International Journal of Enhanced Research in Management & Computer Applications
ISSN: 2319-7471, Vol. 5 Issue 6, June-2016, Impact Factor: 1.544

An ACO Adaptive Approach For Reliable Target Tracking And Scheduling

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ABSTRACT

The criticality of sensor network is identified in terms of available limited resources and constraints. To provide the regular backup to the environment connected critical nodes, the target tracking is required. In this work, an improved ACO based target tracking method is provided. In this layer of this model, the parameter specific node tracking is performed. Later on the quantified ACO algorithm is applied to apply the effective node tracking and setting up the scheduled sequence. The observation shows that the work has improved the network life.

Keywords: Sensor Network, ACO, Fault Analysis, Target Tracking, Coverage

I. INTRODUCTION

WSN is defined as an effective energy communication network defined under integrated communication capabilities with wireless vehicle node communication. In this network system, an intelligent vehicle communication is defined under safety, comfort and optimized and directed path identification. These communication networks required he effective route optimization and the effective communication generation so that the minimum communication throughput is obtained. This kind of network is defined with some specific protocol definition such as LEACH, PEGASIS etc. WSN network is different from mobile network with highly dynamic nature and frequently change in node position and the node exclusion and inclusion in the network. Generally no node is permanent in this network scenario. The nodes enter to the scenario for a fixed interval and then moves to other network. Each network scenario is controlled by a base station. As a vehicle switch between the base station network, this process is considered as Target Tracking process.

A) Target Tracking Mechanism

In Sensor area network as the communication is performed on mobile node and the node moves outside its current coverage range controlled by the base station or the Target head or road side unit. Then, outside the current coverage range, there can exist multiple such controllers that can take the charge of the node. All the base station or controller devices that find a new node in their coverage range, send the access request to that node. This process of request generation is considered as request poll. As a vehicle node get the poll request from multiple base station, It has to elect a base station that will bet the node control. The identification of most effective base station for a node is done using the Target Tracking mechanism analysis. This analysis is done under the base station strength analysis. From this analysis, the effective base station identification is done. After this identification, the control of the node shifted from earlier base station to this new base station.

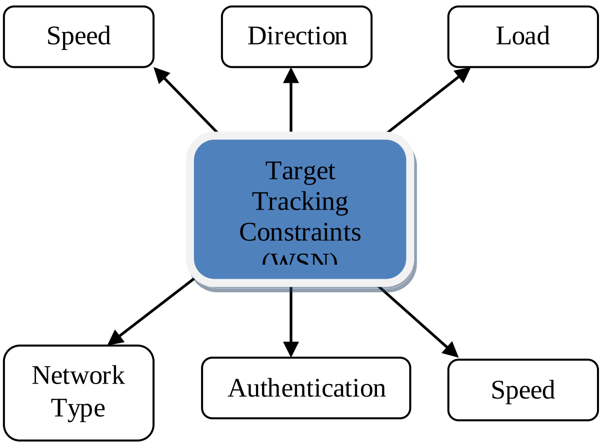

Figure 1 : Target Tracking Constraints

This process of switching a node between base station is called Target Tracking mechanism. The Target Tracking mechanism in Sensor area network is having number of challenges shown in figure 1

WSN is most dynamic communication network in which nodes enter to the system for a small interval and the speed of the nodes is very high because of this there is the requirement of a fast analytical approach that perform the analysis on multiple parameters. These parameters include the positional parameters such as speed and direction. A predictive analysis approach is required to analyze the position or localization of nodes so that effective Target Tracking will be obtained. The direction aspect is quite important, because if two base stations are having a node coverage then the base station, in direction of which node is moving is more effective. Because over the distance, the signal will become stronger. The base station load is the parameter to decide the network capability. A base station with heavy communication cannot provide effective Target Tracking.

