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Prospecting Forecast of Target with Dynamic Sleep Scheduling in Wireless Sensor Network

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Abstract— Wireless sensor networks are used in various large-scale sensor network systems for many purposes. There are many challenges in wireless sensor networks. In wireless sensor networks, sensor nodes are needed to deploy them in the environment dynamically, sense the information, and route the sensed information into the intended target. For all these purpose, sensor needs power. All sensor nodes use batteries for power. The prime motive of our work is to minimize the energy consumption level of the sensor node, when sensed information are moved to the target using sleep scheduling with accuracy of the target. Toward this objective, this study goes through a new energy-efficient protocol named Prospecting forecast of the target with dynamic sleep scheduling. We present a Prospecting Forecast of Target with Dynamic Sleep Scheduling protocol (PFTDSS) to improve energy efficiency with proactive wakeup. A cluster-based scheme is implemented for Prospecting forecast the target with dynamic sleep scheduling. At each time of duty cycle, only approximate sensor nodes of the cluster are activated that are located in the closeness to the target, whereas the other sensors nodes of the cluster and in sensor network are inactive. To wake up the most appropriate cluster and sensor nodes, we propose a non-myopic rule, which is used not only for where the target is located and also its further movement of the target is also predicted. Finally, the effectiveness of the proposed approach is evaluated and compared with the previous existing protocols in terms of tracking accuracy, inter-node communication, and computation complexity.
Keywords— PFTDSS, TCL, Cluster, Target and Sensor Node.

I. INTRODUCTION

This In wireless sensor network systems, which track mobile targets, is one of the most important applications for research are in the field of minimizing the energy of the sensor nodes to increase the lifetime of the network systems. When nodes operate in a duty cycling method, tracking performance can be improved if the target motion can be predicted and nodes along the path can be awakened. However, this will negatively influence the energy efficiency and constrain the benefits of duty cycling. In this paper, we present a Prospecting Forecast of Target with dynamic sleep scheduling to improve energy efficiency of proactive wake up. We start with designing a target prediction method based on both kinematics and probability. Based on the prediction results, PFTDSS then precisely selects the nodes of the cluster to awaken and reduces their active time, so as to enhance energy efficiency with limited tracking performance loss.

To reduce the energy conservation during idle listening, duty cycling is one of the most commonly used approaches. In idea of duty cycling the most of the nodes in the clusters are put into the sleep state for most of the time, and only in active state periodically. In some cases, the sleep state of nodes may also be explicitly scheduled, i.e., forced to sleep or awakened on demand. This is usually called sleep scheduling. As a compensation for tracking performance loss caused by duty cycling and sleep scheduling, proactive wake up has been studied for awakening nodes proactively to prepare for the approaching target. However, most existing efforts about wake up simply all the neighbor nodes in the area, where the target is expected to arrive, without any differentiation. In fact, it is sometimes unnecessary to awaken all the neighbor nodes of the clusters. Based on target prediction, it is possible to know which nodes of the cluster are put into sleep state and which are not, so as to reduce the energy conervation for proactive wake up.

A. We designed a target prediction scheme based on both kinematics rules and prospect method, and increase the energy efficiency of proactive wake up with both minimize the active node reduction and active time control efforts.

B. The proposed distributed algorithms of PFTDSS, which run on individual nodes, make PFTDSS scalable for large-scale WSNs.

The implementation not only verified the rationality and the feasibility of PFTDSS, but also strengthened the paper’s contributions with more convincing results than those from the simulation. The rest of the paper is organized as follows: Related work is discussed, introduce system models, our assumptions, and overview the protocol design.

II. LITERATURE SURVEY

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A. Energy-Quality Tradeoffs for Target Tracking In Wireless Sensor Networks

The tradeoffs involved in the energy-efficient localization and tracking of mobile targets by a wireless sensor network. This work focuses on building a framework for evaluating the fundamental performance of tracking strategies in which only a small portion of the network is activated at any point in time. We first compare naive network operation with random activation and selective activation. In these strategies the gains in energy-savings come at the expense of increased uncertainty in the location of the target, resulting in reduced quality of tracking. We show that selective activation with a good prediction algorithm is a dominating strategy that can yield orders-of-magnitude energy savings with negligible difference in tracking quality. We then consider duty-cycled activation and show that it offers a flexible and dynamic tradeoff between energy expenditure and tracking error when used in conjunction with selective activation.

The results in this work are a first step in our attempt to understand the fundamental bounds on the tracking quality that can be obtained under various energy constraints and sensor models.

