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Resource allocation & avoidance dead node occurrence using overlap sensing ratio with dual base station in WSN

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Abstract-- In current technology advances have led to the beginning of small, low-power devices that integrate sensors and actuators with limited on-board processing and wireless communication capabilities to a large extent the effectiveness of the wireless sensor networks depends on the coverage provided by the sensor deployment scheme. There are different deployment demands and optimization goals in different environment. In this research paper, first sensor node sense the dead node occurrence zone & then overlap randomly shift the node on target location an overlap sensing ratio has been proposed for the coverage which is divided with dual base station, single base station coverage is fifty percent of the network size which get improving sensing area for maximum distance in WSNs. This method increases the total coverage ratio by overlap sensing after the initial deployment with AWGN channel.

Keywords--- WSNs, Enhance Coverage ratio, sensor nodes, grid, resource allocation, overlap sensing ratio, dual base station, AWGN channel.

I INTRODUCTION

In wireless sensor network assigning few heterogeneous nodes is an effective way to increase network lifetime and reliability. The WSNs is the networks composed of low-cost, low-power, and small-size sensors that have circle sense area and communicate information by multiple node & only provide simple sensing data, such as temperature, humidity, and so not as to meet the necessity of more difficult and accurate data applications. But WSNs is the circulated sensing networks composed of video cameras that have sector sense area and can process, send, and receive more concentrated and complicated video information data by packaging with wireless transceiver and differ from the WSNs due to their characteristic of directivity and turn ability.

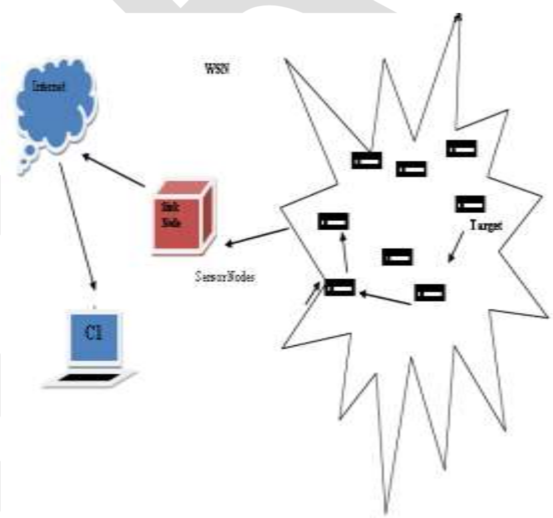


Figure. 1 Wireless Sensor Network with sensor node

ECRM (enhance coverage ratio)

The process of ECRM can be separated into rounds and there are three phases in each round: backbone setup phase, cluster formation phase and steady communication phase. On the first stage, considered only fixed nodes, the communication backbone of network is formed, which should be continued until the first fixed node die, according to ECR protocol. After the backbone setup, Cluster will be formed and the cluster heads on each layer will be selected. On the last stage, data will currents to the base station via the communication link setup by the first two phases. Obviously, the critical phase of ECRM will be implemented in the second phase. In ECRM, cluster heads are in charge of long distance communication and data fusing which are serious energy consumption tasks.

Additive white Gaussian noise (AWGN)

The AWGN is a noise channel. It is a simple model of the imperfections that a communication channel consists of The disturbance caused by the Thermal noise is modeled as Additive White Gaussian Noise.

This noise channel classically is decent for cable and profound space communication but not in experienced communication since of multipath, land obstructive and interfering.

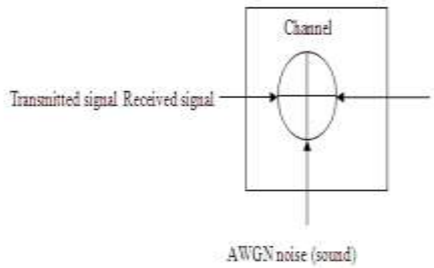


Figure 2: AWGN channel (frequency)

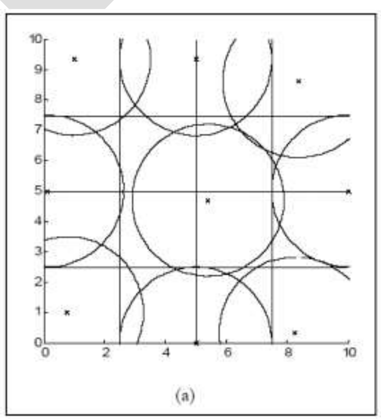
AWGN is used to pretend contextual noise (sound) of channel. In time domain the noise gets added in the transmitted signal so the received signal can be represented as – r (t) = s(t) + n(t) , where s(t) is conveyed signal and n(t) is contextual noise (sound). $C_{AWGN} = W \log_2 (1+P/N_0W)$ bits/Hz

II PROBLEM DEFINITION

Numerous workings have been approved in the field of WSN to remove the redundant data. In our paper [1] it is deliberated that whenever, an event takes place in a detected region it is first of all detected by the hexagonal sensors. Once detecting the event the scalars communicate the information to their respective sensor node. The condition is that the sensor node should lie within the field of view of camera. Then the sensors exchange their reading with each other collaboratively and decide in a distributed manner that who among them are to be actuated. However, the problem is that when the event takes place sensing of event not only occurs within the event region but also up to some extent outside the event region.