In WSN, the Target Tracking can be controlled by different kind of network devices such as a Target head, base station or the RSU. The decision of the responsible component is based on the type of communication scenario. A network type with group mobility performs the Target Tracking over the Target whereas in city scenario like network base station can be considered. Another factor reliable Target Tracking process is the authenticated communication. If the key sharing authentication is defined in such case before the Target Tracking process, authentication is required to apply.

According to the type of networks involved in the Target Tracking mechanism, the Target Tracking is divided in two main classes called horizontal Target Tracking and vertical Target Tracking. If the Target Tracking is performed between two similar networks it is called Horizontal Target Tracking but if the Target Tracking is performed between two dissimilar networks, the Target Tracking mechanism is called vertical Target Tracking. This mechanism is called network switching mechanism. The hybrid networks enables the vertical Target Tracking. The classification of Target Tracking process depends on the base stations and the associated applications. This kind of Target Tracking mechanism is called break before make Target Tracking mechanism. It enables the one to one communication under the connection network analysis. This network type defines the break connection while performing the Target Tracking process. The soft Target Tracking whereas first make the connection with new one and then perform the break with previous one. This does not give any data loss during Target Tracking process.

In this paper, an effective Target Tracking mechanism is defined for Sensor area network. The approach has used the communication and positional parameters for effective base station identification. In this section, an introduction to Sensor area network and Target Tracking mechanism is defined. In section II, the work defined by earlier researchers is discussed. In section III, the proposed WSN communication architecture is presented. In section IV, the results obtained from the work are discussed. In section IV, the results obtained from the work are presented. In section V, conclusion obtained from the work is presented.

II. EXISTING WORK

In this section, the work done by the earlier researchers on different issues and challenges associated with Sensor network is discussed. This section has defined the contribution of the earlier researchers. B. Karp and H.T. Kung [1] has defined a LEACH based routing approach to provide effective communication in WSN. Author has defined the routing protocol specification under complexity analysis and packet delivery analysis in a dense communication network. Author defined the complexity analysis and packet delivery analysis in communication analysis in route length optimization for protocol message generation and mobility analysis so that the data packet transmission is not performed. Data packet is defined under protocol specification. Johnson and Maltz [2] has defined a communication analysis approach using DSR. Author defined the packet throughput in the network. Author defined the route definition and request analysis so that the destination analysis for propagation for request analysis.

C. Lochert [4] has defined an improved communication for position based routing and Target Tracking process. Author defined work for city scenario and provides the effective network communication in such network. Author defined the communication analysis under multiple parameters and provided topology specific communication to improve delivery rate and latency. Author[7] also defined the LEACH based routing to improve the communication throughput. Author presented the comparative study with AODV and DSR protocols so that effective delivery rate will be obtained and the delay will be reduced over the communication. H. FulBler [8] has presented a positional analysis based approach for optimized Target Tracking process for highway scenario. Author defined the topology based mechanism to provide effective route generation in city scenario. Author presented the broader view under route optimization. Author defined multihop communication approach for real word scenario.

Author[7] refer to vehicles that link WSN with the 3G/UMTS network. The present paper addresses these concerns in the envisioned WSN-UMTS integrated architecture and delineates the methodology of dynamic Targeting and adaptive gateway management. Author[9] explores geographical positional awareness to support software agent mobility in ad hoc networks. The idea is to evaluate the concept of opportunistic communication to perform agent migration and mobility among nodes (Target Tracking), in an infrastructure less Sensor ad-hoc network (WSN). Author[10] analyzed several Ad hoc routing communications protocol, Responsive, Proactive & Hybrid, lecturing in to consideration several Sensor Ad-Hoc Network argument corresponding Speed, height etc in actual communication Scenario. The parameters of Sensor Ad-Hoc Network (WSN) are changing demonstrates that in the actual communication scenarios proactive communication protocol accomplish more efficiently toward energy preservation[8]. Author [11]studied various Ad hoc routing protocols, Reactive, Proactive & Hybrid, taking in to consideration various WSN parameters like speed, altitude etc in real communication scenario and evaluated them for various battery models for energy conservation. Author [12] defined novel routing protocols for a sparse environment in WSN with the context of utilizing the mobility feature, with the aid of the equipped devices, such as Global Position System (GPS) and Navigation System (NS). This approach exploits the knowledge of Second Heading Direction (SHD), which represents the knowledge of the next road direction the vehicle is intending to take, in order to increase the packet delivery ratio, and to increase the route stability by decreasing instances of route breakage.