1) *Advantages*
   a) Energy-efficient localization and tracking of mobile targets.
2) *Drawbacks*
   a) Reduced quality of tracking performance.

B. DCTC: Dynamic Convoy Tree-Based Collaboration For Target Tracking In Sensor Networks

Most existing work on sensor networks concentrates on finding efficient ways to forward data from the information source to the data centers, and not much work has been done on collecting local data and generating the data report. This paper studies this issue by proposing techniques to detect and track a mobile target. We introduce the concept of dynamic convoy tree-based collaboration, and formalize it as a multiple objective optimization problem which needs to find a convoy tree sequence with high tree coverage and low energy consumption. We propose an optimal solution which achieves 100% coverage and minimizes the energy consumption under certain ideal situations. Considering the real constraints of a sensor network, we propose several practical implementations: the conservative scheme and the prediction-based scheme for tree expansion and pruning; the sequential and the localized reconfiguration schemes for tree reconfiguration. Extensive experiments are conducted to compare the practical implementations and the optimal solution. The results show that the prediction-based scheme outperforms the conservative scheme and it can achieve similar coverage and energy consumption to the optimal solution.

A big challenge of implementing the DCTC framework is how to reconfigure the convoy tree in an energy efficient way as the target moves. To address this problem, we first formalize it as an optimization problem of finding a min-cost convoy tree sequence with high tree coverage, and give an optimal solution (o-DCTC) based on dynamic programming. Considering the constraints of sensor networks, we propose some practical solutions. Specifically, we propose two tree expansion and pruning schemes: the conservative scheme and the prediction- based scheme; and two tree reconfiguration schemes: the sequential reconfiguration and the localized reconfiguration. We also evaluate the performance of the optimal solution and the practical implementations through extensive simulations.

1) *Advantages*
   a) It should promptly provide robust and reliable status information about the mobile target and the region around it in an energy efficient way, and the network should forward this information to the sinks in a fast and energy efficient way.
2) *Drawbacks*
   b) The performance metrics are not good when the node density is low.

C. Coverage and Connectivity Issues in Wireless Sensor Networks

Wireless sensor networks have inspired tremendous research interest in since the mid-1990s. Advancement in wireless communication and micro electromechanical systems (MEMSs) have enabled the development of low-cost, low power, multifunctional, tiny sensor nodes that can sense the environment, perform data processing, and communicate with each other unlettered over short distances. A typical wireless sensor network consists of thousands of sensor nodes, deployed either randomly or according to some predefined statistical distribution, over a geographic region of interest. A sensor node by itself has severe resource constraints, such as low battery power, limited signal processing, limited computation and communication capabilities, and a small amount of memory; hence it can sense only a limited portion of the environment.

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Challenges also arise because topological information about a sensing field is rarely available and such information may change over time in the presence of obstacles. Many wireless sensor network applications require one to perform certain functions that can be measured in terms of area coverage

Historically, three types of coverage have been defined by Gage:

1) *Blanket coverage* — to achieve a static arrangement of sensor nodes that maximizes the detection rate of targets appearing in the sensing field
2) Barrier coverage — to achieve a static arrangement of sensor nodes that minimizes the probability of undetected penetration through the barrier
3) *Sweep coverage* — to move a number of sensor nodes across a sensing field, such that it addresses a specified balance between maximizing the detection rate and minimizing the number of missed detections per unit area

a) *Advantages*
   i. This service facilitated by a better coverage is application specific.
   ii. Reduced computation and communication cost.

b) *Drawbacks*
   i. Still require better solutions to overcome challenges to the coverage–connectivity problem.

D. Wireless Sensor Network Energy-Adaptive Mac Protocol

Wireless Sensor Networks (WSNs) provide a valuable capability to autonomously monitor remote activities. Their limited resources challenge WSN medium access control (MAC) layer designers to adequately support network services while conserving limited battery power. This paper presents an energy adaptive WSN MAC protocol, Gateway MAC (GMAC), which implements a new cluster-centric paradigm to effectively distribute cluster energy resources and extend network lifetime. G-MAC's centralized cluster management function offers significant energy savings by leveraging the advantages of both contention and contention-free protocols. A centralized gateway node collects all transmission requirements during a contention period and then schedules their distributions during a reservation-based, contention-free period. With minimal overhead, the gateway duties are efficiently rotated based upon available resources to distribute the increased network management energy requirements among all of the nodes.

