

# An Energy Efficient Multi-sink Clustering Based Weighted Rendezvous Planning Method for Wireless Sensor Networks

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## ABSTRACT

With the fast development of the Internet, wireless communications has received significant attention. Wireless sensors networks are equipped with tiny, irreplaceable batteries and therefore it is necessary to design energy efficient algorithms to prolong the network lifetime. In wireless sensor networks (WSNs), the sink mobility along a constrained path can improve the energy efficiency. Sink mobility is an important technique to improve sensor network performance including energy consumption, lifetime and end-to-end delay. Existing method used weighted rendezvous planning (WRP) which is a novel algorithm for controlling the movement of a mobile sink in a WSN. This method focuses on a single mobile sink or source. This leads to inefficient communication, reducing the network lifetime. Because of this problem, some nodes or parts of WSN are not frequently visited. To deal with this problem, the proposed system uses enhancing energy efficiency by using energy efficient multi-sink clustering based weighted rendezvous planning method (EE-MSCWRP) which uses multiple mobile sink nodes on energy consumption under different scale networks. In this WSN is partitioned into smaller areas known as clusters where each area is assigned a mobile sink by cluster head (CH). Experimental result of proposed system achieves better reduction of energy consumption than with the existing system.

**Keywords:** WSNs, Sensor nodes, Cluster head, Multi-sink, weighted rendezvous planning

## I. INTRODUCTION

A mobile ad-hoc network (MANET) is a kind of wireless ad-hoc network and the main function of Ad hoc networks is to fewer dependence of the infrastructure and increase in speed and the ease of distribution . MANET is used mainly in sensor networks to transfer the signal [1]. 802.11/Wi-Fi is used in the wireless networking became all over the place in the mid to late 1990s [1]. Sensor node consists of four units they are sensing unit, processing unit, Tran-receiver unit and power

Management unit. Sensor unit consists sensor which is used to sense the development in the surrounding, processing unit consists ADC which convert analog signal to digital signal and storage, and trans receiver unit consists transmitter which is utilized to transfer the data to next node. These three units are connected with power unit. All the sensor nodes are battery driven contrivances so the potency administration unit is very consequential issue in the wireless sensor network. The sensor nodes connect through a wireless medium like radio frequencies, infrared or any other medium, which is having no wired connection. Node accumulates the data and transfer to as sink. The sink may connect to the outside world through internet. Sink accumulates the data from SN, and transfer to the utilize who requested the data. The sink may withal be an individual utilize who requires the desired information. The main quandary in WSN is constrained battery life of sensor nodes. Data communication consumes battery power so any optimization in these networks should fixate on optimizing energy consumption. Caching is a technique which provides rapid data access in any computing system. It additionally stores data to be needed in future. Clustering is withal utilized in WSN for load balancing and to reduce traffic from network. Clustering consists groups of sensor nodes. Every cluster consists cluster head which controls all other sensor nodes[3]. The proposed system uses multiple sink nodes in WSN. In this, the entire network is divided into several more diminutive areas kenneed as clusters. In each cluster, there is one Cluster Head (CH) for data amassment and the rest of the sensors are called mundane nodes. The CH is resolute by the residual energy among sensors and the CH culls the mobile sink nodes in each area and sends aggregated data to the germane sink.

## II. RELATED WORK

A wireless sensor network consists of an astronomically immense number of sensor nodes and a Base Station (BS) and is utilized to monitor certain physical event. The BS typically acts as a gateway to other networks and is comparatively resourceful [4]. While diminutive size sensor Nodes are inhibited in potency, processing, and recollection [5]. Many types of algorithm are utilized for the Clustering process. In wireless Ad hoc Networks clustering can be dissevered into two types they are may be either Deterministic or Randomized. Deterministic is nothing but which can be used when the nodes are culled by their weights and the result which leads to the cluster head. This weight can be quantified by the number of

neighboring sensor nodes, mobility rate [6]. In the process of randomized clustering approach algorithm the nodes which elect themselves desultorily their cluster heads. Energy efficient quandary in WSN is handling by utilizing weighted rendezvous orchestrating (WRP) by controlling the kinetics of single mobile sink node. WRP culls the set of rendezvous points (RP) such that the energy expenditure of sensor nodes is minimized and uniform to avert the formation of energy apertures while ascertaining sensed data are amassed on time. WRP is a heuristic method that finds a near-optimal travelling tour that minimizes the energy consumption of sensor nodes. WRP assigns a weight to sensor nodes predicated on the number of data packets that they forward and hop distance from the tour, and culls the sensor nodes with the highest weight. The sensor node that forwards the highest number of data packets and have the longest hop distance from the tour reduces the network energy consumption, as compared with other nodes[7].

