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Secure Routing For Cooperative Heterogeneous Network

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ABSTRACT: Wireless sensor networks are receiving significant attention due to their potential applications ranging from surveillance to tracking domains. Optimal sensor deployment is necessary condition in homogeneous and heterogeneous wireless sensor network. The number of Sensor nodes and Relay nodes, and their locations has significant influence on optimization of network lifetime. Effective deployment of sensor nodes is a major point of concern as performance and lifetime of any WSN. In proposed system consider node deployment in a 3D environment. By considering 3D deployment network owner can deploy maximum number of sensor nodes in a limited area that results in optimization of network lifetime. Regular Hexagonal Cells are used to deploy sensor nodes at 3D locations. Deployment system in WSN explore every sensor node sends its data to the relay node having maximum energy and then it is send to the nearest sink node of the WSN. This system gives advantages over the existing system that consider node deployment in 2D environment.

KEYWORDS: 3D Sensor deployment, homogeneous, heterogeneous etc

I. INTRODUCTION

Wireless sensor networks (WSNs) collect data from the physical world and communicate it withvirtual information world, such as computers. Wireless Sensor Networks (WSNs) are a valuable resource for a lot of innovative monitoring applications, acting in home automation, weather monitoring, traffic management, tracking, industrial control, surveillance, among many others fields. Sensor nodes are battery powered devices it has limited power so we need to use it efficiently. Proper sensor deployment improves monitoring and controlling of physical environment. Proposed system is used to sensing in the target area. SNs closer to the sink node forward more packets than the SNs at the periphery of network is called funneling effect. Funneling effect causes Energy Hole problem [1]. We avoid redundant nodes for the conservation of energy. Node deployment strategy plays an important role in optimizing network lifetime. Node placement problem arise due to the undetermined locations of sensor nodes hence we have to avoid node placement problem. In wireless sensor network clustering of sensor nodes is one of the most useful methods because of its good scalability and the support for data aggregation. Data aggregation combines data packets from multiple sensor nodes into one data packet by removing same information. This reduces the transmission load and the total amount of data. With this energy consumption is reduced in clustering, because the energy load is well balanced by dynamic selection of cluster heads. As a result, nodes around sinks node die earlier than other nodes, even in clustered WSN. In a multiple-sink WSN, sensor nodes are divided into a few clusters. Sensor nodes within a cluster are connected with one sink, which belongs to that cluster. Purpose of node deployment for wireless sensor network is to deploy relay nodes dynamically in order to overcome the energy hole problem and optimize network lifetime. Relay nodes are used to communicate between sensor nodes and sink node or base station. Relay nodes transfer data from sensor nodes to the sink node. Relay nodes are deployed in such a way that maximum area should be covered. Nodes are distributed based on precise locations that are mapped on to Regular Hexagonal Cells.

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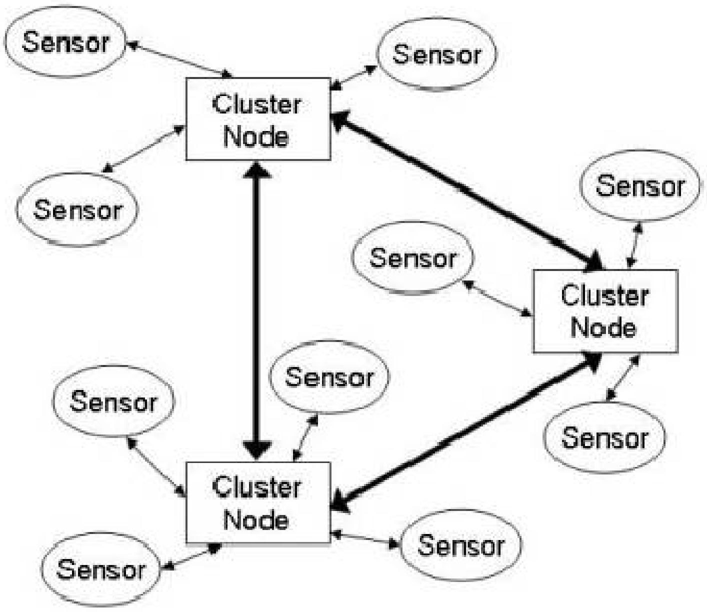