The G-MAC protocol's innovative architecture is motivated by the necessity for resource-challenged WSN mote sensor platforms to minimize the time radios spend in both the idle and the receive modes. Research shows that wireless platform transceivers expend a significant amount of energy receiving on an idle channel, and many of the WSN mote platform radios expend more energy in receive than in transmit mode. G-MAC provides effective network control mechanisms to maximize sleep durations, minimize idle listening, and limit the amount of cluster control traffic overhead. G-MAC dynamically rotates point coordination duties among all the nodes to distribute the management energy costs, to allow other nodes to sleep longer, and to extend the network's lifetime.

1) *Advantages*
   a) Significantly reduces energy consumption.
   b) Reduced overhearing or idle listening overhead and increases the network lifetime

2) *Drawbacks*
   a) Still networks require delicate tradeoffs in energy, latency, and throughput.

E. Energy Efficient Sleep Schedule for Achieving Minimum Latency in Query Based Sensor Networks

Energy management in sensor networks is crucial to prolong the network lifetime. Though existing sleep scheduling algorithms save energy, they lead to a large increase in end-to-end latency. We propose a new Sleep schedule (Q-MAC) for Query based sensor networks that provide minimum end-to-end latency with energy efficient data transmission. Whenever there is no query, the radios of the nodes sleep more using a static schedule. Whenever a query is initiated, the sleep schedule is changed dynamically.

Based on the destination's location and packet transmission time, we predict the data arrival time and retain the radio of a particular node, which has forwarded the query packet, in the active state until the data packets are forwarded. Since our dynamic schedule alters the active period of the intermediate nodes in advance by predicting the packet arrival time, data is transmitted to the sink with low end-to-end latency. The objectives of our protocol are to (1) minimize the end-to-end latency by alerting the intermediate nodes in advance using the dynamic schedule (2) reduce energy consumption by activating the neighbor nodes only when packets (query and data) are transmitted. Simulation results show that Q-MAC performs better than S-MAC by reducing the latency up to 80% with minimum energy consumption.

In query based sensor networks, the sensors report their results in response to an explicit request from the user. Users input the queries at the sink that describes the data they wish to collect. In a home network, user may send a query. Based on the query for a particular detail, data can be collected from the corresponding subset of nodes in the complete network.

1) *Advantages*
   a) It provides minimum end-to-end latency in query based sensor networks with low energy consumption.
2) *Drawbacks*
   a) Data collection rate is not achievable i.e. low throughput ratio.

F. Power Conservation and Quality of Surveillance in Target Tracking Sensor Networks

Target tracking is an important application of wireless sensor networks. In this application, the sensor nodes collectively monitor and track the movement of an event or target object. The network operations have two states: the surveillance state during the absence of any event of interest, and the tracking state which is in response to any moving tar- gets. Thus, the power saving operations, which is of critical importance for extending network lifetime, should be operative in two different modes as well. In this paper, we study the power saving operations in both states of network operations. During surveillance state, a set of novel metrics for quality of surveillance is proposed specifically for detecting moving objects. In the tracking state, we pro- pose a collaborative messaging scheme that wakes up and shuts down the sensor nodes with spatial and temporal preciseness. This study, which is a combination of theoretical analysis and simulated evaluations, quantities the trade-off between power conservation and quality of surveillance while presenting guidelines for efficient deployment of sensor nodes for target tracking application.

1) *Advantages*
   a) It provides minimum end-to-end latency in query based sensor networks with low energy consumption.
2) *Drawbacks*
   b) Data collection rate is not achievable i.e. low throughput ratio.

G. Smart Sleeping Policies for Energy Efficient Tracking in Sensor Networks

The problem of tracking an object that is moving randomly through a dense network of wireless sensors. Assume that each sensor has a limited range for detecting the presence of the object, and that the network is sufficiently dense so that the sensors cover the area of interest. In order to conserve energy the sensors may be put into a sleep mode with a timer that deter- mines the sleep duration. A sensor that is asleep cannot be communicated with or woken up. Thus, the sleep duration needs to be determined at the time the sensor goes to sleep based on all the information available to the sensor. The objective is to track the location of the object to within the accuracy of the range of the sensor. However, having sleeping sensors in the network could result in tracking errors, and hence there is a tradeoffs between the energy savings and the tracking errors that result from the sleeping actions at the sensors.

