ISSN (Online) : 2319 - 8753
ISSN (Print) : 2347 - 6710

International Journal of Innovative Research in Science, Engineering and Technology

Volume 3, Special Issue 3, March 2014

2014 International Conference on Innovations in Engineering and Technology (ICIET'14)

On 21st & 22nd March Organized by

K.L.N. College of Engineering, Madurai, Tamil Nadu, India

Enhancement of Energy Efficient in WSN Based on Sleep Scheduling Model

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ABSTRACT- Wireless Sensor Networks has numerous nodes with limited energy in a particular area have major issues is increasing the network life time. Wireless Sensor Networks has promised a large variety of applications. They are often deployed in potentially adverse or even hostile environments. Intrusion detection systems make available a necessary layer of in-depth fortification for wired networks. Miniature research has been performed about intrusion detection in the areas of wireless sensor networks. Tracking Performance can be improved that the target motion predicated and also trajectory can be awakened when the nodes were operated on a duty cycling mode will negatively influence the energy efficiency of wireless sensor networks . Our proposed work has prolonged the increasing the network life time in wireless sensor Networks using Probability-based Prediction and Sleep Scheduling protocol (PPSS) to improve energy efficiency of proactive wake up . We have Simulation results on the prediction method based on both kinematics and probability and also PPSS then precisely selects the nodes to awaken and reduces their active time. The efficiency of PPSS method both simulation-based and implementation-based experiments and results show that compared to MCTA algorithm. Our results indicate PPSS improves energy efficiency by 25-45 percent (simulation based) and 16.9 percent (implementation based), 5-15 percent on the detection delay (simulation based).

KEYWORDS- Target Tracking, Sleep Scheduling Method, PPSS

I. INTRODUCTION

We explore the problem of wake-up scheduling in WSNs where sensors have different lifetimes [1]. A novel Probability-Based Prediction and Sleep Scheduling (PPSS) strategy is proposed to prolong the network lifetime with full coverage constraint [2]. In the PPSS strategy, it is possible to save more energy by reducing energy consumption [3]. We are able to predict the probability by which the Mobile target moves, we can make the sensors along that direction to be active and putting rest of the sensors in sleep mode, so we can save comparatively more energy than the existing work, this can be achieved by creating a Local Active Environment and sleep scheduling for a wireless sensor which detects the mobile target will create a Local active environment by awakening the neighbor sensors or next hop sensors and sensors in the routing table to send the information about the target to the base station , putting the remaining sensors to sleep modes [4]. By this way the sensors that are close to mobile targets will predict the direction in which mobile target moves and creates a Local Active Environment dynamically each time the target moves [5]. Thus the energy efficiency is increased to great extent compared to the Existing works which maximize the network lifetime.

II. RELATED WORK

All wireless sensors are activated initially. Once an active sensor runs out of energy, that sensors are not present in the network. So communication is not fully completed. Tian and Georganas proposed off-duty eligibility rules, which do not depend on any neighbor information. It is a probability-based algorithm. To determine redundant nodes, each node relies on a given intensity of homogeneous spatial Poisson process and sensing area of each node to obtain the probability. This

probability is compared with random number from [0, 1] generated by each node to decide its status as off-duty or on-duty. This could acquire better energy conservation ratio, however, a lot of coverage loss ratio also may be expected in a long term process due to hardware hazard and unreliable wireless environment.

Besides reducing the number of active nodes, there are other network topology control techniques, which also intend to increase power control level and prolong network lifetime by adjusting transmission power. Power control technology helps combat long term fading effects and interference. When power control is administrated, a transmitter of a node will use the minimum transmit power level that is required to communicate with the neighboring nodes. This can improve both bandwidth and energy consumption.

When a node wakes up then the periodically broadcasts a probe message within a sensing range with no reply message is received within a particular interval, the probing node will decreases energy level in a particular node. The particular node means the dead mode in the sleep time interval. Also, a large number of periodic update of a probing node results in quick depletion of the limited battery power and more collisions

III.PROPOSED WORK

We enhance the proposed PPSS design to detect and track multiple targets by activating the sensor nodes along the boundaries so as to detect multiple targets coming from different ends once we detect the Target we will track the target and send the current information about the target to the base station. We define the problem and the requirements of object tracking applications and develop some basic energy-saving solutions which reduce the number of sensor nodes needed for monitoring the moving objects or decrease the frequency of sampling the environment, respectively. Moreover, we discuss other possible solutions by illustrating a solution space. Based on our analysis and observations , we propose a Prediction-based Energy Saving scheme , called PE , that minimizes the number of nodes participating in the tracking activities , while inactivates other nodes into sleeping modes. Simulation based performance evaluation, in terms of total energy consumption and missing rate, has been conducted. The simulation result shows that the PE can effectively reduce the energy consumption on MCU and sensor components. Moreover, the different heuristics discussed with this paper can be used to balance the energy savings and application requirements. It is very expensive to replace sensor node batteries in which these nodes are deployed.

