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Probability Based Optimized Techniques for Tracking Target Object in Wireless Sensor Network

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***Abstract*- The most important application of wireless sensor network in surveillance system is tracks mobile targets. Tracking performance can be improved when they operate in duty cycle mode. The movement of object can be predicted and collect the information. The alarm messages send by tracked node to energy efficiency of proactive wake up add the Sleep Scheduling protocol and Probability-based Prediction. For track the object we design method probability and kinematics. Select some nodes, they have high residual energy and these nodes track the moving object and collect the information about that object. This optimized prediction method improves the energy efficiency and reduce the detection delay.**

Keywords: Target Predictions, Sensor Networks Sleep Scheduling, Target Tracking, Energy Efficiency.

I. INTRODUCTION

Sensor networks are dense wireless networks of small, lowcost sensors, that collect and disseminate environmental data. Wireless sensor networks are increasingly being envisioned for collecting data, such as environmental properties, from a geographical region . Sensor nodes are powered by batteries .This tracking a mobile target such as a human being or a vehicle in surveillance applications. A continuous monitoring for target tracking object [1], [2].To extend lifetime of sensor network critical feature is energy efficiency. The quality of service enhance the energy efficiency target tracking highly. Improving energy efficiency at the expense of a relatively small loss on tracking performance. The main energy wastage is idle listening [3]. duty cycling is one of the most approaches [4] To reduce the energy consumption during idle listening. On demand nodes may also be explicitly scheduled. Sleep-schedule nodes precisely to reduce the energy consumption for proactive wake up. if nodes know the exact route of a target, that will be sufficient to awaken those nodes that cover the route during the time when the target is expected to traverse their sensing area.

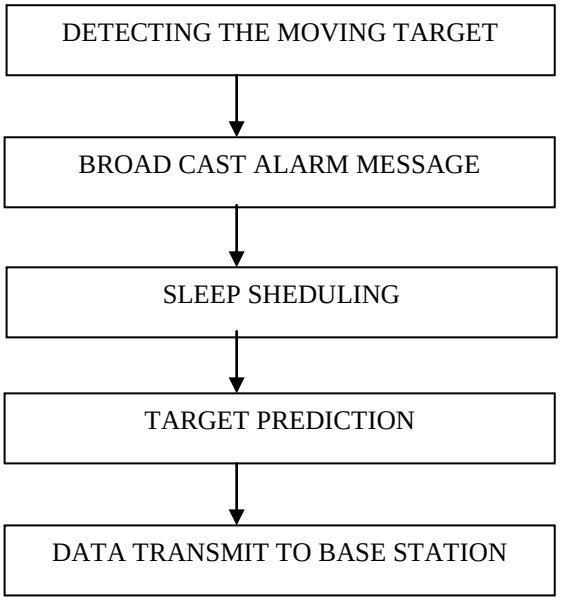
In this paper, probability-based target prediction and sleep scheduling protocol to improve the efficiency of proactive wake up and enhance the energy efficiency with limited loss on the tracking performance. This protocol not only predicts a target's next location but also describes the probabilities with which it moves along all the directions. Unlike other physics-based prediction work target prediction of method provides a directional probability as the foundation of differentiated sleep scheduling in a geographical areas. Prediction depends on kinematics-based target prediction it primarily aims at tracking a vehicle that usually moves in a smooth curvilinear trajectory without abrupt direction changes.

Sensor is a transducer that transforms some physical process into an electrical signal, which can be measured by a digital processor. Many sensors can provide information of interest for traffic surveillance, such as temperature, humidity, pollutant, vibration , photonic , acoustic and magnetic sensors. It is possible to provide a detailed picture of the road conditions and traffic flow with a combination of these sensors.

Typical target prediction methods include kinematics based prediction dynamics-based prediction and Bayesian estimation methods . Kinematics and dynamics are two type of the classical mechanic. Kinematics describes the movement of objects without considering the circumstances that cause the motion while.dynamics studies the relationship between the object motion and its causes .It depends on kinematics-based target prediction it primarily aims at tracking a vehicle that usually moves in a smooth curvilinear trajectory without abrupt direction changes.

II. DESIGN OF OPTIMIZED TARGET TRACKING METHOD

Initially the network is created using sensor nodes and the nodes are placed in a region .Place a moving node as target node.Set the network for operation and nodes are arranged for operations and set for communication. Here the movement of object wants to predict and collect the information about that object. In a duty-cycled sensor networks proactive wake up and sleep scheduling can create a local active environment to provide guarantee for the tracking performance. They introduce a awaken region, the nodes are active at that time.



This flow chat explain about the flow of target prediction.First they detect the moving target .Than broad cast the alarm message to neighbouring nodes and apply the sleep scheduling.Then target is predicted.At last the data is transmit to the base station.