1) *Advantages*
   a) It was possible to design suboptimal solutions that closely approximate optimal performance. The results also indicate that the tradeoffs between energy consumption and tracking errors can be considerably improved by using information about the location of the object.
2) *Drawbacks*
   a. This is not suitable method when object movement are unknown or partially known presents another interesting challenge. Data collection rate is not

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III.METHODOLOGY

A. Existing System

In spite of the diverse applications, WSNs face a number of different technical challenges due to their less energy and bandwidth limitations, ad hoc deployment, and unattended operation, etc.,. Unfortunately, very little previous works on distributed systems can be applied to WSNs, since the underlying assumptions have changed dramatically. Therefore, innovative energy-aware, scalable, and robust algorithms for distributed signal processing in WSNs are highly required. A problem that is closely related is the localized topology control, which maintains energy-efficient network connectivity by controlling the transmission power at each node, or selecting a small subset of the local links of a node.

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All the nodes in the sensor networks are run on batteries for sensing, processing and target tracking that are generally difficult to be recharged once deployed. Hence, energy efficiency is a difficult problem of WSNs for the purpose of extending the network lifetime. Here, target tracking in WSNs has been studied extensively to save the life time of the wireless sensor network. Due to the limited sensing capability and limited resources for communications and computation, collaborative resource management is required to trade-off between the tracking accuracy. Therefore, energy-efficient target tracking should improve the tradeoff between energy efficiency and tracking performance—e.g., by improving energy efficiency at the expense of a relatively minimum loss on target tracking performance. In target tracking applications, idle listening is a important source of energy waste. For this, duty cycling is one of the most commonly used approaches to reduce the energy conservation during idle listening. The idea of duty cycling is to put nodes in the sleep state for most of the time, and only wake them up periodically. In certain cases, the sleep pattern of nodes may also be explicitly scheduled, i.e., forced to sleep or awakened on demand. This is usually called sleep scheduling.

As a compensation for tracking performance loss caused by duty cycling and sleep scheduling, proactive wake up has been studied for awakening nodes proactively to prepare for the approaching target. However, most existing efforts about proactive wake up simply awaken all the neighbour nodes in the area, where the target is expected to arrive, without any differentiation. Based on target prediction, it is possible to put nodes in cluster are put into sleep state according the not closet path to the target. For example, if nodes know the exact route of a target, it will be sufficient to awaken those nodes of the cluster that cover the route during the time when the target is expected to traverse their sensing areas but not achieve that much target performance.

1) Drawbacks

a) As a compensation for tracking performance loss caused by duty cycling and sleep scheduling, proactive wake up has been studied for awakening nodes proactively to prepare for the approaching target.

b) However, if energy efficiency is enhanced, the quality of service (QoS) of target tracking is highly likely to be negatively influenced. For example, forcing nodes to sleep may result in missing the passing target and lowering the tracking coverage.

c) Sleep scheduling inevitably increases the probability of losing track of the object when the sensor nodes that should be active are asleep.

d) Proactive awake, it is sometimes unnecessary to awaken all the neighbour nodes.

B. *Proposed System*

Our proposed work, present a probability-based forecast the target and dynamic sleep scheduling protocol (PFTDSS) to improve the efficiency of proactive wake up and enhance the energy efficiency with limited loss on the tracking performance. With a target prediction scheme based on both kinematics rules and theory of probability, PFTDSS not only predicts a target's next location, but also describes the probabilities with which it moves along all the directions.

C. *PFTDSS Routing Protocol*

PFTDSS is designed based on proactive wake up: when a node (i.e., alarm node) detects a target, it broadcasts an alarm message to proactively awaken its neighbour nodes (i.e., awakened node) to prepare for the approaching target. To enhance energy efficiency, we modify this basic proactive wake-up method to sleep schedule nodes precisely. Specifically, PFTDSS selects some of the neighbour nodes of the cluster (i.e., candidate node) that are likely to detect the target to awaken. On receiving an alarm message, each candidate may individually make the decision on whether or not to be an awakened node, and if yes, when and how long to wake up. We utilize two approaches to reduce the energy consumption during this proactive wake-up process:

1) Reduce the number of awakened nodes.

a) Those nodes that the target may have already passed during the sleep delay do not need to be awakened;

b) Nodes that lie on a direction that the target has a low probability of passing by could be chosen to be awakened with a low probability. For this purpose, we introduce a concept of awake region and a mechanism for computing the scope of an awake region.

c) Schedule their sleep pattern to shorten the active time.

d) The active time of chosen awakened nodes can be curtailed as much as possible, because they could wake up and keep active only when the target is expected to traverse their sensing area. For this purpose, we present a sleep scheduling protocol, which schedules the sleep patterns of awakened nodes individually according to their distance and direction away from the current motion state of the target.

