

# Efficient Cluster-Head Selection in Wireless Sensor Network With Energy Effective Parameter

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**ABSTRACT:** In WSNs energy consumption is one of major issues which need to be carefully consume by sensor node to “maximize the network lifetime. Wireless Sensor Networks is an auspicious arch type of interacting and computing, where a node is self-powered and all discrete node have the ability to intellect and interconnect. Node can be used as efficient tool for sensing and collecting data among various platforms using large number of wireless sensor network. Routing is the process of choosing the best paths in a network. Formerly, the term routing was used to forward network traffic among the networks. However this function is better described as simple forwarding. This paper presents a survey on the routing in wireless sensor network, need of routing protocol and the various works done in this field.

**KEYWORDS:** Wireless Sensor Network; routing; network life time,

## I. INTRODUCTION

Wireless communication technology is trending nowadays, due to which several mobile applications have been used. Mobile networks are used because of their flexibility in nature and cost. In comparison with wired network, mobile networks have unique characteristics as node can move freely anywhere that cause frequently changes in the topology of the network. Wired networks bounds; whereas wireless link capacity varies through the impact of noise, fading and interference. On the other hand, wireless mobile networks also have some demerits like high error rate, power restrictions as well as bandwidth limitations. Uses of WSN are increasing day by day without any kind of limitations. Different type of applications have different type of network bearing constraints and features but still most of the issues are common or same which makes them comparable

Routing is basically used to forward the traffic among networks to attain less traffic on the network as the speed and performance of the network will be increased. Thus routing helps to obtain the best path in a network to send the traffic on that path. Routing is performed on telephone network, electronic data networks and transportation network.

The above explanation can be done through the algorithm. Initially, a node does not know about the other nodes information, it knows only about the intermediate neighbor or node and direct cost involved in reaching them. In the routing table or distance table of each node it contains information about the list of destinations, total cost to each, and address of next hop to get there. At the time of communication, each node sends its own information with the total cost to get to all the destinations it knows of. When other nodes receive this information, it will compare the received information with their own information i.e. stored in their routing table. With this comparison it will replace the relevant information with their stored information for the improvement purpose. This process will lead each node with the best next hop with its best total cost for all destinations. The basic advantage behind using this algorithm is that in case of damage of any node,++ other nodes who having damaged node as their next hop will discard its entry from its routing table and will also create new routing table information. Also it will inform other nodes about updated routing

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information to all adjacent nodes. The whole process will go like same until or unless all the nodes in a network receive updates and able to discover new paths that are still reachable.

## II. RELATED WORK

In this comprehensive survey of literature the work of the other researches has been highlighted. Researchers have been involved in the research related to Wireless sensor network since several years. Here the study work carried in this field of wireless sensor network and related algorithms have been highlighted:

**Cheng-fuchou et al [1]** In this paper, the main focus is on the wireless sensor networks, thus energy efficient routing protocol has been proposed. The proposed protocols also known as straight line routing algorithm i.e. SLR that is being used in wireless sensor network. Broad cast based routing protocols do not use in this paper so on the behalf of these protocols, SLR protocols have been used. Thus to obtain the same concept follows in broadcasting, source and sink host constructs event path and query path respectively. Query path helps in finding the routing path and event path first intersect. SLR algorithm does not want any type of geographic information to find the event and query path for a network. Performance has been evaluated on straight line and rumor routing protocols with the help of simulations. Thus result shows that the SLR performs better in comparison with rumor routing in terms of energy consumption, path quality and ratio of successful routing. SLR saves more energy consumption and ratio of finding a best path improves.

**Adnan Fidaet al [2]** This paper focuses on the selection of the path or route and its optimization in mobile sensor network. Transmission has been done between the source and the destination through multiple intermediate routers between them across presence of noise, path loss, multipath fading and interference. This paper proposes a route optimization technique known as COMPARE named as communication and position aware reconfigurable route optimization which provides end to end transmission. This approach selects the route after checking the quality of the link of the network and this quality has been checked through the probability of the successfully receiving packets over a link. After the selection of the path, route is reconfigured. At the end, experiments has been performed and results shows that proposed approach is better than conventional approach.

**EhsanAhvar et al [3]** Energy consumption in a network plays a vital role in wireless sensor network. Energy aware routing protocols are used to less consumption of the energy. These protocols are divided into two categories known as energy balancers and energy savers. In energy savers, it reduces the overall energy consumed whereas energy balancers distribute the energy at the time of overhead at one node. But energy savers and energy balancers do not provide good saving and good balancing of energy respectively. Thus these protocols are not better due to which proposed energy aware routing protocols are mentioned in this paper. Proposed approach helps in decreasing the total energy consumption through fuzzy sets and learning automata techniques.

**Monica R Mundada et al [4]**– This paper concludes that a wireless sensor network consists of low power, low cost, smaller in size and multifunctional sensor nodes. Routing protocols used in WSNs lay emphasis on data broadcasting and collection, limited battery power consumption and bandwidth constraints to assist efficient working of the whole network, thus increasing the lifetime of the whole network. Routing protocols which are used in WSNs are also application explicit which has directed to the expansion of a variety of protocols. Based on the basic underlying network structure, the routing techniques can be categorized into three sets: location based, data-centric and hierarchical routing. In this research paper, a survey of state of the art routing techniques under all the three categories is carried out. The study is being carried out about these routing techniques and conclusion of the advantages and disadvantages followed by their application domain is being done

**DušanmTeodorović et al [5]**– This research paper proposed the concept of Swarm intelligence which is basically the branch of artificial intelligence that is based on the study of the behavior of all the individuals in various different decentralized systems. This paper represents the classification and analysis of all the results attained using swarm intelligence (SI) in order to model transportation processes and complex traffic. The most important goal of this research paper is to familiarize readers with the elementary principles of Swarm Intelligence (SI), as well as to specify potential swarm intelligence applications in transportation and traffic.

