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# CLUSTER HEAD FAULT TOLERANCE MECHANSIM USING DUAL CH FOR WIRELESS SENSOR NETWORK

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## ABSTRACT

*Wireless Sensor Networks (WSN) have become a critical research issue for a wide range of applications such as environmental monitoring, medical, habitat monitoring, surveillance and tracking systems with the improvement of wireless communication and VLSI technology.WSN is consisted of a large number of sensor nodes to collect the information and dispatch information. . As power is a limiting factor in a WSN, the major challenge in deploying a WSN is to enhance the network life time. So, it becomes inevitable to devise an efficient method of conserving the power. Wireless Sensor Networks have many nodes are connected to the network to calculate the network performance like transmission power. The power consumption is directly related to the size and weight of the nodes. It gains low cost and also to detect shortest path to transmitted the power through the network. The major design challenge for WSN is to extend the lifetime of sensor nodes longer and reduce power consumption important issue to prolong the lifetime of WSN.*

***Keywords: Graph Theory, Transmission Power, Shortest Path***

## I. INTRODUCTION

Wireless sensor networks (WSNs) have become a hot research topic in recent years. Wireless sensor network is one of the pervasive networks which sense our environment through various parameters like heat, temperature, pressure, etc… [1]Since sensor networks are based on the dense deployment of disposable and low-cost sensor nodes, destruction of some nodes by hostile action does not affect a military operation as much as the destruction of a traditional sensor, which makes the sensor network concept a better approach for battlefields. [2]. The transmission between the two nodes will minimize the other nodes to show the improve throughput and greater than spatial reuse than wireless networks to lack the power controls. Transmission Power technique to improve the Network Life Time in Wireless Sensor Networks [3]. Wireless sensor networks (WSNs) are emerging as an effective means for environment monitoring to improve the quality of life and safety in emergency situations. Sensor networks are equipped with energy limited batteries, energy conservation in such networks is prolong the network lifetime. Advances in wireless sensor network (WSN) technology has provided the various types of physical and environmental conditions, data processing, and wireless communication and

the characteristics of wireless sensor networks require more effective methods for data forwarding and processing.

## II. GRAPH THEORY

Graph theoretical ideas are highly research areas of computer science such data mining, image segmentation, clustering, image capturing, networking etc., Modeling of network topologies can be done using graph concepts. The shortest spanning tree in a weighted graph, obtaining an optimal match of nodes and distance and locating the shortest path between two vertices in a graph.

Some algorithms are as follows:

1. Shortest path algorithm in a network
2. Finding a minimum spanning tree
3. Finding graph planarity
4. Algorithms to find adjacency matrices.
5. Algorithms to find the connectedness
6. Algorithms to find the cycles in a graph
7. Algorithms for searching an element in a data structure (DFS, BFS) and so on.

## III. RELATED WORK

Many algorithms and techniques have been developed that utilize power in an efficient manner. Some of the techniques and methods that are used to design the proposed algorithm are discussed here to know how power is dynamically reconciled to meet the constraint of power depletion in nodes of the network.

Sorooshyari et.al. have addressed the problem of adjusting the transmission power level at each wireless radio interface on a per packet basis, based on user and network applications. They have put forth a power control policy that enables a user to address various user – centric and network – centric objectives. The proposed power control policy is optimal with respect to users dynamically allocating transmit power.

Correia et. al. in have devised two transmission power control protocols for WSNs, which can be embedded into any existing MAC protocol. The first, called Hybrid,

calculates the ideal transmission power using a closed control loop that iterates over the available transmissions powers in order to maintain a target link quality. The second, called AEWMA, employs calculations to determine the ideal transmission power based on the reception transmission power and average noise.

Arnab Nandi et. al. have propose power based transmission scheme for WSN where transmit power is adapted depending on node density and channel conditions so as to maintain a desired level of signal detection probability at a receiving node as demanded by sensing range. They have compared the energy level performance and the proposed transmit power schemes. With respect to energy consumption, they have shown that the proposed scheme consumes less energy than FTPS in moderate and high node spatial density region.