III. PROPOSED MODEL

The presented work is about to define a solution for target coverage problem under ACO integrated approach applied in segmented network. Here multiple constraints will be defined to perform target coverage under ACO approach. The constraints covered in this work include sensing range, fault, energy evaporation factor etc. After generating the coversets, the ACO adaptive scheduling method will be applied for activation of these coversets. The proposed work model is here shown in figure 2.

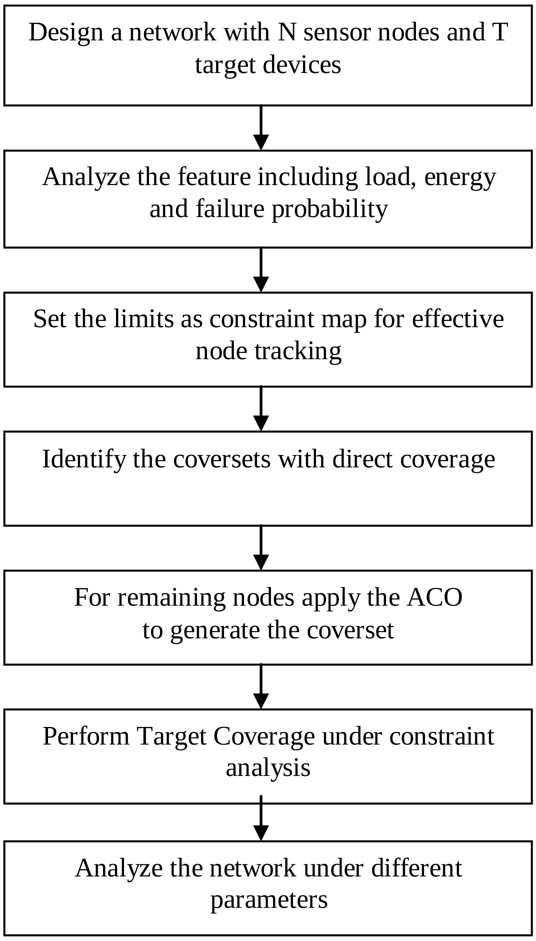

Figure 2: Proposed Work Model

The presented work is here defined based on multiple parameter map at the earlier stage including the energy, distance, fault etc. Based on this the coversets are identified. Later on the ACO approach is applied to track the nodes and to provided to perform effective node tracking. The work is here defined to utilize the relative network resources and to provide the effective and optimized network communication.

A) ACO

ACO is basically the optimization approach that is basically used to speed up the algorithmic process. In wireless network the ACO is basically used to optimize the communication process. According to this approach a node generate the ant to find the optimized path over the network. These ants place the pheromones on this located path so that all other nodes can follow these pheromones to communicate on this optimized path. The foremost step of ant communication is the identification of pheromone location and to place them at appropriate location. More time it takes for an ant to travel down the path and back again, the more time the pheromones have to evaporate. A short path gets marched over faster, and thus the pheromone density remains high as it is laid on the path as fast as it can evaporate. In this work, ACO is used as the path tracker and to generate the optimized scheduled sequence for node tracking.

IV. RESULTS

The presented work is here implemented in a sensor network with N number of nodes and M number of random targets. The ACO adaptive approach is applied to perform effective target tracking and to provide the optimized network communication. The work is applied in random physical network with N nodes and defined a work on track the nodes effectively. The simulation of work is done in matlab environment. The simulation resuts are here taken in terms of network life.

