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Implementation of Wire Sensor Network using MATLAB Simulator

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***Abstract*– In this paper work, a fault analysis based approach is presented to perform the target coverage in wireless sensor network. The presented approach is effective enough to provide the effective covers for these target nodes. These covers are fault tolerant as well as provide the energy effective solution for the network. The obtained results show that the pretend work has improved the network life and reduce the fault chances while targeting the sink nodes.**

***Keyword*- WSN, LEECH, MANET, ESPDA, CLUSTER**

I. Introduction Of WSN

Wireless Sensor network is most adaptive communication network that is used in many applications and organizations. A Wireless Sensor Network (WSN) consists of spatially distributed autonomous sensors to monitor physical conditions, such as temperature, Light, vibration, Volume, motion or Pollution and to cooperatively pass their data through the network to a main location. These networks are defined by using the tiny sensor nodes where each node is defined under energy definition. The sensor network is connected with outer network by the help of base station. The base station is defined at specific distance location. All the network nodes transfer the collected information to base station and base station broadcast this information over the web. These networks are defined under some architecture so that effective will be drawn over the network. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in much industrial and different application, such as industrial processing, monitoring and control of the channels on multimedia, environment and storm monitoring, healthcare applications, home appliances, and traffic control. The parameters in sensor network are defined under memory, time, power and bandwidth parameters. The objective of the communication architecture is to achieve the effective communication and to improve the performance of the networks.

II. Characteristics Of Wireless Sensor Network

The Characteristics of a WSN are as below:

- Power consumption constrains for nodes using batteries or energy harvesting.
- Ability to cope with node failures.
- Mobility of nodes.
- Dynamic network topology.
- Communication failures.
- Heterogeneity of nodes.
- Scalability to large scale of deployment.
- Ability to withstand harsh environmental conditions.
- Ease of use.

III. Basic Architecture Of WSN

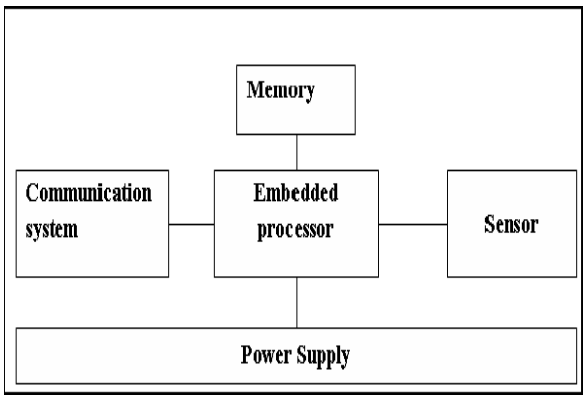

Fig. 3.1 Architecture of a Sensor Node

- WSNs are basically used to assemble material while MANETs are designed for distributed computing rather than evidence gathering.
- Usually a WSN is positioned by the owner while MANET could be run by several distinct things.
- The number of nodes in WSNs can be several remits of enormousness higher than that in MANETs.
- WSN nodes are quite low-cost than those in MANETs, and are usually arranged in thousands.
- Power spring of WSN nodes could be very inadequate; however nodes in MANETs can be re-energized.
- WSNs are more imperfect in their computational and communication skills compared to MANET.

IV. WSN Goals And Challenges

4.1 Goals

- Coverage and Connectivity.
- Lifetime.

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4.2 Challenges

- Balance load evenly across network.
- Minimize unnecessary energy intemperance.
- Minimize cost and energy.
- Avoid long-range transmissions (multi-hop is less expensive).

V. Classification Of Wireless Sensor Network

A humble classification of Wireless sensor networks based on their mode of functioning and the type of target application is given below.

5.1 Proactive Networks

The nodes in this sort of network periodically switch on their sensors and spreaders, sense the atmosphere and conduct the data of interest. Hence, they gather the data for the pertinent parameters at regular intervals. They are well appropriate for presentations requiring sporadic data monitoring. Some known illustrations or protocols of this kind are the LEACH (Low Energy Adaptive Clustering Hierarchy) protocol, some enlargements on LEACH such as and PEGASIS (Power-efficient gathering in sensor information systems).

5.2 Reactive Networks

The nodes of the networks according to this scheme react immediately to sudden and drastic changes in the value of a sensed aspect. They are well matched for time precarious applications.