Jasmine Norman in their paper have developed Random Geometric Graphs a very influential and well-studied model of large networks, such as sensor networks, where the network nodes are represented by the vertices of the RGG, and the direct connectivity between nodes is represented by the edges. This assumes homogeneous

wireless nodes with uniform transmission ranges. In real life, there exist heterogeneous wireless networks in which devices have dramatically different capabilities. The connectivity of a WSN is related to the positions of nodes, and those positions are heavily affected by the method of sensor deployment. As sensors may be spread in an arbitrary manner, one of the fundamental issues in a wireless sensor network is the coverage problem. study connectivity and coverage in hybrid WSN based on dynamic random geometric graph.

B.Baranidharan in their paper have energy efficiency in wireless sensor network [WSNs] is the highly sorted area for the researchers. Number of protocols has been suggested for energy efficient information gathering for sensor networks. These protocols come under two broad categories called tree based approach and clustering techniques. In these techniques clustering is more suitable for real time applications and has much more scalability factor when compared with its previous counterpart. It presents the importance and factors affecting the clustering. Surveyed the different clustering algorithms with its extensions till date and proposed the clustering technique using Minimum Spanning Tree [MST] and shortest path concept with its strength and limitations.

## IV. PROPOSED WORK

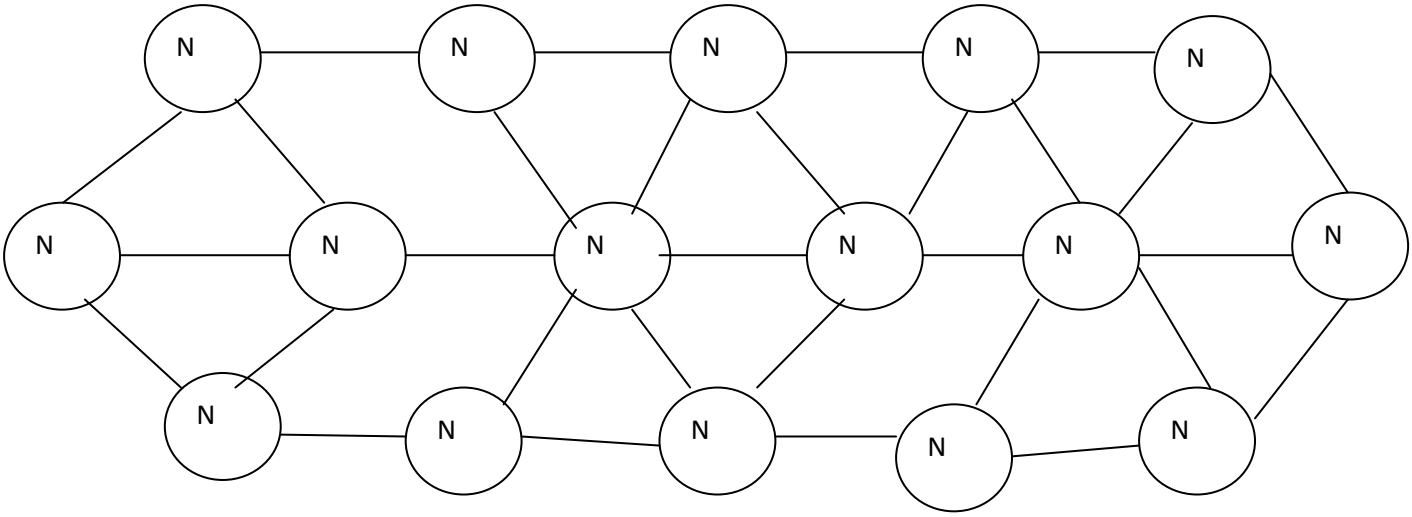


**Figure 1: Network Structure**

The main objective of the paper is to develop a transmission power technique using graph approach. The Graph based Transmission Power is developed to prolong the lifetime of WSN by reducing the communication mechanism with reduced processing and network power consumption. The basic ideology behind this novel method is to reduce the transmission power of the node automatically so that the communication happens on a one to one basis. The concept of the transmission technique is best implemented with Graph Theory. In Graph Theory, the nodes are treated as vertices and the links between them are considered as edges of the graph. Consider the network shown in Figure 1.