2) Advantages

a) In a duty-cycled sensor network, proactive wake up and sleep scheduling can create a local active environment to provide guarantee for the tracking performance.

b) PFTDSS improves the energy efficiency with an acceptable loss on the tracking performance.

3) Drawbacks

a) Proactive awake, it is sometimes unnecessary to awaken more number of nodes of the cluster that are trajectory to the target.

IV. SYSTEM MODULES

A. Nodes Network architecture development Module

We are having many systematic problems and tedious to understanding of positioning of sensor node. There are many problems during the deployment of sensor nodes. When placing the sensor node we have to consider many problems. To solve this problems, we considered experience on present methods to placing the senor node and taken the problems to solve sensor network placement. Some of the parameters are considered to solve the problems occurred in deployment of Sensor Network. In this work, Transmission range, Local during the formation of sensor Network, Node aware system and Mobility are the three parameters are considered during the formation of sensor network.

1) Transmission range: nodes want to communicate with each other. According to the transmission range only it can communicate. For this, nodes are placed closely to each other to communicate each other.

2) Node aware system: Nodes must consist of many feature like battery power, processing capability, bandwidth, memory etc. so according to those, nodes are grouped.

3) Mobility: Mobility refers the node movement procedure so need to consider the mobility options with limitation in maximum and minimum speed.

According to the critical event monitoring process, sensor network formed under node aware system with sleep wake scheduling mechanisms.

B. Clustering Scheme Module

The next step after the node architecture development nodes are grouped among them. A group of sensor nodes are formed and it is called cluster. In this way, nodes in node architecture developments are proposed into the cluster scheme. All clusters have cluster head (CH) and remaining nodes are considered to be member of that cluster. Using the clustering scheme in wireless sensor network, it is possible to save the energy of the sensor network. Cluster is formed dynamically using some parameters of the node for every cycle. In the point of each cycle, only one cluster is activated to track the target. The remaining sensors of the clusters are in sleep mode. In this way, we can save the energy of the sensor node. During the target prediction, the active cluster head (CH) that finds the target node in active mode and other nodes are in sleep mode. Then the active CH selects one sensor node of its members is called as Leader node (CL) of that cluster. The Leader node (CL) sense the target and current target location is calculated.

C. Target Tracking Approach Module

In this module, we quantify the benefits of our approach in terms of energy consumed and accuracy of tracking for different mobility patterns. The accuracy of tracking is strongly influenced by the number of active sensor nodes. The more sensor nodes that are active, the higher will be the accuracy in tracking. Too few will result in inaccurate tracking. On the other hand, energy expenditure is proportional to the number of active sensor nodes; the larger the size of the active tracking region, the higher the energy consumption. To accurately track the target and minimize energy, a minimum set of sensors nodes need to be active.

D. Sleep Wake Scheduling Module

Sensor nodes are most of the time in idle state during the network life time. When nodes are in idle state it takes the minimum energy of 50% of the total energy. Furthermore the sensor nodes are in most of the time in idle state. So much of time sensor nodes are in idle state only. In connection with this, the energy of the sensor node is wasted without any usage only because of the idle state. Therefore, idle listening becomes the one of important facts of energy waste in wireless sensor networks. To solve this, sleep scheduling has been studied. The mechanism of sleep scheduling can be divided into two approaches.

One approach, the "periodical packet-arrival based approach", assumes periodical packet arrival, thus proposing a periodic active/sleep (i.e., ON/OFF) schedule.

The second approach is "coverage-based approach", which assumes large density of sensor nodes, thus maintaining the connectivity of the network by a subset of nodes which are ON all the time, while letting the other nodes sleep. There are also various strategies for adaptation of the sleeping schedule, that is ending the ON period according to different criteria, such as the overheard messages, the network topology, the residual energy of the nodes, the most recently updated neighbour sleeping schedule, the database of neighbour nodes' sleeping schedule, the number of packets queued in the MAC layer, and the waiting time of packets and the length of waiting queue in the previous node.

E. Routing Protocol Designing Module

A routing protocol is a protocol that implies how sensor nodes are communicates with each other and broadcast the details about the sensor node to nearby nodes for the purpose of routing the information between nodes in the sensor network environment. The transmission between the nodes is based on the routing algorithms. All routers have prior information about routing techniques of networks attached to it directly. A routing protocol shares this information first among immediate neighbours, and then throughout the network. In this way, all routers know the information about the network topology. Implementation of Routing protocol named as PFTPOSS (Probability-based Forecast Target Prediction with Optimization-based Sleep Scheduling protocol), which is going to implement in OSI layer that need to get and deliver the messages from other layers for that make some more changes in supported layers. The routing protocol is implemented using simulation tool named Network Simulator (NS2 simulator).