We develop a model which provides minimum distortion with Maximum Coverage. We develop node deployment strategy in a 3 Dimensional environment. By considering 3D node deployment we can deploy maximum number of sensor nodes in a limited area that results in optimization of network lifetime. Regular Hexagonal Cells are used to deploy sensor nodes at 3D locations. Based on the energy balancing principle we can derive number of homogeneous and heterogeneous SNs to be deployed along with their deployment location. Deployment system in WSN explore every sensor node sends its data to the relay node having maximum energy and then it is send to the nearest sink node of the WSN.

II. REVIEW OF LITERATURE

A Review of literature survey of various sensor node deployment strategies is defined. In [2] described the sensor deployment problem as a source coding problem with distortion reflecting sensing accuracy. When the communication range is limited, a WSN is divided into several disconnected sub-graphs under the condition that every sensor node location should coincide with centroid of its own optimal sensing region. In this a backbone network is designed for communication between sensor nodes and cluster node. In [3] authors determine the optimal deployment of nodes by taking into consideration the density in monitored area. By using this dynamic deployment scheme, energy balance can be achieved. A mathematical model is proposed to compute the desired sensor density in the monitored area. Sensor nodes send their messages to a sink located centrally. The density distribution optimization problem is solved by determining number of nodes in each sub-region as a result, longer lifetime is achieved. In [4] authors tackle the problem of optimal surface deployment problem on 3D surfaces, aiming to achieve the highest overall sensing quality. It introduces a new model to formulate the problem of sensor deployment on 3D surface. We assume stationary and homogeneous sensors deployed on surfaces. The accuracy of their collected data depends on the distance between the sensor and the target point to be sensed. It presents the optimal solution for 3D surface sensor deployment with minimized overall unreliability. In [5] authors proposed techniques for balanced energy depletion for a primitive geometric node distribution (GND) and a primitive energy proportional node distribution(EPND). Three novel non uniform node distribution strategies are proposed. Strategy I isable to fully achieve energy balance. Strategy II achieves the longest network lifetime through the EPND and a simple sensing/ non sensing switch scheduling. Strategy III requires the fewest sensor nodes among the three proposed strategies. The distributed wireless video scheduling with delayed control information (DCI) is proposed in [6]. It considers two classes of DCI distributions first the class with finite mean and variance and second is a general class that does not employ any parametric representation. A distributed

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scheduling scheme is proposed to achieve performance bound by making use of the correlation among the time-scale control information. S. Halder and A. Ghosal [7] introduces a approach for deployment strategy for energy balancing using customized Gaussian distribution in a layered network architecture by discrediting the standard deviation. Standard deviation has been identified as the parameter responsible for energy balancing. The target of the strategy is achieving energy balancing and enhancing network lifetime. Node deployment using Gaussian distribution is widely acceptable when random deployment is used. Optimal Sensor deployment together with a realistic terrain model is proposed in [8]. It considers only those terrain features which can be modeled by convex polygons. Optimal sensor deployment together with a realistic terrain model makes sensor deployment more practical and robust. Results show that the number of sensors, their locations and the node density change in presence of obstacles. In [9] authors proposed a curve based sensor deployment for coverage barriers in WSN. For enhancing barrier coverage performance, we introduced a concept of distance-continuous curve, and provided an algorithm to obtain the optimal sensor deployment when the deployment curve is distance continuous, and an algorithm which can attain close-to-optimal sensor deployment when the deployment curve is not distance continuous. Two deployments strategies-Hexagonal Deployment Strategy (HDS) and Diamond Deployment Strategy (DDS) are proposed in this system [10]. A Radar Sensor Network (RSN) is effectively deployed to detect multi-target within a given surveillance area with required detection performance and energy consumption. It propose two decision fusion rules over pass-loss fading channel in multi-hop RSN to improve the performance of multi-target detection. In [11] authors introduced the maximum coverage deployment problem in wireless sensor networks and analyze the properties of the problem and its solution space. They propose an efficient genetic algorithm using a novel normalization method. To cover a wide range of a target area with a minimum number of sensors and can be accomplished by efficient deployment of the sensors. Sensor coverage models measure the sensing capability and quality by capturing the geometric relation between a point and sensors. A new approach to find out least covered regions in a sensor network where further sensor deployment is desirable is described in [12].