The sensors are deployed randomly in a WSN. The distance between the sensors nodes need to be calculated to know the neighboring nodes of a particular node. Calculating the distance from the node also helps in finding

the amount of power required to reach the next neighbor node. Network nodes are represented by the vertices and also direct connectivity between the nodes by the edges. Sensor nodes are maximum flow from one node to the other node to calculate the distance. The Combinatorial Structure is called as network structure. The Number of vertices are connected to the source node in a network is called its neighbor node and the number of edges are its size. Two or more edges of a network joining the same pair of vertices are called multiple edges. The distance calculation and the neighborhood discovery form the basis for finding the shortest path that can be taken to communicate between the source and the destination with reduced power requirement thereby prolonging the life time of the network.

## V. RESULT AND DISCUSSION

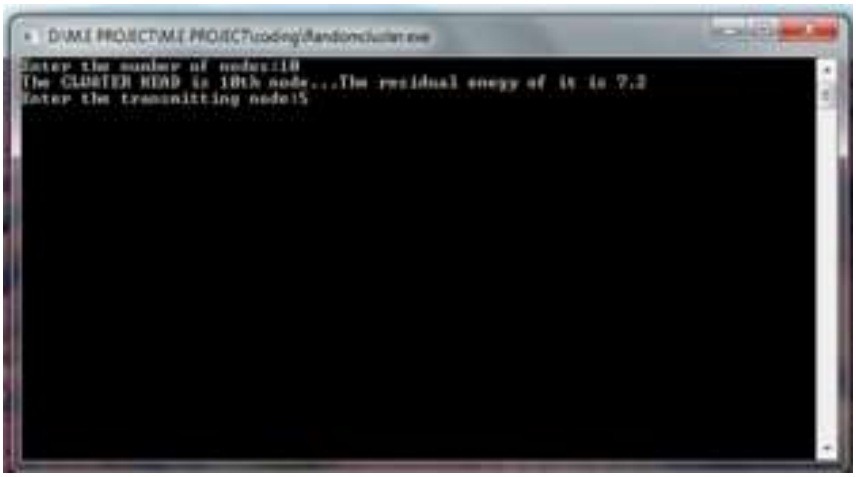


**Figure 2: Node Result**

Figure 2 shows the Number of nodes results in the given network of the wireless sensor networks.