F. Initial Configuration Setup

We need to configure some attributes which is supported to execute our routing protocol like Number of nodes, Mobility, Mac protocol, Simulation time, Band width, Transmission range etc… by setting these kinds of attributes we execute out routing protocol with layers interaction. We setup the layer wise results in the configuration process.

G. Performance Evaluations

First, we need to specify the necessary input parameters in the Config.in file as said above. For our simulation procedure, we have been specific about certain parameters as mentioned below to enable hassle free simulation

Terrain range – (500,500)

Number of nodes – 20 (This is a scalable simulator. Hence number of nodes can be increased at will.)

1) *Energy Efficiency:* The energy conservation of nodes during sleep scheduling is most relative to the position of the target, where the target is detected. Hence, the nodes are consuming more energy than the other nodes in the clusters, where those nodes are in trajectory to the target. This extra energy can be calculated as follows:

$$EE = \sum_i EE_i = \sum_i (E_{Scheduled} - E_{Default})$$

Where $E_{Scheduled}$ is the total energy of the node when target is detected and the $E_{Default}$ is the total energy of the node when no target is detected.

V. CONCLUSION AND FUTURE WORK

In this paper, a system is developed in such a way that target tracking in WSN is done in efficient way using an energy efficient forecast based sleep scheduling algorithm. In a duty-cycled sensor network, awake and sleep scheduling nodes can provide a local active surrounding for giving guarantee to the tracking performance. By effectively limiting the scope of this local active surroundings (i.e., reducing low value-added nodes that have a low prospect of detecting the target), PFTDSS improves the energy efficiency with an acceptable loss on the tracking performance. Given some limitations in tracking accuracy, the potential future work includes not only for target tracking and also use the sleep scheduling at the time of sensing depends on coverage and connectivity. So as a future enhancement, the tracking algorithm can be extended by forming clustering as one of the optimization methods.