We consider one of the sensor network killer applications - object tracking. Among the technical issues to be addressed in developing sensor networks for object tracking's, energy conservation is probably the most critical one since the sensor nodes are often supported by batteries which could be difficult to replace. A lot of existing researches are focused on optimizing the communication cost by inactivating radios as much as possible or by trading off computation for communication. However, these studies neglected a fact that, while the sensing and computing components consume less power than the communication components, they are still important sources of energy dissipation in sensor nodes, especially after the communication cost being optimized. Thus, in this paper, we study the problem of how to reduce the energy consumption in the sensing and computing components of sensor nodes

All sensors are deployed initially. Each sensor updates their information to its neighbor sensor. This is called Initial Neighbor Discovery.

All sensors communicate with each other and updates the routing information once object is detected creates a Local Active environment predicts the Target movement and sends the information to base station.

Once Target is detected creates an awake region and based on the prediction results assigns Sleep scheduling to individual sensors at synchronized time and the graph is plotted for Energy efficiency in comparison with the Existing concept along with Throughput, Packet Delivery ratio.

We are synchronizing the proposed PPSS protocol, i.e., Local Active environment with Boundary selection nodes in which the sensors along the boundary of the field region are activated, thus the Mobile target that comes from different directions are detected, once it detects the Moving object along the boundaries, it will start sending the information about the mobile target to the base station, so we are enhancing the proposed concept to detect multiple target along with improved power efficiency.

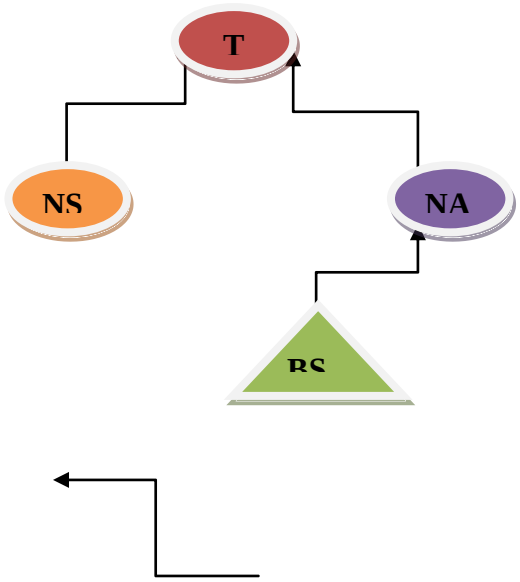

Fig .1 Target Tracking of Sleep Scheduling Method

BS- BASE STATION
NS- NODES IN SLEEP MODE
NA- NODES IN ACTIVE MODE
T- TARGET

IV. RESULTS AND DISCUSSION

Nodes have been transmitted at a specified interval one after another. Figure 2 show that the object tracking techniques transmitted data to the base stations. Figure 3 shows that the Average Energy Consumption of the Network. Figure 4 shows that the Throughput in the given network. Figure 5 Shows the Power Consumption in the given Network

The performance is evaluated mainly, according to the following metrics.

Average Packet Delivery Ratio: It is the ratio of the number of packets received successfully and the total number of packets transmitted

Throughput: It is the number of packets received by the sink successfully

Drop: It refers to the no. of valid packets dropped due to malicious nodes

Energy: It is the average energy consumed for the data transmission.

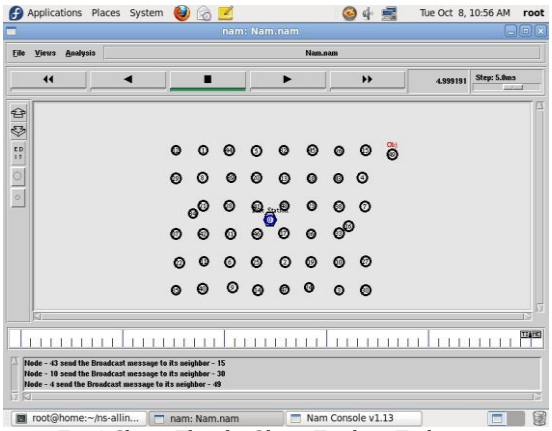

Fig .2 Shows That the Object Tracking Techniques

In the figure 2 shows the sensed data from the Object tracking techniques in the network

