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A NOVEL APPROACH TO DETECT THE MOVEMENT OF TARGET IN WIRELESS SENSOR NETWORKS

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Abstract— The ultimate aim of a wireless sensor network is to provide accurate and reliable information regarding the environment in which the sensors are deployed. Among the various applications of a sensor network, target tracking is the one of the key application of WSNs. In existing system To design a Face Track for detecting the movement of a target in polygon. Develop a brink detection algorithm used to reconstruct another conceptual polygon. Optimal node selection algorithm to select which sensor of spatial region to track data. All wireless sensors are activated and idle listening is a major source of energy waste. Once an active sensor runs out of energy, that sensors are not present in the network. So communication is not fully completed. We enhance the proposed algorithm Probability-Based Prediction and Sleep Scheduling (PPSS) to overcome this problem also it improve the power efficiency and increase the network life time.

Keywords- Wireless sensor networks, mobile target, edge detection, face tracking, multiple tracking

I. INTRODUCTION

Wireless sensor networks (WSN) is used to bring about the interaction between humans and the environment. Wireless sensor network was originally developed for application in battlefield. A wireless sensor networks consist of spatially distributes sensor nodes. Each distributed sensor node is able to perform some processing and sensing task independently. The sensor nodes are able to communicate with each other to forward the sensed information to a station. This target tracking method for wireless sensor networks make use of a centralized approach. As the number of sensors rise in the network, more messages are passed on towards the sink and will consume additional bandwidth. Thus this approach is not fault tolerant as there is single point of failure and lacks scalability. Moreover in traditional target tracking methods, sensing task is usually performed by one node at a time resulting in less accuracy and heavy computation burden on that node. In WSNs each node has very limited power; consequently traditional tracking methods based on complex signal processing algorithms are not useful.

Some nodes like black nodes are used for detecting and sending messages to the node about whether the node is in wake up state are in motion. To find path of some moving object in an area of network, nodes plays a important role in it. Node that has very close path will help to participate in tracking and provide continuous coverage. This helps in improve energy efficient and provide accuracy in tracking objects.

Various type of target tracking objects are 1) finding the location, distance and measurements of the target from the node; 2) Nodes must be in groups example clustering for tracking the target mobile;3) the leading sensor must report about the target movement to the central sink, where sink is a resource-rich node for getting information from leading node.

WSNs has some challenging problems like

1) To get a group of nodes that provide accurate measurement of a target that is in motion is very difficult.
2)Getting accurate target location is very difficult.
3)Maintaining the operation of node in time is difficult.4)node failure or loss of target tracking is often occurs.

In a target tracking application, the sensor nodes which can sense the target at a particular time are kept in active mode while the remaining nodes are to be retained in inactive mode so as to conserve energy until the target approaches them. To continuously monitor mobile target, a group of sensors must be turned in active mode just before target reaches to them.

Target tracking has major duty to maintaining the balance networks resources like energy, bandwidth, and over heads. In wireless sensor networks target tracking classified into many types. There are Tree-Based tracking, Cluster-Based Tracking, Prediction-based Tracking, Mob cost Message-Based Tracking and Hybrid methods.

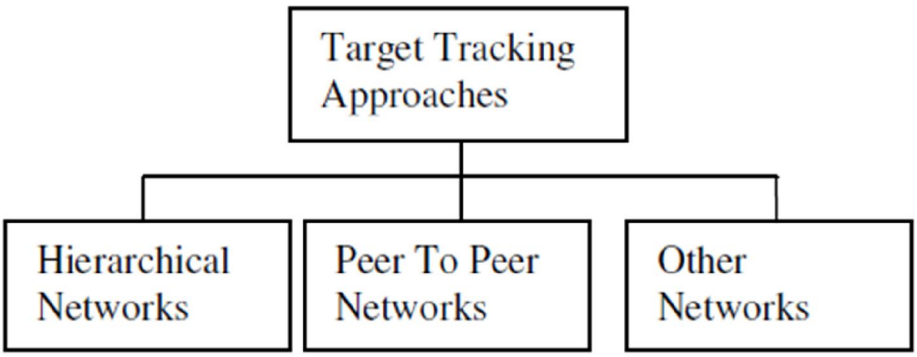

Figure: 1 Types of target tracking

We present a prediction based target prediction and sleep scheduling protocol (PPSS) to improve the efficiency and enhance the energy efficiency of proactive wake up with limited loss on the tracking performance. PPSS enhances energy efficiency by reducing the number of proactively awakened nodes and controlling their active time in an integrated manner.