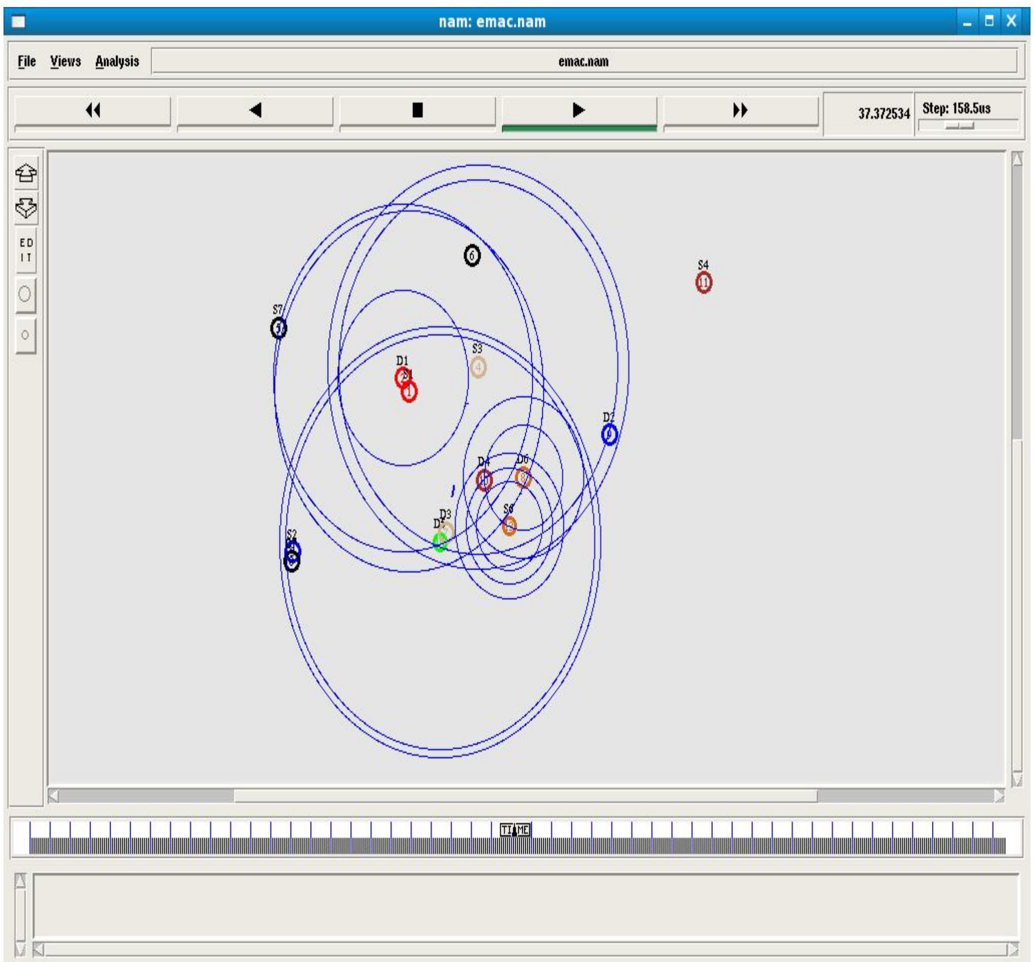
A. Future Enhancement

Prospecting forecast of target with dynamic Sleep Scheduling protocol (PFTDSS) besides, a cluster-based scheme is proposed, where sensors are statically divided into clusters, and each cluster consists of a single Cluster Head (CH) and a bunch of slave sensors. At every sampling instant, only one cluster of sensors is triggered to track the target. Resource consumption of the network is thus restricted to the activated cluster, where intra cluster communication is dramatically reduced so achieves optimization based sleep scheduling. Therefore, the cluster activation phase has a great importance not only in minimizing resource consumption but also in tracking accuracy. First, all the CHs need to measure the distances between the target and themselves at every sampling instant; then, a comparison among them is required to choose the nearest one. When a target enters the wireless sensor network, the CH that detects the target becomes active while other nodes are in sleep mode. Then the active CH selects three sensor nodes of its members for tracking in which one node is selected as Leader node. The selected nodes sense the target and current target location is calculated.

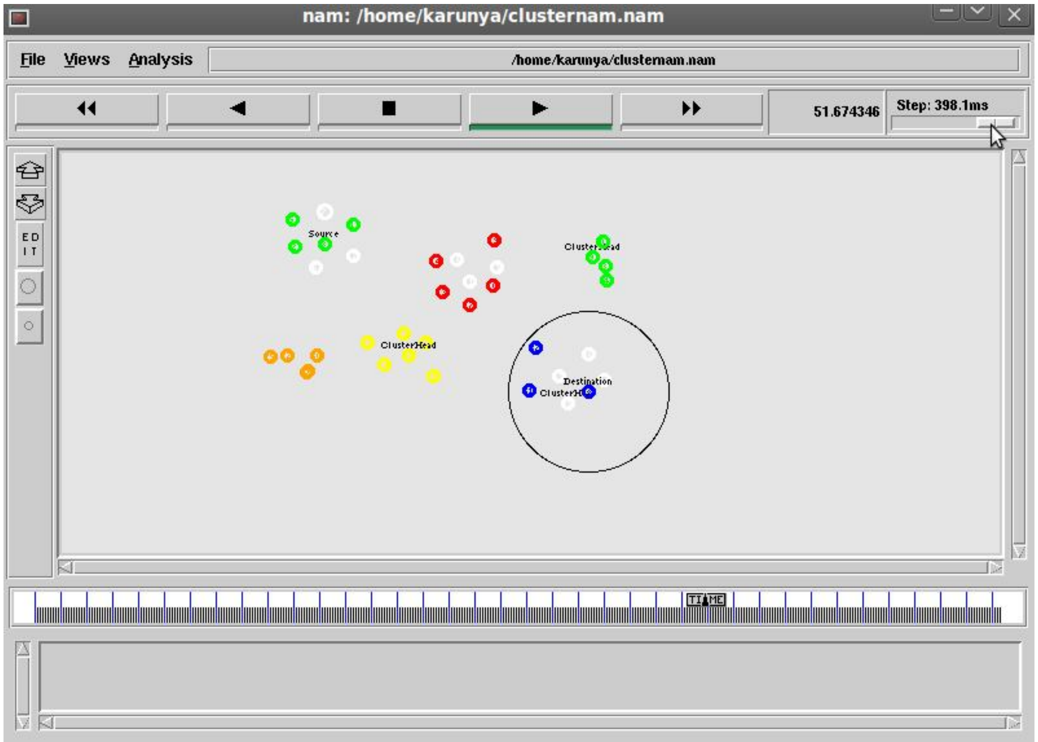
In this approach three sensor nodes are selected each time in which two nodes calculates its distance from the moving object and sends the data to the leader node. The localization of the moving object is done by leader node whereas in previous methods it's done by CH. Using prediction based clustering method energy consumed in the network will be reduced since the transmission power of the nodes is directly proportional to the distances. The three nodes selected for tracking are close to each other, thus the energy consumed for sending a data between the nodes is lower than sending a data from one of the selected nodes to its CH.