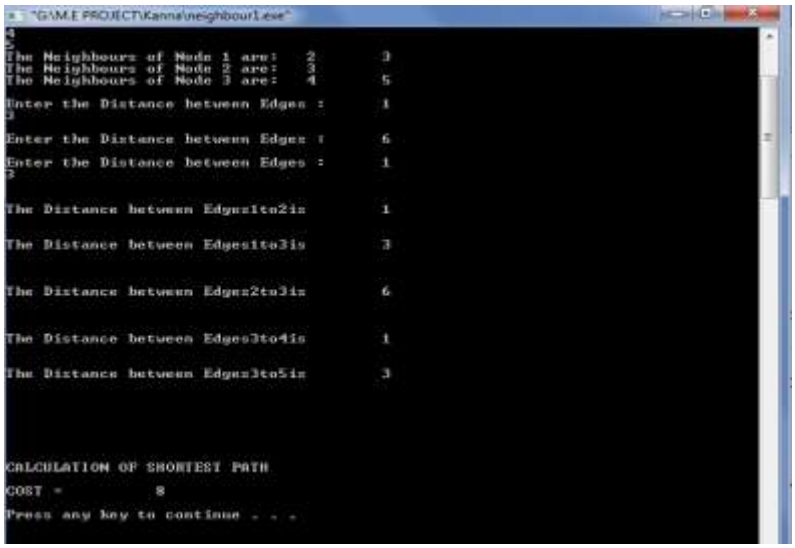


**Figure 3: Shortest Path Result**

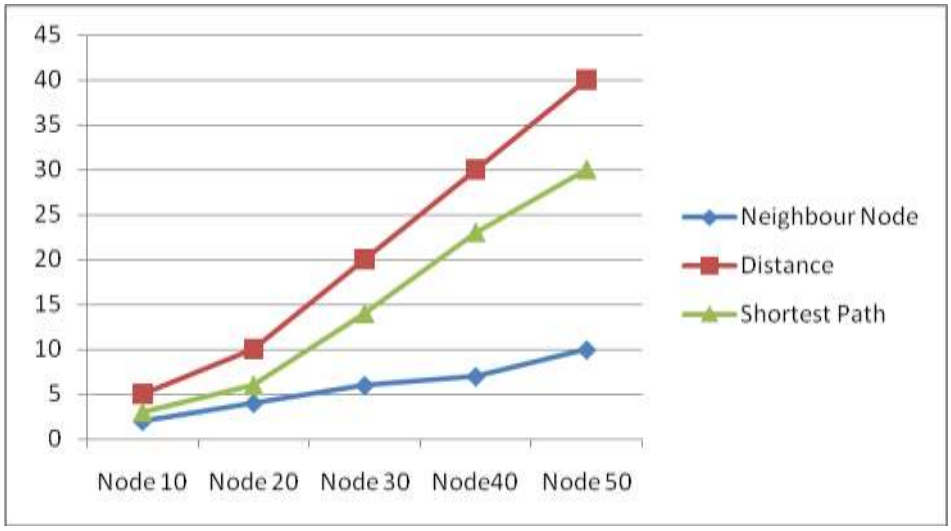


**Figure 4: Comparison of Various Nodes**

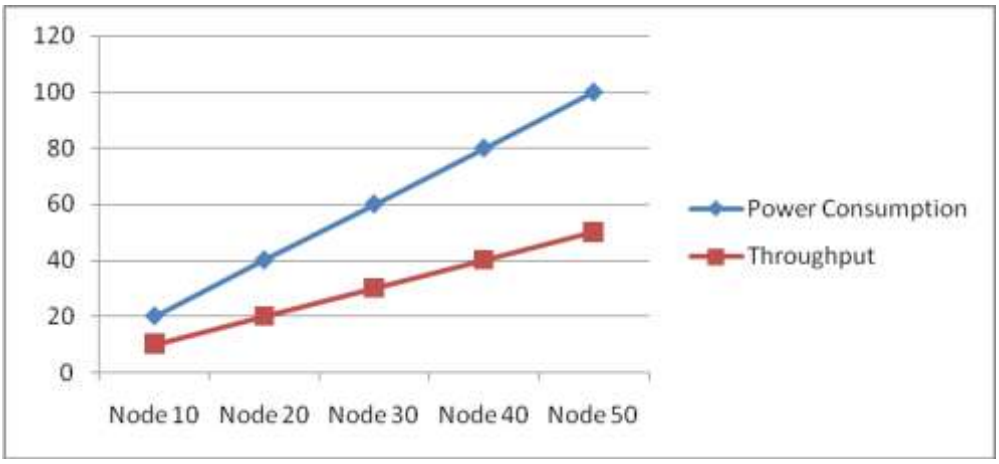


**Figure 5: Power Consumption of various Nodes**

Figure 3 shows that shortest path of given network based on the distance of the neighbouring node. Figure 4 shows the comparison of various node based on the distance, shortest path and neighbouring node of the given network. Figure 5 shows that power consumption of various nodes.

## VI. CONCLUSION

The proposed system of Transmission power technique is to enhance the lifetime of the entire sensor network. The eligible sensor nodes are chosen depending on their power levels and association with number of nodes in transmission area. The efficiency of the proposed model is experimented and evaluated in C++ and the results

accomplished showed that in this technique, sensor nodes utilize extremely less power and stay in the network for a greater period of time.

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