Related neighborhood graph (RNG) is used width *p* points for dividing the plane into spatial non overlapping region which is called as face. Each face in the network helps in finding the points that are connected. Each neighboring face shares edge which is common to them.

In WSNs face can be of diffence sizes and geometrical polygonal-shape form. For finding inter node edge of polygons a complete WSNs is generated by using planarization algorithm. By introducing the edge detection algorithm the polygon location is identified and wakes up the node before the target moves, which helps in tracking the target in time. That target is about to cross its location it is called as brink and each node are the couple node. To identify the brink in the network the target must move towards the brink by marking rectangular or square shape around the move.

Characteristic requirements

The following are the characteristic requirements that are shared among the wireless sensor network application

1. Type of service used by a conventional communication network is unmistakable.
2. Quality of Service traditionally bounded with multimedia application where delay and bandwidth requirements are given more importance.
3. Fault Tolerance in wireless sensor network is able to tolerate the faults that are raised due to damage in the or communication between two wireless nodes.

4. Lifetime-the sensor node have to rely on limit energy because of the use of batteries.
5. Scalability employed architectures and protocols must be able to scale these numbers.
6. Wide range of Densities the number of unit per area. This density can vary considerably. Different application will have diverse node densities.

II. RELATED WORKS

One of the major goal of the wireless sensor networks is to detect the object and monitor the change in region.WSNs originally developed for Military purpose in battle surveillance. But now a day's used for health care, environmental industries. This RSSI algorithm very useful especially in the case exploited for localization, distance estimation and link assessment. Variations of the signals strength in the region can reveal the movements of persons.Instusion detection system minimize the transmitting information to sink and instead of transmitting information it gives only alert notifications about the unauthorized movement in the respective region. This method used to detect the intrusion of a moving person inside the region and correctly keep tracking of the path. It is possible to estimate the velocity of the movement by knowing the transmission rate of the system and the sensitivity area of a radio link.

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. The wake-up scheduling of sensors has significant impact on the lifetime and coverage of a WSN. In this paper, a duty-cycled sensor network, proactive wake up and sleep scheduling can create a local active environment to provide guarantee for the tracking performance.

In the wireless sensor network target tracking is that individual homogeneous sensors only can able to target the position and velocity in the Cartesian coordinates. This extended kalman filtering is used to detect the nonlinearity. But some cases its leads to unsatisfactory or unstable tracking performance. To overcome this problem introduced new algorithm called maximum likelihood estimator.MLE especially for prelocalization also overcome the nonlinearity before applying the extended kalman filter.

Most existing work on sensor networks widely concentrates on finding efficient way to send a message or a information to the base station, and much work has been done on collecting local data and generating the data report.

III.DESIGN OF FACE TRACK

Polygon is used for tracking target when it is in moving. The active polygon for polygon and active nodes for nodes is used for detecting the target of some nodes in the WSNs. The active node always follows

1) its own information
2) information about adjacent neighbors
3) Information about active neighboring nodes
4) Information about neighbors through direct communication.

The target can move anywhere of the adjacent polygon. The adjustment polygon is called as forward polygon (P_f).correspond to adjust cent neighbor the target is been detected and are called immediate neighbors. Node that are corresponds to the number of polygon is depend on the number of edges or adjacent neighbor. The polygon size can be determined by the number of edges surrounding.

IV.BRINK DETECTION ALGORITHM

An edge detection algorithm used to reconstruct another polygon called critical region by determining an edge which is called a brink to the active polygon. Since the brink generated on the boundary of active polygon which crates polygon region problem that in turns into a critical region problem. The main objective is to find the brink when the target is moving to a brink between couple node (CN).This CNs will help in conforming that the target is leaving the active polygon and moving to forward polygon. This forward polygon allowed for tracking the target in time.The edges of active polygon are mapped by brinks. The target moves towards brink, the target is aimed on a spot which is called as follow spots. Since the target moves towards a brink of active polygon, the follow spot is divided into three phase detection spots.

1) Square detection phase:
   The target is preliminarily detected by two nodes from active polygon but don't guarantee that the target cross the brink.
2) Rectangular detection phase:
   The target crosses the brink between the nodes.
3) Crossing phase:
   The target is going to cross the brink between the nodes.