In this work, a system is developed in such a way that target tracking in WSN is done in efficient way using an energy efficient prediction- based clustering algorithm. Energy efficient prediction based Clustering algorithm, reduces the average energy consumed by sensor nodes and thereby increase the lifetime of the network. The tracking of the moving object is accurately done.

VI. SIMULATION RESULT



Awaken region on awaken node expected to track target



Target Prediction using minimum Energy

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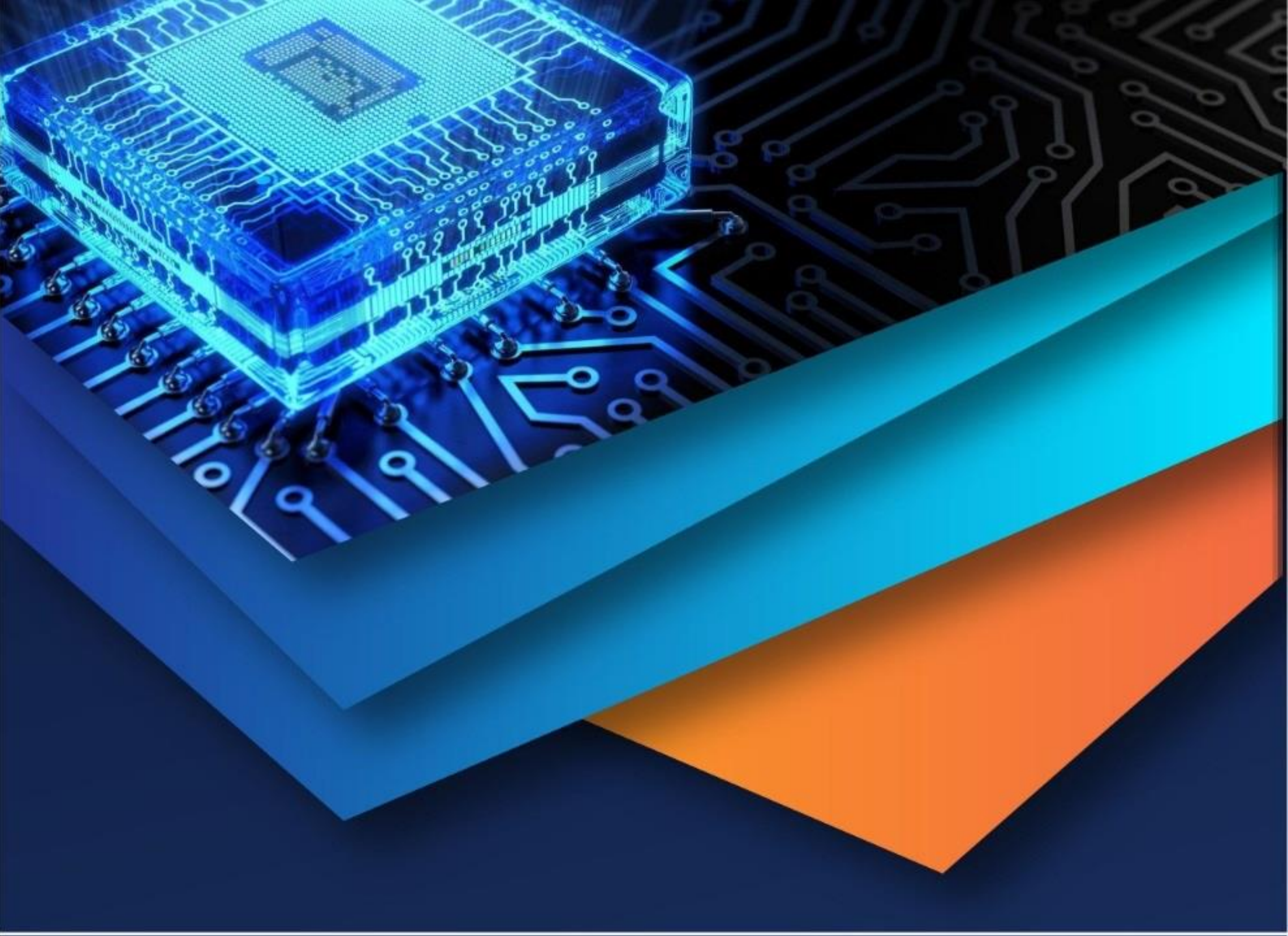

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