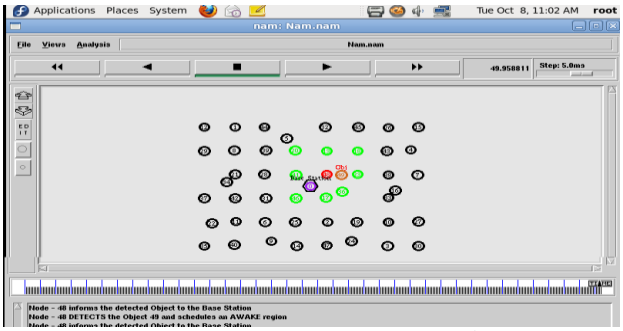

Fig .3 shows that the Average Energy Consumption of the Network.

Figure 3 shows the average energy consumed in the data transmission network. It is inferred that the energy consumed decreases as time progresses. The result of energy reduction increases the life time of the network. It gives the energy consumption, when no. of sources is increased.

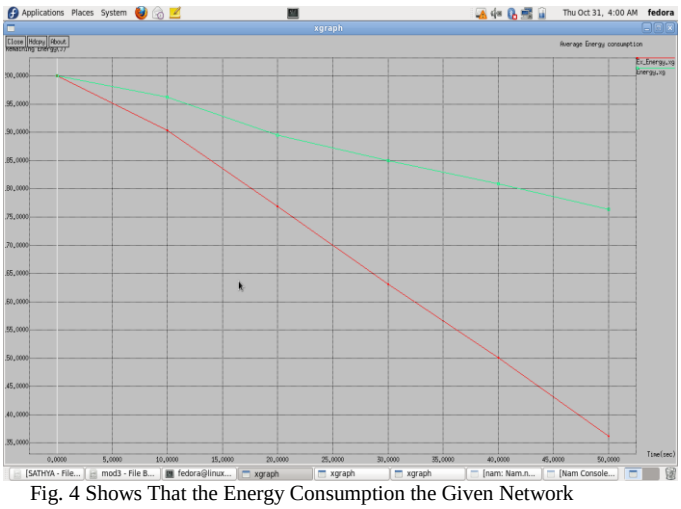

Fig. 4 Shows That the Energy Consumption the Given Network

Figure 4 shows the average energy consumed in the data transmission network. It is inferred that the energy consumed decreases as time progresses. The result of energy reduction increases the life time of the network. It gives the energy consumption, when no. of sources is increased.

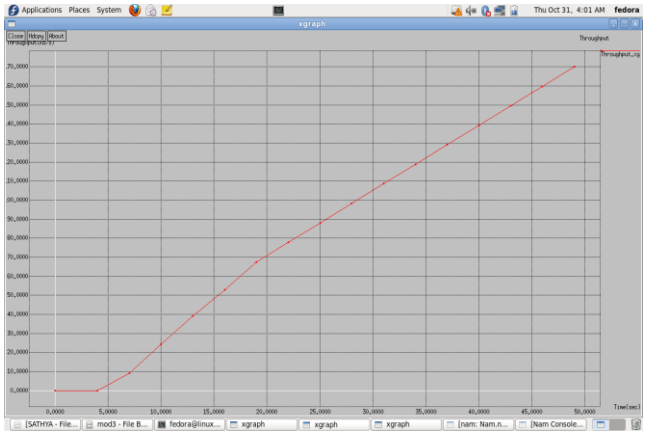

Fig .5 Shows That the Throughput the Given Network

Figure 5 shows the increase in throughput of the proposed technique. The numbers of packets are received when the data is transmitted to the sink successfully. It gives the Packet Received, when no. of sources is increased.

V. CONCLUSION

Proactive wake up and sleep scheduling in a duty cycle can create a local active environment to provide guarantee for the tracking performance to sensor network. When reducing the energy consumption to performance without constraints is difficult to the protocol configure towards the best energy performance tradeoff for a specific network environment. The performance of PPSS can evaluate under various conditions to the prediction method of PPSS under the target movement with abrupt direction changes. Our results indicate PPSS improves energy efficiency by 25-45 percent (simulation based) and 16.9 percent (implementation based), 5-15 percent on the detection delay (simulation based). Our proposed work shows the overall life time sensor network is increased.

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