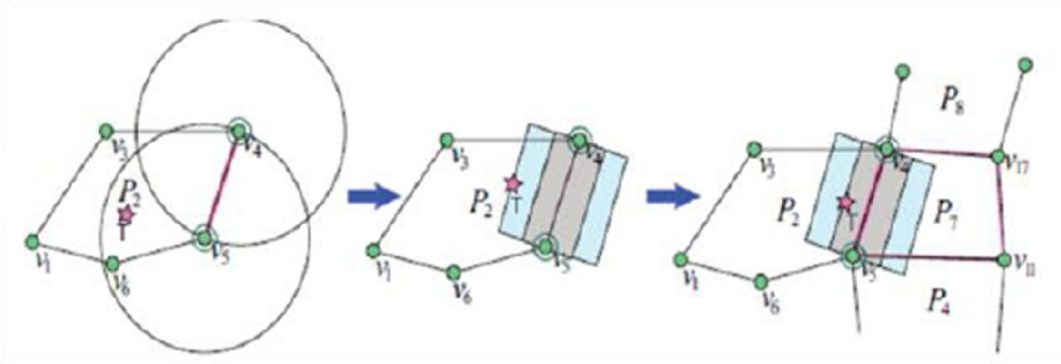

Figure 2: Brink detection process

Each brink in forward polygon is identified during when the target crosses network by three phase detection. If the target is in square phase are touch as the rectangular phase a joined-message is sent to forward polygon. Some of the different parameter of the brink are brink length,loal mean length and local standard deviation. This brink is easily identified when CNs is allowed.

$$\rho = 1/A \int_{-D/2}^{D/2} e_s(\mathrm{CN},j)dx \int_{-D/2}^{D/2} dy,$$

$$\rho' = 1/\mathrm{A} \int_{-D/2}^{D/2} e_s(\mathrm{CN},j)dx \int_{-D/4}^{D/4} dy,$$

$$\rho'' = 1/\mathrm{A} \int_{-D/2}^{D/2} e_s(\mathrm{CN},j)dx \int_{-D/8}^{D/8} dy.$$

P,$p^1$and p^{11} be the detection probability for three-phases respectively. This values of P,$p^1$and $p^{11}$are relay on the length of the brink. To find the target, node should have to two condition:1) The node must be in an active polygon2) The node must be in active state when target pass through brink.

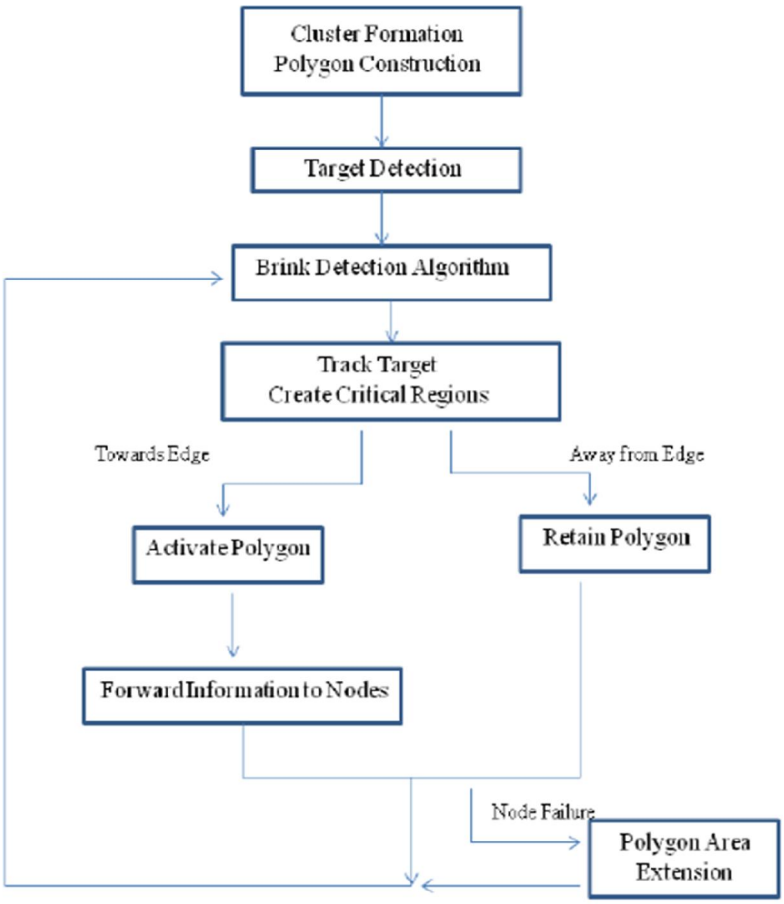

Figure3: Polygon-Based Tracking Framework

V.CONCLUSION

The main challenge in wireless sensor network is to determine how to perceive the target in an efficient manner. The proposed algorithm archives a WSNs system for identifying the movement of a target using polygon tracking. The proposed method also track framework which estimate target position area. It archives high accuracy while tracking. It also reduces energy cost of a WSNs.The target is detected inside a polygon by means of brink detection. It is strong to sensor node failure and error in target location.

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