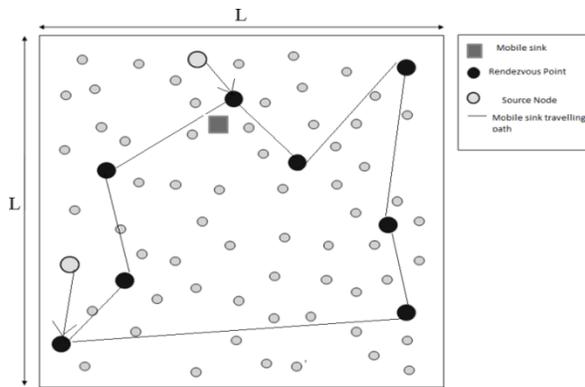


Fig 1.1

### III. PROBLEM STATEMENT

The Mobile sink path cull proposed single path which is utilized to reducing the network lifetime. If any interference detected it should not alternate the channel. Then the packet or data should be loosed. It follow the time driven plot which should be avails the sensor nodes perpetually sends a data to the mobile sink. It should actively monitor the energy levels in the mobile nodes. Mobile sink path cull leads to inefficient communication, reducing the network lifetime withal energy utilization needs to be minimized.

### IV. MODULES

#### A. Node Selection

In a network node is mainly arranged to boost the efficiency and throughput of the communication. The node should be act as a cognition point or a redistribution point or the cessation point for the Data Transmission. It is utilized to maintain the information of the signal vigor, direction and information of the neighbor node, resources,

location etc. In a network the function of the node is to group as a network and composed as a cluster. The cluster of nodes should be elects the cluster head and the cluster head maintains the Report about the nodes in the topology.

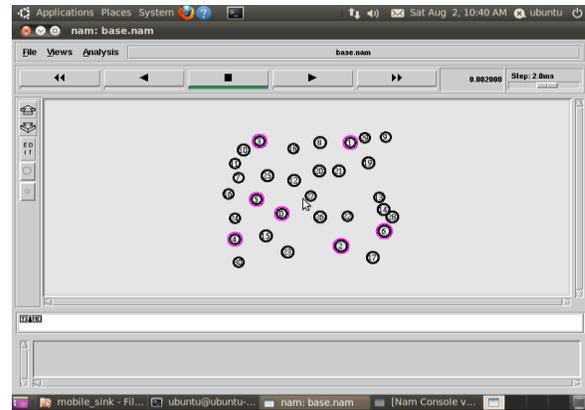


Fig 1.2

#### B. Cluster Head Election

The route should be perpetuate and the felicitous communication between the neighbor Nodes and the cluster head should be maintained systematically. The probability of the node should be culled as the cluster head which the nodes are uniformly distributed over the network. The Cluster Head is additionally a type of the sensor node for organizing the other sensor nodes. It avails to provide the route and provide the way to communicate between clustering nodes ant the process is kenneas inter cluster Communication. This boundary sensor nodes avail when the cluster head does not work and does not have long range efficiency. The overlapped Clusters which used to boost the network robustness and utilized in the recuperation process. The cluster head which should be possess equal number of clusters nodes and it avails to provide the balanced data processing and aggregation. The storage load should be mainly reduced according to the size of the clusters.