To reduce the energy conception during the idle listening introduce the sleep scheduling pattern.The proposed target prediction method consist of three steps. current state calculation, kinematics-based prediction, probability based prediction. After calculating the current state, the kinematics-based prediction step calculates the expected displacement from the current location within the next sleep delay, and the probability-based prediction step establishes probabilistic models for the scalar displacement and the deviation.

Prediction method not only predicts target's next location, but also describes the probabilities with which it moves along all the directions. It modify this basic proactive wake-up method to sleep-schedule nodes precisely. Specifically, PPSS selects some of the neighbor nodes 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.

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.

They calculate the current state calculation using current position. Sense that information .Kinematic based prediction for kinematic rules for calculates the distance between them. Probability based prediction for polar coordinates calculation. Detecting the target or sense the movement of target object, Inform other sensing node active at that time, Apply sleep scheduling ,Calculate the distance between the target object and the node and collect the information about that moving target node.

III. RESULT AND DISCUSSION

The Simulation is carried out in NS2 under LINUX platform. The aim is to simulate the moving target prediction. The movement of nodes are showed there and probability based prediction improve the energy efficiency. Target detection and the prediction methods are simulated and collect the information of the target and send to the base station. NS2 is an open-source simulation tool that runs on Linux. It is a discreet event simulator targeted at networking research and provides substantial support for simulation of routing, multicast protocols and IP protocols, such as UDP, TCP over wired and wireless (local and satellite) networks.

A. Simulation parameters

Energy conception :

The amount of energy used by sensor node for tracking the nodes. For packet transmission during the communication.

Throughput :

The throughput metrics measure how well the network can constantly provide data to the sink.

Packet delivery ratio:

The number of packets delivered in communication link in seconds.

B. Simulation Results

The performance result of existing target prediction and probability prediction improves the energy efficiency with an acceptable loss on the tracking performance. The throughput of probability based prediction is better and the packet loss very less, the energy conception, delay reduces.

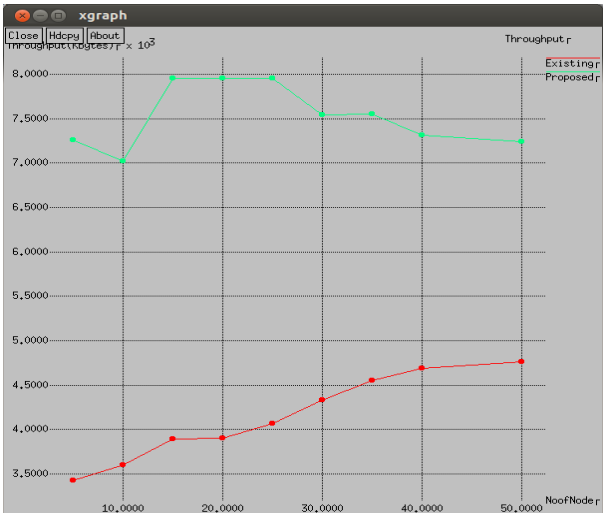


Figure 1. Comparison Of Packet loss For existing tracking and probability prediction

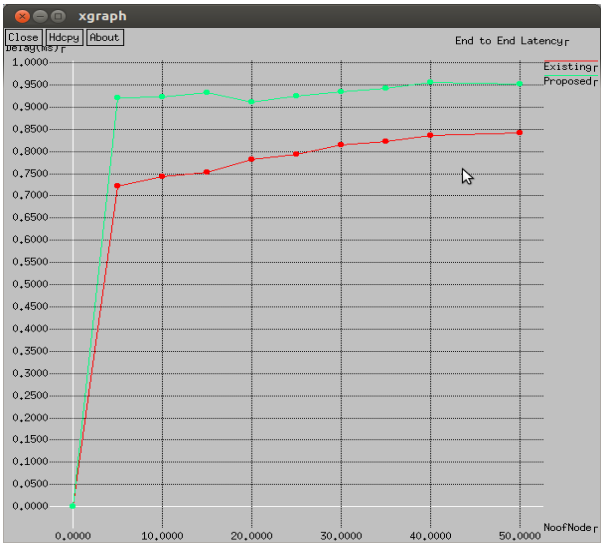


Figure 2.Comparison of throughput between existing tracking and probability prediction

IV. CONCLUSION AND FUTURE ENHANCEMENT

A surveillance system, which tracks mobile targets, is one of the most important applications of wireless sensor Networks. When nodes operate in a duty cycling mode designing a target prediction method based on both kinematics and probability. Based on the prediction results, Prediction method then precisely selects the nodes to awaken and reduces their active time, so as to enhance energy efficiency with limited tracking performance loss. Moving target node is detected and apply the sleep scheduling for reduce energy loss. Using kinematic and probability methods used for the target prediction, calculate the distance from moving target and the sensor nodes. Sense the information about the target. Probability based prediction improves the energy efficiency with an acceptable loss on the tracking performance. 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. The work will be extended by implementing grouping the nodes . The head select the target node and collect the information. This will increase the performance of the tracking.

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