5.3 Hybrid Networks

The nodes in such a network not only react to time-critical positions, but also give a global picture of the network at periodic intervals in a very energy efficient manner. Such a network facilitates the user to request previous, current and impending data from the network in the form of chronological, one-time and stubborn queries respectively. Such kind of network grosses benefits of Pre-emptive and Reactive networks.

5.4 Clustering

It is a process in which the network is divided in smaller segments called clusters and each segment is controlled by a controller node called cluster head. The cluster head assembles the data from all the cluster knobs and pass it to the immoral station. Clustered network is the most common network scenario defined in many sensor networks to perform the effective communication over the network. These kinds of networks are organized under different protocol measurement. These protocols include the clustering as well as aggregation based protocols.

These protocols embrace the Leach, Pegasis and ESPDA protocols. The clustering is explored by these protocols to improve the network by reducing the network communication and by reducing the energy consumption over the network. The localization of knobs in the network also reduces the communication as well as the energy feasting over the network.

5.5 Clustered Network Architecture

These kinds of networks are effective because of its aggregative communication nature. The network provides the efficiency as the short distance communication is restricted to the cluster head and the cluster head collect the data from different nodes and perform the data aggregation while performing the communication over the network. As the data is collected by the cluster head, the collected data is transferred to immoral station. The network model reduces the network communication and energy consumption over the network. This kind of network is divided in two core prototypes.

5.6 Single hop model

This kind of model performs the direct communication with cluster head. LEACH is an sample of homogenous Single Hop model. Both LEACH and LEACH – C use one level clustering (The Cluster heads of each cluster directly connected with the sink node or base station).

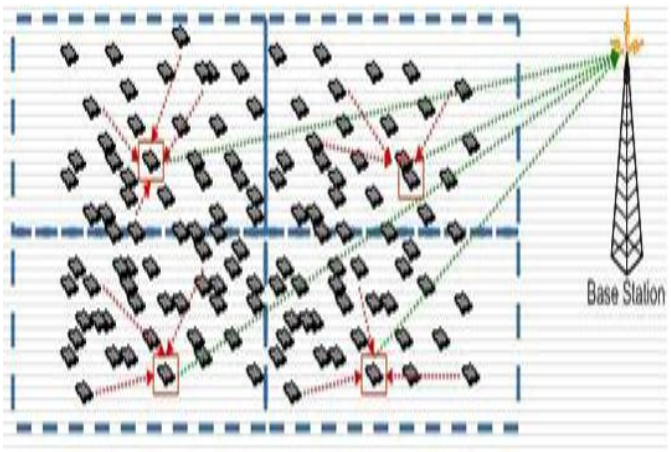

Fig: 4.1 Single hop Clustered architecture

5.7 Multi hop model

In multi hop network, the data is transferred from multiple nodes and transferred to cluster head. The extension of LEACH called M – LEACH or multi – hop LEACH is a good example of multi hop model.

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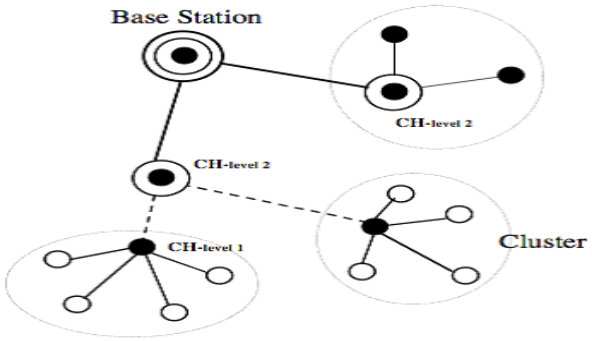

Fig: 5.1 Multi hop Clustered Architecture

Figure 5.7 shows the hierarchal clustered network that contains one base station and 3 clusters.

5.8 Clustering objectives

There are number of reasons why clustering is important. A few reasons are as below:

5.8.1 Load balancing:

The major property of clustering is to perform the equalize distribution of nodes over the network. The equalize distribution of nodes shows the load balanced network generation. The effective distribution of nodes in the network reduces the network load and provides the energy efficient communication over the network.

5.8.2 Fault-tolerance:

Another property of clustered network is to reduce the error consumption over the network and to reduce the failure chances while performing the communication. The network loss in such network can be identified easily so that the communication node can be reduced and the early tracking of nodes can be done.

5.8.3 Increased connectivity and reduced delay:

Now the communication is restricted to the short distance cluster head. It will reduce the communication distance and increase the communication connectivity. Because of this, the communication delay over the network will also reduce.