III SYSTEM MODEL

Grid points are used in two ways in WSN deployment; either to measure coverage or to determine sensors positions. The grids points can also be used in decide deployment technique. Coverage percentage is ratio of area covered to the area of region of area. A grid-based sensor network as described is to divide the Region of interest (ROI) into grids and the sensors can only be placed at the center of the grid [1],[2].



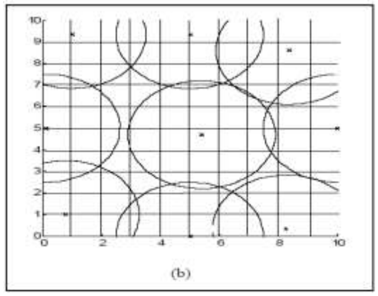


Figure 2: Grid based coverage estimation for 9 sensors

But in a sparse network large grid size is better as it will avoid overlapping of sensors' sensing range therefore ensuring occupied utilization of their sensing abilities. The guaranteed coverage assured by grid based deployment can be cooperated by errors such as misalignment and misplacement. Grid-based sensor networks as described in divide the ROI into square grids and the sensors can only be placed at the center of the square. This results in the bigger the grid size with respect to the sensing range the higher the probability that an object can penetrate the area without detection, provided that the object is traversing along the grid lines [7].

Sensor Deployments A) Sensor Deployments Based on Square:

i) Four sensors at four vertexes of the square (its edge length is equal to r) as illustrated in Fig. 4, four sensors are respectively deployed at four vertexes of the square the length of which edge is equal to the length of the radius r of circle. The efficient coverage area SEACsI is

$$S_{EACsI} = \frac{150}{360}\pi r^2 \times 4 + \frac{1}{2} r \times r \sin\left(\frac{\pi}{3}\right) \times 4 + r \times r$$

$$= \frac{5}{12}\pi r^2 \times 4 + \frac{1}{2} r^2 \times \frac{\sqrt{3}}{2} \times 4 + r^2$$

$$= \left(\frac{5\pi}{3} + \sqrt{3} + 1\right) r^2$$

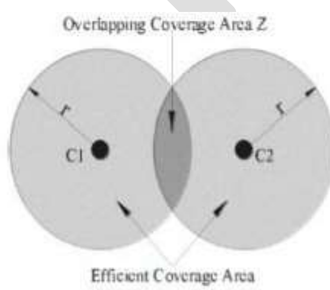


Figure 3: Efficient coverage area

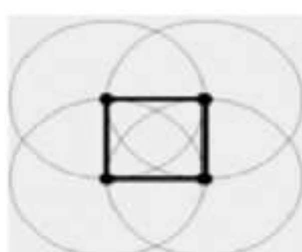


Figure 4: Four sensors at vertexes of square (edge length is r)

The sensor nodes in this technique need to be carefully placed accurately at the selected grid points. This technique promises to provide certain percentage and degree of coverage and also the connectivity. There are three types of grids commonly used in networking; triangular lattice, square grid and hexagonal grid. Triangular lattice is the best among the three kinds of grids as it has the smallest overlapping area hence this grid requires the least number of sensors, square grid provide fairly good performance for any parameters while hexagonal grid is the worst among all since it has the biggest overlapping area .Other than type of grid the size of grid also plays an important role. The size of grid need to be chosen based on how dense the WSN going to be. For a highly dense network small size grids help in reducing coverage nodes thus providing better result.