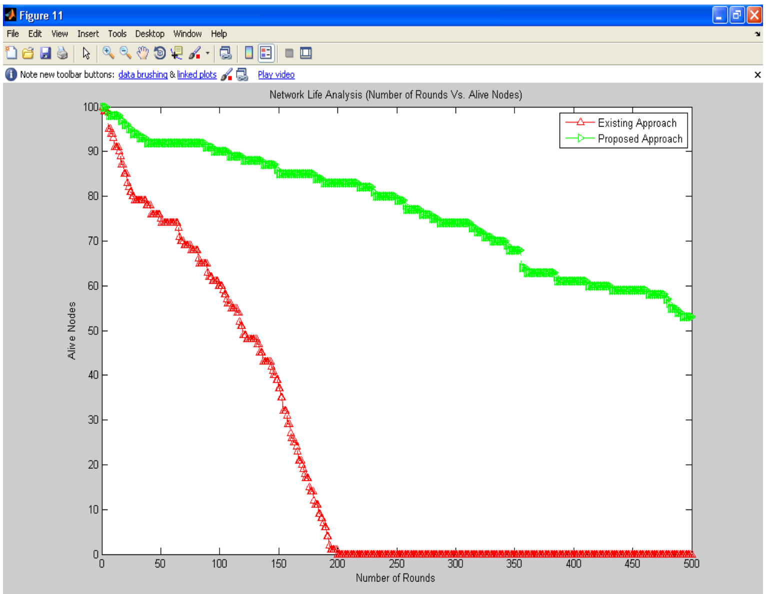

Figure 3 : Alive Node Analysis

The comparative observation taken here to prove the significance of work is here defined in terms of number of alive nodes in the network. The figure 3 here shows that the method has improved the network life by aplying the effective node tracking.

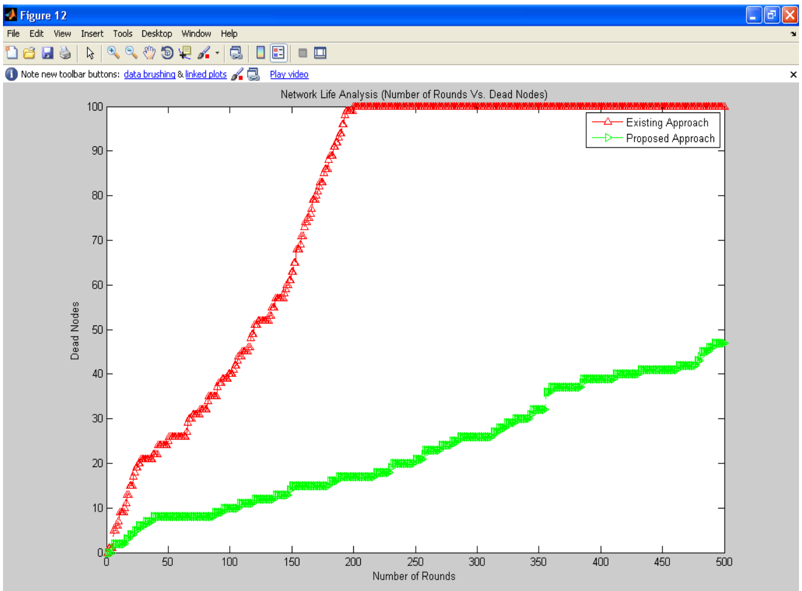

Figure 4 : Dead Node Analysis

The comparative observation taken here in figure 4 is to prove the significance of work is here defined in terms of number of dead nodes in the network. The figure 4 here shows that the method has improved the network life by aplying the effective node tracking.

CONCLUSION

In this present work, an improved node tracking is provided for critical target nodes using ACO based approach. The work model has improved the tracking method and the scheduling sequence. The comparative observations shows that the method has improved the network life and improved the node tracking in the network.

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