5.8.4 Minimal cluster count:

The clustering architecture must be defined in such form; the number of clusters over the network will be reduced. Larger the number of clusters are more expensive and difficult to manage.

VI. IMPLEMENTATION RESULTS

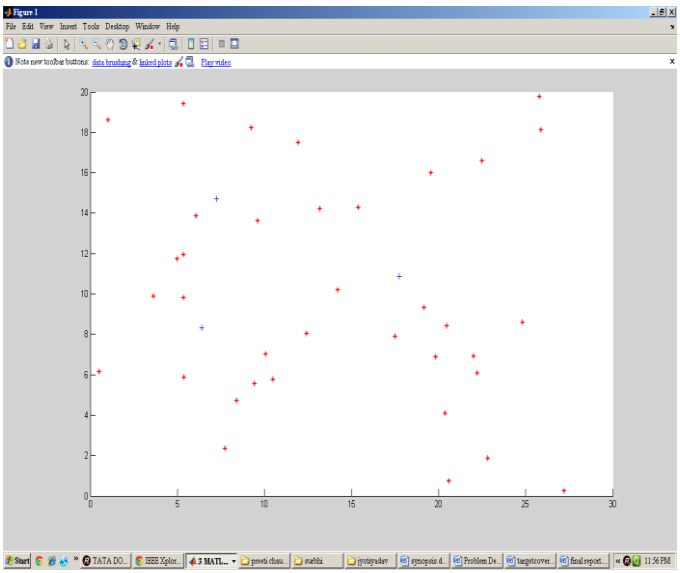

Figure 6.1 Sensor Network Establishment

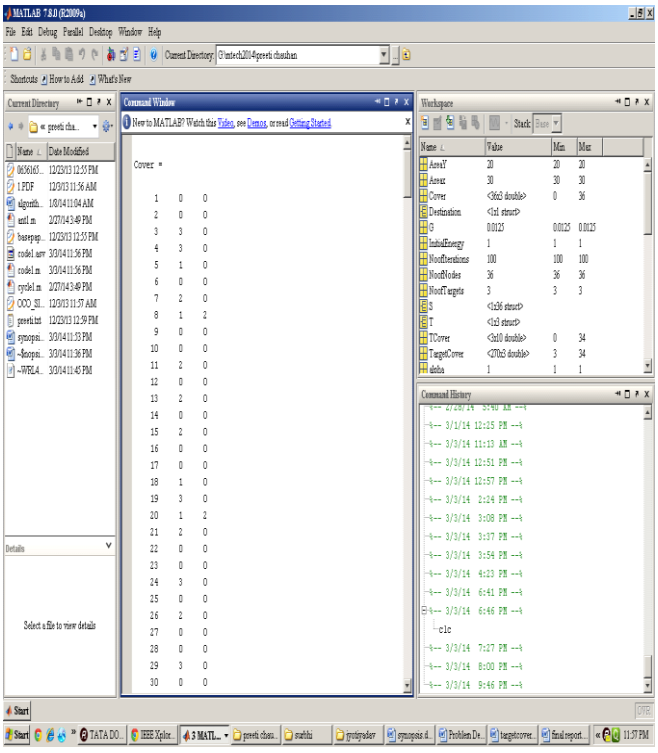

Figure 6.2: Euclidean Distance Matrix

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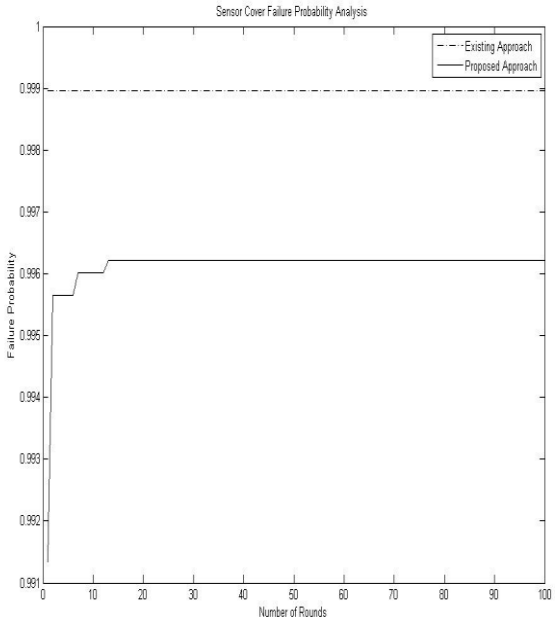