IV PROPOSED METHOD

ALGORITHM FOR ECOSR

1. Find neighboring sensors nodes in grid ;
2. If dead node occurrences;
3. Shift advance node due to dead node in another grid or area;
4. Set parameter state=1
5. While (overlap==1)
6. Calculate OSR;
7. Node overlap optimal angle according to the rotation angle function;
8. if (network is equilibrium)
9. overlap =0;
10. end
11. end
12. calculate OSR;
13. while(OSR>=predefined threshold)
14. calculate priority;
15. if(priority is highest)
16. state=0;
17. send state information to its neighboring sensors
18. else
19. calculate OSR;
20. end
21. end

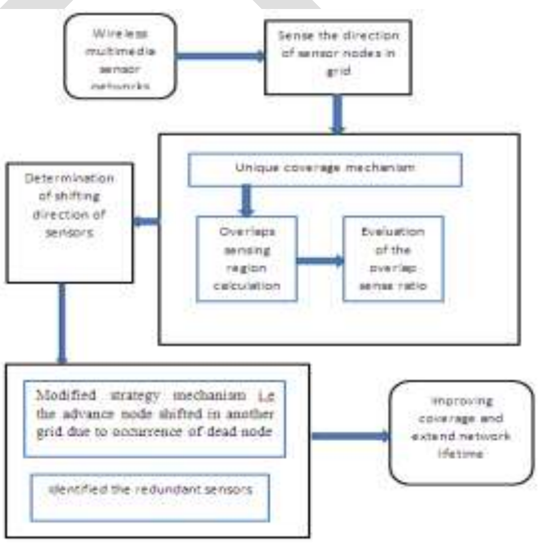


Figure 5: Proposed flow chart

V.RESULT

We evaluate the performance of the Enhance coverage overlap sensing ratio with dual station (ECOSR) algorithm, the Random approach each sensor select its sensing direction randomly.

We also take help of AWGN channel for reduce the noise during sensing ratio & shifting the node on target location without any noise.

Simulation Parameters	**Values**
Network of field size (area)	**200*200**
Number of sensor nodes (N)	**100**
Number of advanced nodes (an)	**0.2**
Number of normal nodes (nn)	**0.8**
Energy of a normal node (E_0)	**0.5**
Location of the base station	**Centroid**
Sensor network deployment type	**Random**
Simulator software Version	**2012a**
Mobility model	**Random wave-point**
Sensing range	**100**
Grid radius	**3.5**
Fading	**AWGN**

Table 1: Simulation parameter

In figure 1 sensor area predicting for minimum energy node which is executing towards low or dead

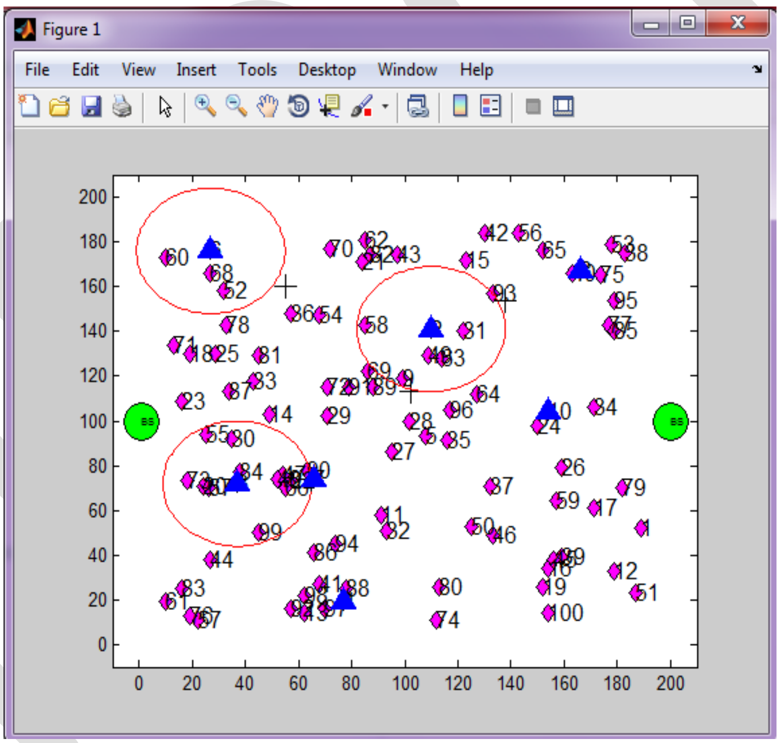


Fig. 1: 100 Nodes with lower energy node sensing in 100 coverage range with dual station

In the below figure 2, higher energy node shifting towards week node into the void grid or single sensor node in a network.

