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# Energy Efficient Target Tracking Using Sleep Scheduling In Wireless Sensor Networks

**R.Roopavathy**
M.Tech Student, ECE,
Qis college Ongole.

**Dr.Ch.Balaswamy, M.tech, Phd, MISTE,**
Head of the Department,
Qis College,Ongole.

**Mr.V.Jaikumar, M.Tech, Phd, MISTE,**
Assoc.Professor,
Qis College, Ongole.

## ABSTRACT:

In the development of various large-scale sensor systems, a particularly challenging problem is how to dynamically organize the sensors into a wireless communication network and route sensed information from the field sensors to a target system. The prime motivation of our work is to balance the inherent trade-off between the resource consumption and the accuracy of the target tracking in wireless sensor networks. Toward this objective, the study goes through a new energy-efficient dynamic optimization-based sleep scheduling and target prediction technique for large-scale sensor networks.

We present a probability-based prediction and optimization-based sleep scheduling protocol (PPOSS) to improve energy efficiency of proactive wake up. A cluster-based scheme is exploited for optimization-based sleep scheduling. At every sampling instant, only one cluster of sensors that located in the proximity of the target is activated, whereas the other sensors are inactive. To activate the most appropriate cluster, we propose a non myopic rule, which is based on not only the target state prediction but also its future tendency. Finally, the effectiveness of the proposed approach is evaluated and compared with the state-of-the-art protocols in terms of tracking accuracy; inter node communication and computation complexity.

## KEYWORDS:

Target Tracking, Energy Efficient, Sleep Scheduling and Target Prediction.

## INTRODUCTION:

As the usage of wireless sensor network has been increased enormously in all the fields such as environment analyzing, earth nature, and medical fields to identify the disease etc.

In wireless sensor network the factors which are to be considered to obtain better performance in its result are connection establishment, transmission speed and energy consumption. By decreasing the energy consumption in each node of WSN, the lifetime of the network can be improved.

Wireless Sensor Network (WSN) is a collection of spatially deployed wireless sensors by which to monitor various changes of environmental conditions (e.g., forest fire, air pollutant concentration, and object moving) in a collaborative manner without relying on any underlying infrastructure support. Recently, a number of research efforts have been made to develop sensor hardware and network architectures in order to effectively deploy WSNs for a variety of applications.

Due to a wide diversity of WSN application requirements, however, a general-purpose WSN design cannot fulfill the needs of all applications. Many network parameters such as sensing range, transmission range, and node density have to be carefully considered at the network design stage, according to specific applications.

## PROPOSED SYSTEM:

Our proposed work, present a probability-based target prediction and sleep scheduling protocol (PPSS) 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, PPSS not only predicts a target's next location, but also describes the probabilities with which it moves along all the directions.

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## PPSS ROUTING PROTOCOL :

PPSS 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 neighbor 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, PPSS selects some of the neighbor nodes (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.

2. Schedule their sleep pattern to shorten the active time.

First, the number of awakened nodes can be reduced significantly, because:

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

2) 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.Second, 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.

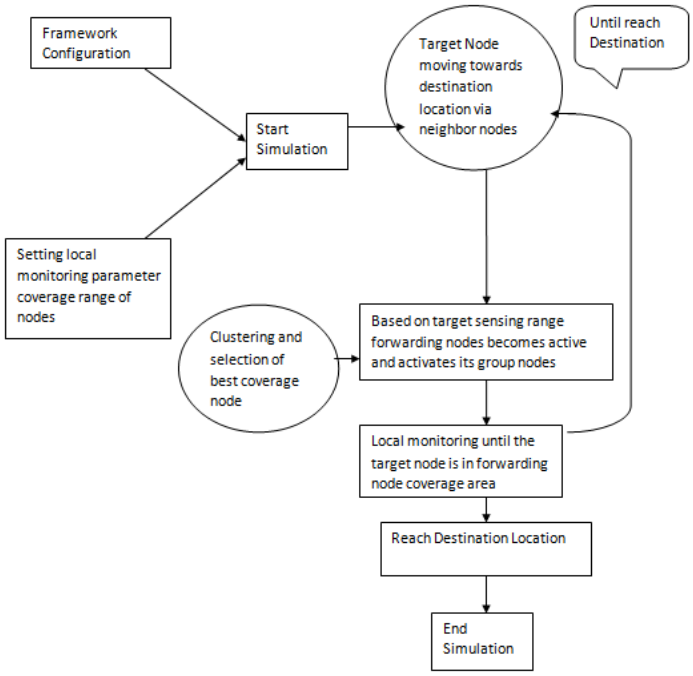
## ADVANATGES:

- 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.

- PPSS improves the energy efficiency with an acceptable loss on the tracking performance.

## Drawback:

- Proactive awake, it is sometimes unnecessary to awaken all the neighbor nodes.



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## METHODOLOGY:

» In this paper, we present a Probability-based Prediction and Sleep Scheduling protocol.

» (PPSS) to improve energy efficiency of proactive wake up.

» We start with designing a target prediction method based on both kinematics and probability.

» Our objective is to propose a simple routing metric that is composed of the energy expenditure and battery power of a node.

» Therefore, the cluster activation phase has a great importance not only in minimizing energy consumption but also improve the optimized tracking accuracy.

» PPSS improves the energy efficiency with an acceptable loss on the tracking performance.

» Future enhancement, the tracking algorithm can be extended by forming clustering as one of the optimization methods.

## SIMULATION RESULT ANALYSIS:

## CONCLUSION AND FUTURE ENHANCEMENT:

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 prediction based sleep scheduling algorithm.

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. By effectively limiting the scope of this local active environment (i.e., reducing low value-added nodes that have a low probability of detecting the target), PPSS improves the energy efficiency with an acceptable loss on the tracking performance.

Given some limitations in tracking accuracy, the potential future work includes optimization-based sleep scheduling and target prediction for abrupt direction changes. So as a future enhancement, the tracking algorithm can be extended by forming clustering as one of the optimization methods.

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