) based energy and congestion control mechanism.Through simulation we have proved that our proposed protocol has low congestion when Compared to other congestion control algorithms.

Due to congestion reduction packet loss is reduced and network throughput is increased.prior work have high delay then our system.Our proposed system has low energy consumption.It achieves less energy compared with existing system.

7. REFERENCE

- [1] Lindsey S, Raghavendra CS. PEGASIS: Power-Efficient Gathering in Sensor Information Systems. Proceedings of the IEEE Conference on Aerospace; Los Angeles, CA. 2002. 3. p. 1125–30.
- [2] Liao Y, Qi H, Li W. Load balanced clustering algorithm with distributed self-organization for Wireless Sensor Networks. IEEE Sensors Journal. 2013 May; 13(5):1498–506.
- [3] Yu L, Wang N, Zhang W, Zheng C. GROUP: A Grid-Clustering Routing Protocol for Wireless Sensor Networks. IEEE International Conference on Wireless Communications Networking and Mobile Computing; Wuhan. 2006 Sep 22-24. p. 1–5.
- [4] Kaur J, Gaba GS, Miglani R, Pasricha R. Energy Efficient and Reliable WSN based on Improved Leach-R Clustering Techniques. Indian Journal of Science and Technology. 2015 Jul; 8(16):1–6.
- [5] Syed SSA, Kumaran TS. An Energy Efficiency Distributed Routing Algorithm based on HAC Clustering Method for WSNs. Indian Journal of Science and Technology. 2014 Nov; 7(S7):66–75.
- [6] Revathi AR, Santhi B. Efficient clustering for Wireless Sensor Networks using Evolutionary Computing. Indian Journal of Science and Technology. 2015 Jul; 8(14):1–5.
- [7] Sheikhpour R, Jabbehari S, Khadem-Zadeh A. Comparison of energy efficient clustering protocols in heterogeneous Wireless Sensor Networks. International Journal of Advanced Science and Technology. 2011 Nov; 36:.
- [8] Heinzelman WR, Chandrakasan A, Balakrishnan H. Energy-efficient communication protocol for wireless microsensor networks. Proceedings of the 33rd IEEE Annual International Conference on System Sciences; Hawaii. 2000 Jan 4-7. p. 1–10.