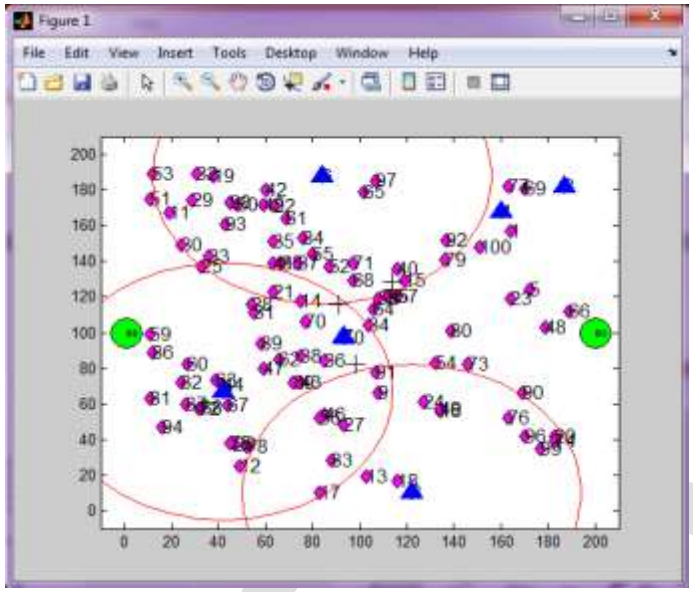


Fig. 2: After shifting the nodes network update the nodes position

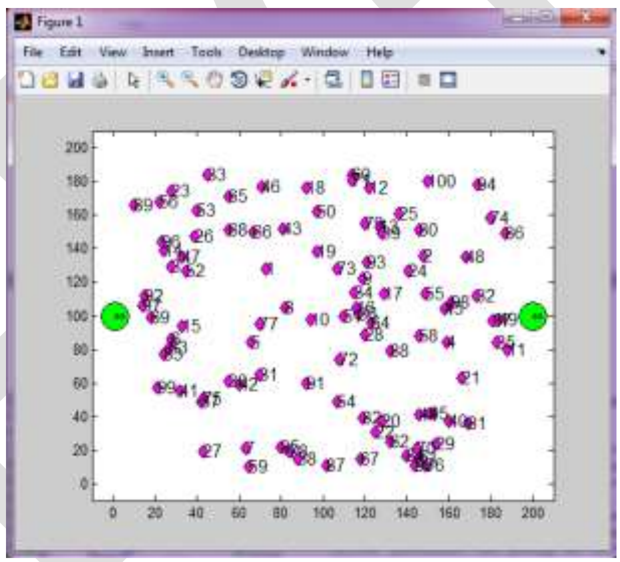


Figure 3: After overlapping lower energy to higher energy node

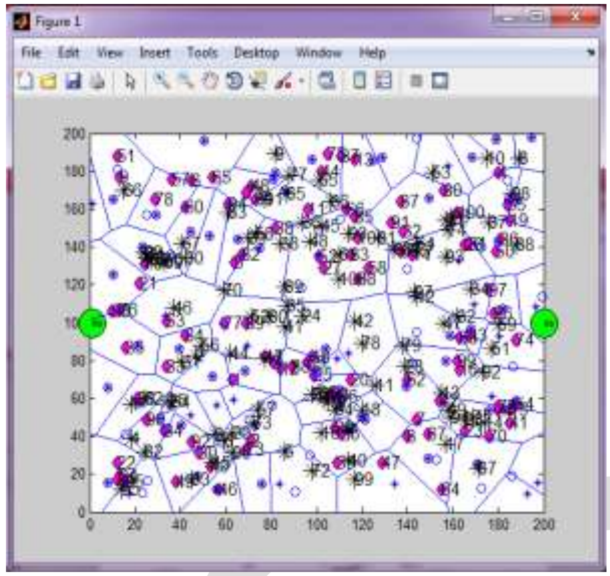


Fig. 4: Updating the node energy in Hexagonal grid for 100 nodes

VI CONCLUSION

In wireless communication systems have enabled the development of low-cost, low-power, multifunctional, tiny sensor nodes that can sense, process, and communicate with one another over random deployment distances. A sensor node by itself has severe resource constraints, including low battery power, limited signal processing, limited computation and communication capabilities, and a small amount of memory. Optimal resource management and assuring reliable QoS (qulity of service) are two of the most fundamental requirements in wireless sensor networks. Sensor deployment strategies play a very important role in providing better QoS, which relates to the issue of how well each point in the sensing field is covered. As we know based on the experimental records, coverage hole problems may exist in the sensor networks if the random deployment strategy is used to deploy the static sensor nodes. In this paper, we have proposed a grid-based with overlap sensing ratio recovery mechanism for wireless sensor networks. The whole network will be divided into grids to ensure the coverage ratio and connectivity.

In future work, the virtual force has been taken into consideration for allocating the mobile nodes to recover the hole grid. The proposed hole recovery mechanism could resolve the hole problem and maintain a high coverage ratio in hybrid wireless sensor networks. Furthermore, it could enhance network performance and prolong the network lifetime.

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