III. SYSTEM ARCHITECTURE

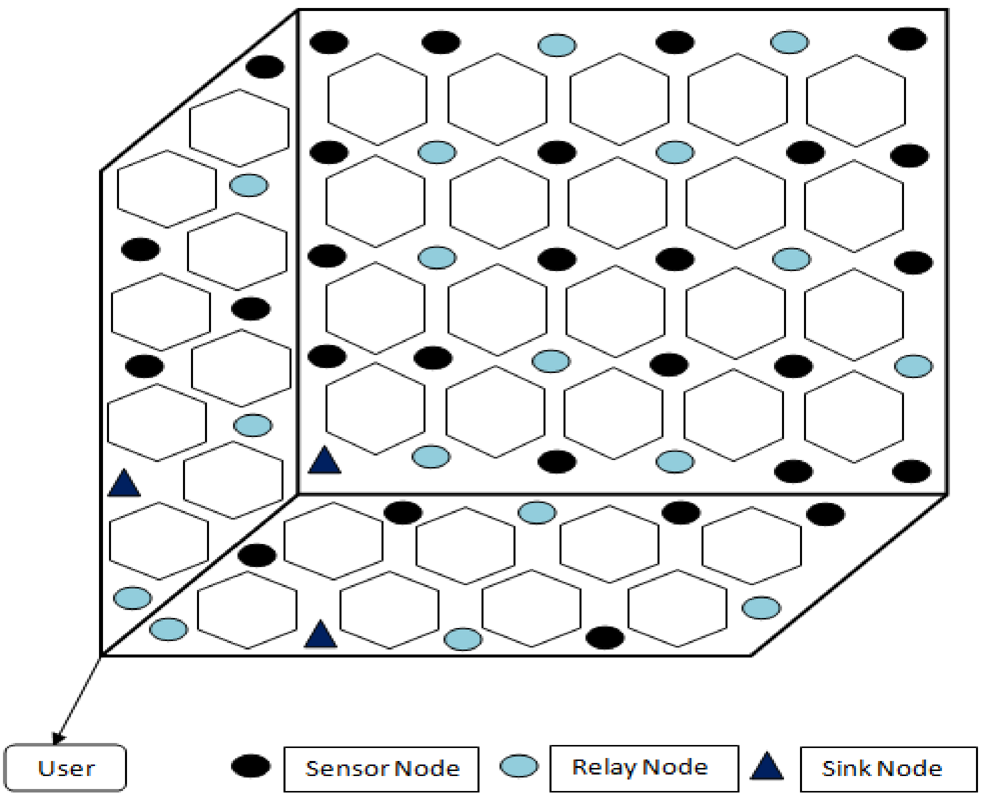

Figure 01. 3D Node Deployment Architecture

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In the node deployment strategy shown in above architecture state relay nodes and sink nodes for data transmission in wireless sensor network. Relay nodes are the nodes which are having maximum energy and acts as intermediate node for transmitting data from sensor node to sink node. Sink node is base station from which sensed data is transmitted from Wireless Sensor Network to the user. Once the nodes (i.e., SNs/RNs) are deployed, network set-up phase starts. In this phase, all SNs learn about their neighboring RNs by exchanging messages among themselves and record their assigned node ID. Here, neighboring RNs are those which are within the communication range of a SN. A SN in network chooses a RN as a receiver which is nearest to SN and has the highest residual energy for sending its data. If there is more than one receiver node with the same highest residual energy, one of them is chosen randomly. Next, the receiver RN employs the same procedure to choose the next receiver RN in the network for sending its data. This process repeats till the data arrives at the sink node.