Figure 6.3: Number of replicas vs. Failure Likelihood

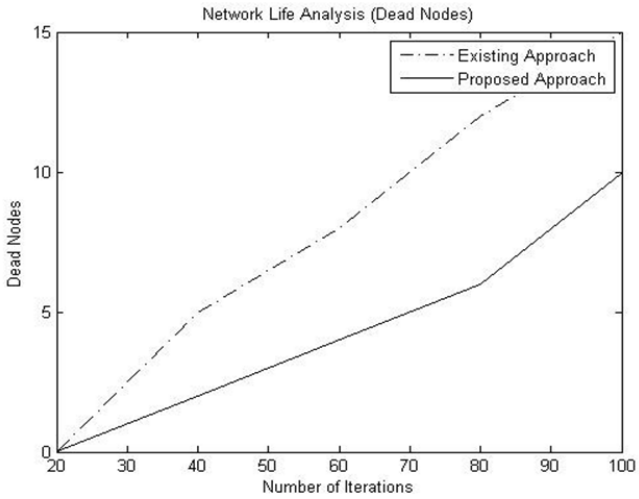

Figure 6.4 Number of iterations vs dead nodes

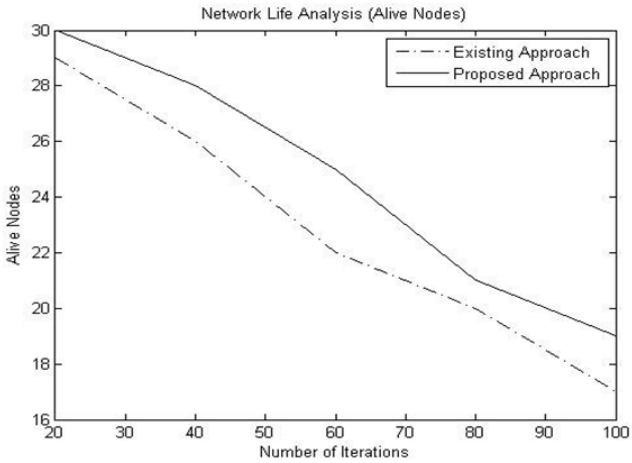

Figure 6.5 Number of iterations vs alive nodes

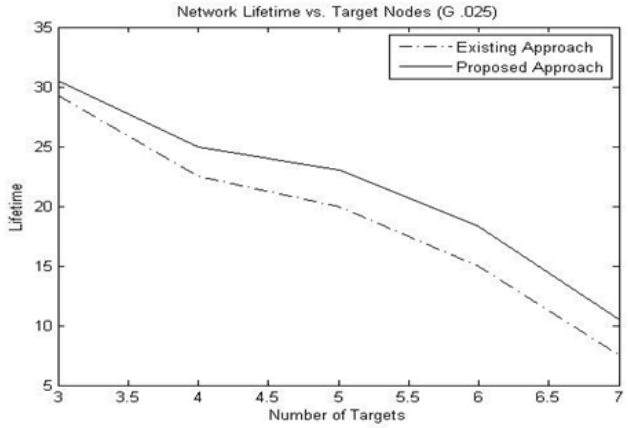

Figure 6.6 Network Lifetime vs Number of Targets (a) G=0.0125 (b) G=0.02

VII. IMPENDING OF WSN

The presented work is about to perform the effective selection of cover nodes for targeting the target nodes. The work can be improved in different directions in future. In future some optimization approach can be used to perform the target node selection such as ACO, Genetics etc.

REFERENCES

[1] GholamAli Yaghoubi," Connectivity Issue in Wireless Sensor Networks by Using Depth-First Search and Genetic Algorithm".

[2] Nauman Aslam," Distributed Coverage and Connectivity in Three Dimensional Wireless Sensor Networks".

[3] Yinian Mao," Coordinated Sensor Deployment for Improving Secure Communications and Sensing Coverage".

[4] Ashwinkumar Badanidiyuru," Approximating Low-Dimensional Coverage Problems",.

[5] Vikram P. Munishwar," Coverage Management for Mobile Targets in Visual Sensor Networks".

[6] Vijay Chandrasekhar," Localization in Sensor Networks — Survey and Challenges"

[7] Muzammil Hussain," Distributed Localization in Cluttered environments"

[8] Melike Erol," Localization with Dive'N'Rise (DNR) Beacons for Acoustic Sensor Networks", UWNet'07,