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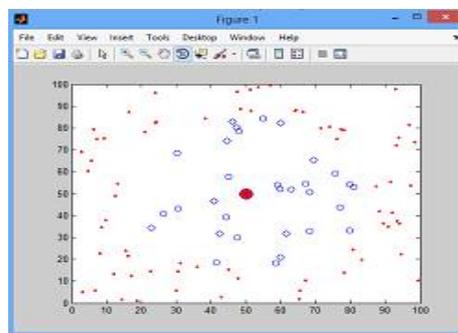
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**M. J. Handy et al [6]** this paper mainly focused on the reduction of the power consumption of wireless micro sensors. Therefore, another communication protocol named LEACH i.e. Low-Energy Adaptive Clustering Hierarchy is amended. This paper used a new approach that defines the lifetime of micro sensor network that used three new metrics i.e. FND-First Node Dies, HNA -Half of the Nodes Alive, and LND -Last Node Dies. The paper extend LEACH's cluster head selection algorithm by a deterministic approach. An increase of network lifetime by about 30 % can be accomplished depending on the network configuration.

**Christine E. Jones et al [7]** – The paper represents an ample summary of recent work that addresses the low-power design and energy efficient within all the layers of the wireless network protocol stack. As the wireless networks have become a fundamental component of this modern communication infrastructure, therefore energy efficiency will now be an important design concern due to this limited battery life of the mobile terminals. The power conservation techniques are basically and commonly used in hardware design of such systems. Therefore a considerable research has been enthusiastic to this low-power design of this entire network protocol stack of the wireless networks in reference to enhance the energy efficiency.

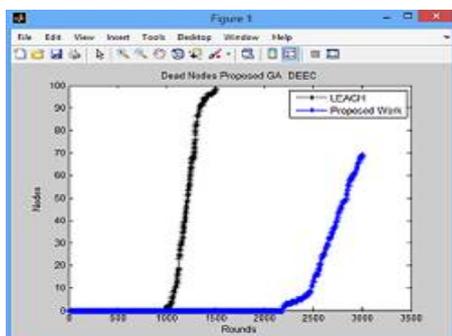
**Mahesh K. Marina et al [8]**-Mobile ad hoc networks are one of the most emerging areas whereas different routing techniques have been mentioned. In this paper, proposed approaches are used to evaluate the performance of dynamic routing techniques with other techniques. Several routing techniques like proactive, reactive, on demand etc routing techniques are also discussed in this paper. This paper also concludes the future scope of different techniques

### III. EXPERIMENTAL RESULTS



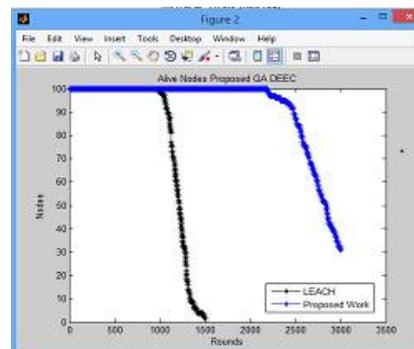
(a)

Fig a. network parameter are initialized



(b)

Fig b. perform on the cluster and its shows the dead node



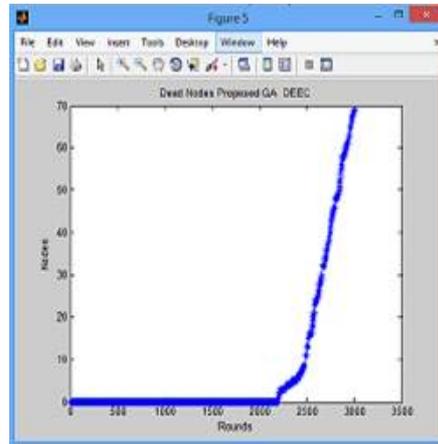
(c)

Fig c. its represents the regular and alive node

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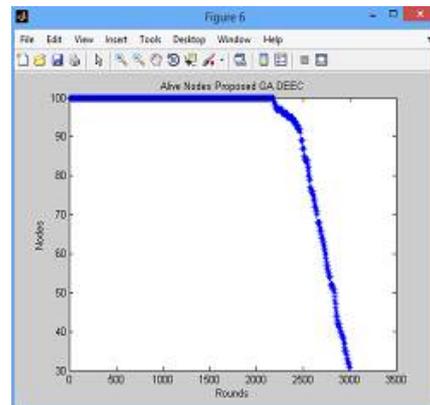
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(d)

**Fig d** represents the cluster node goes on decrease



(e)

**Fig 'e'** represents the regular and alive node

Figures show first the crossover has been performed on the cluster and if the fitness function of a cluster is decreased or the fitness function maximum is decreased then check and save it. In the else case, mutation is performed. After the mutation process, a regular node can become the cluster head or the cluster head can become the regular node. If the cluster head becomes a regular node after mutation; members of that cluster join nearest cluster head. But if the regular node becomes the cluster head, for that reason nodes which are close to it will join this cluster.

## IV. CONCLUSION

We have implemented the traditional work of the same field and will give better results in the case of various parameters as dead nodes, alive nodes, residual energy etc. The work will be implemented in the MATLAB software and the results will be graphically represented. The process of routing is done to select the best path for transmission of data from source to destination. The technique used for selecting best path or routing is employed for this work only i.e. for selecting the best path from the available paths. In this the detailed study of the routing in the wireless sensor network is presented.

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