IV. SYSTEM OVERVIEW

In this system Sensor nodes are distributed in a 2D plane covered by Regular Hexagonal Cells. In deployment strategy nodes are deployed in three phases. In first phase, VNs are deployed in some strategic locations which are located on the boundary of each layer for ensuring complete coverage of the network. In one such phase (i.e. second phase), RNs are placed at the centre of each RHC of each layer for ensuring complete connectivity of the network. After second phase of deployment, the remaining RNs are deployed uniform randomly within each RHC in third phase. The objective of the proposed node deployment scheme is achieving balanced energy consumption of VNs and RNs so that network lifetime is optimized. RHC consists of sensing range which is from the center of RHC to the boundary and communication range which is a circular section around RHCs for communication between different sensor nodes. A VN in a layer chooses a RN as a receiver which is in the same layer and has the highest residual energy for sending its data. If there is more than one receiver node with the same highest residual energy, one of them is chosen randomly this process continues till data arrives at sink node.

The location of VNs and RNs are calculated with respect to the sinks location. We assume both a VN and a RN have limited energy while an unlimited amount of energy is set for the sink. We also consider continuous monitoring applications in which each VN uniformly generates n bits packet and sends the packet to the sink through intermediate RNs at every time slot. The RNs collect packet and send them to the sink through multi-hop communication after each time slot. Each VN and RN has the same transmission range and sensing range rs.

IV. EXPERIMENTAL RESULT

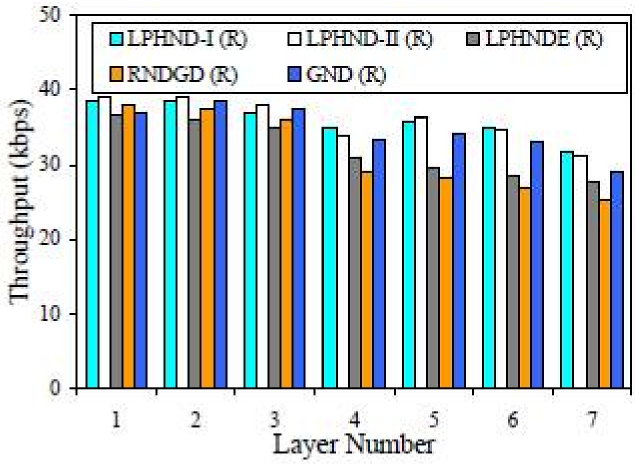

Fig 2:-Throughput of different layer

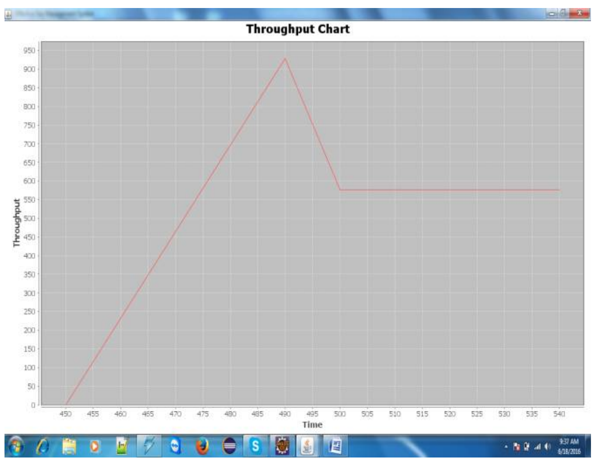

Fig 3: Throughput by 3DSensor Model

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TABLE 1

Communication overhead (In bits)

Parameters	Values
Initial Energy	50 J
Channel Propagation Model	G_t,G_r
Simulation Area	700*500 pixels

V. CONCLUSION

Proposed system model presents deployment of sensor nodes in Wireless Sensor Network. This algorithm has analyzed the issue of energy hole problem and node placement problem in existing systems. Node deployment strategy has significant influence on limiting energy hole problem and optimizing network lifetime. This system proposed a 3 Dimensional node deployment strategy by considering multi objective 3D environment. Using target localization to deploy sensor we select nodes which is having minimum cost for data transmission. It formulates the problems of sensing and connectivity. Coverage is one of the most important performance metrics for sensor network reflects how well a sensor field is monitored. In future work includes increase the capacity of sensor nodes by providing solar energy support to nodes which helps nodes active for long time.

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