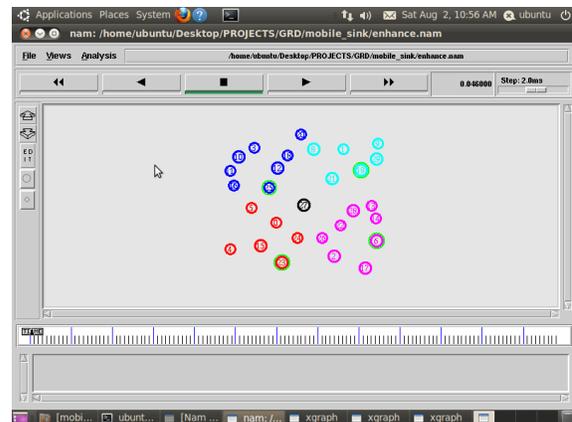


Fig 1.3

### C. Cluster Communication

The cluster communication which may possess the End-to-End Reliability, Message fragmentation and Multi point connection. The sender gateway which avails to receives the message from the sender when the sender is acknowledged. Thus the sender surmised that the packet has reached the destination. The sequence number cluster head which designate the inductively authorizing of the message and the acknowledgements and communicate together.

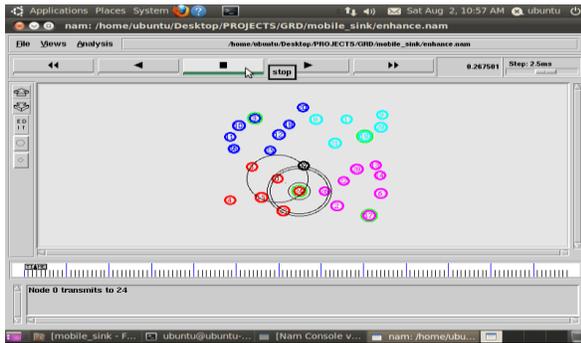


Fig 1.4

### V.RESULT

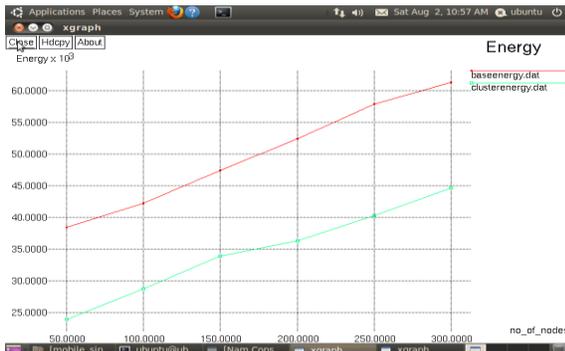


Fig 1.5

### VI.CONCLUSION

In this paper, we have a proclivity to study of mobile information about the different users utilized the same channel and the merging of the information in the concurrent slots. The planned algorithm makes it possible that multiple neighboring users able to switch to the same channel [1]. The coordination of the multiple users should be acclimated to make connect the users in various time slots. The trade-off between the relay hop count of sensors for natural information gather and withal the peregrinate

The network lifetime should be evaluated by the mobile nodes. The Unnecessary travelling time which could be have evaded by the proposed protocol and for the each node the transmission range was varied. It should be find the multiple routes have been ascertaining by the mobile nodes in mobile collector and peregrinate along the path with less hop transmission. The Cluster Head should be varied from hop of the nodes. Energy- efficient multi-sink clustering predicated weighted rendezvous orchestrating method (EE-MSWRP) is proposed to minimize the energy consumption so that data from different nodes are amassed within a given deadline.

By adopting clustering or hierarchical routing technique, network scalability and more facile management can be ensured. In the proposed system the clustering algorithm is well designed with CHs located in a geographically uniform way, energy consumption is well balanced and reduced, causing a much protracted network lifetime. In EE-MSWRP each cluster head culls an optimal sink to send aggregated data. In many clustering algorithms, some sensor nodes in the same cluster send data directly to the cluster head. Due to the fact of sundry locations, certain sensor nodes may consume substantial amount of energy predicated on long-distance transmission. To eschew this quandary multi-hop routing is utilized here. At end, performance of the proposed system is analyzed and evaluated with the subsisting stem of work. Consumption of energy is well balanced and reduced by utilizing Multi- sink nodes. Efficient communication..



Fig1.6

length of the mobile information should be quantified. We have a proclivity to orchestrate a polling-predicated theme and relinquish much sensible results. In depth simulations are distributed to validate the potency of the system.

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