

Effective Performance Analysis of Bin –Periodic Algorithm for Wireless Sensor –Actor Network

M.E. Sanap¹, Rachana A.Satao²

¹Department of Computer Engineering
SAE Kondhwa , Pune -48, Maharashtra,India

²Department of Computer Engineering
SKNCOE, Pune-41. , Maharashtra,India

Abstract-In wireless sensor-actor network, to transmit the data efficiently for long distance sensor-actor network is used .It will improve the performance in terms of energy consumed and end to end delay between sensor nodes compare to wireless sensor network. In this paper, we proposed the protocol for wireless sensor-actor network. It consist set of actor nodes and sensor nodes. We consider the scenario which covered large deployment area. We proposed the idea to get the better result while transmitting the data through WSA. We analyzed practically parameters like energy consumed and end to end delay of sensor nodes.

Keyword:WSAN, Active Mode, Deactivate Mode,BS,Actor

I. INTRODUCTION

Now a day's Emergent trend occurred to interact with real world different rationale. In the recent year for large geographical area many applications are available in WSA like surveillance, environmental monitoring and many more. In many application set of large no of sensor nodes are used, which will used more energy. WSA is able to provide the information from the observation based on the physical world .we are considering the heterogeneous network in which sensor node having different capabilities. Sensor node having very low battery, so in case of large geographical area more energy is consumed as well as delay is more.[1].To overcome this problem, we proposed the solution to consumed less energy .

For example ,consider the example of handicap person, for specific task he will structured the sensor nodes .once the task is completed again the sensor nodes goes in dormant mode. The rest of the paper organized as follows: we briefly analyze the background and idea about the topic in section II. Section III introduces our proposed Network Model. Proposed algorithm is discussed in section IV. Section V talks about the performance analyses of proposed protocol in terms of delay and energy consumed. Finally, the paper is concluded in section VI.

II.BACKGROUND AND MOTIVATION

In the existing system simple wireless sensors are used for surveillance large-scale geographic area. A Wireless Sensor Network is composed of a large number of sensor nodes which are resource constraints. eg. Small battery. In the paper [2] they had implemented the protocol based on an intuitive

coordinate system imposed onto the deployment area, which partitions the sensors into clusters. The protocols were asynchronous, in the sense that the sensors wake up for the first time at random, then alternate between sleep and awake periods both of fixed length, and no explicit synchronization is performed between them and the actor. Theoretical properties are stated under which the training of all the sensors is possible. They had used actor centric network in which one actor was placed centrally which controls the set of sensor nodes.

This makes our research focus to gather data efficiently so that the life of the network can be increased [7]. The WSA (wireless sensor –actor network), sensor –actor communication and research challenges are studied [1].for Homogeneous/ Heterogeneous WSA sensor nodes were unaware of their location in deployment area. These type of sensor nodes don't have special algorithm or properties to controls themselves in this situations. They are always in active mode even in unwanted period .they have BS far away from the their location hence they have to use high energy to transmit the data to BS.These sensors are active even non busy-hours ,so energy is lost without use. The sensors have very less life time and it will die soon, energy consumption is also more. Also BS is far away from the location so end to end delay between sensor nodes is more .

The motivation for the proposed protocol came from the paper[3] ,in which it was mentioned that the for large geographical area application ,required large number of sensor –actor network .this paper talked about actors organized the sensor node for specific event/task and once the task is completed ,again they goes in unorganized state. Our idea is used the concept of sensor –actor network

III .SYSTEM MODEL

In the WSA, we are assumed that we are using set of actors and sensor node which deployed in large geographical area with range R.

Consider the system model as shown below figure 1 in which we are considering the S is sensor node and A is actor node. Each actor node is responsible for activation and deactivate o f sensor node. We are using set $X=\{S1,S2,S3,\dots\dots\dots Sn\}$, $Y=\{A1,A2,A3,\dots\dots\dots An\}$ and BS is base station.

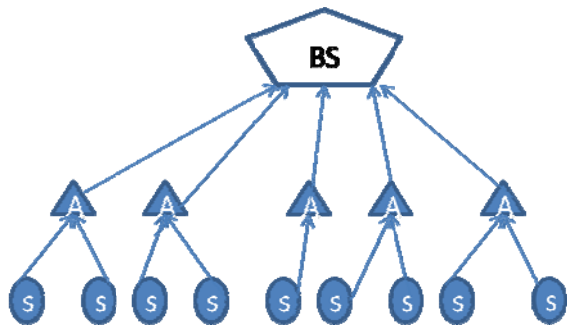


Figure 1: system model

As shown in figure 1 each sensor node having sensing capabilities. The data collected by sensor nodes forwarded to actor nodes, then set of actor node sent data to base station. The actors in the network will controls set of sensor nodes, it would intimates them to deactivate during their non busy hours.

TABLE I
SYSTEM PARAMETERS

| Notations | parameters |
|-----------|------------------------------------|
| R | Communication range of sensor node |
| X | Set of sensor node |
| Y | Set of actor node |
| BS | Base station |
| S | Sensor |
| A | Actor |

IV.ALGORITHM

In this section, we proposed the algorithm in which set of Actor =X, set of sensor node =Y and range =R is considered. PLT protocol Algorithm

1. Each actor node P controls sleep and awake mode of sensor node Q.
 2. If any event occurred then actor tells sensor node
 - a) Go to active mode
 - b) Collects the data
 - c) Sends it to Actor node
 - d) Again go to passive mode
 Else
 If no event occurred then
 Go to sleep mode for periodically.
 3. Actor collects data and sends data to BS.
- Basically our idea used the proposed protocol for better utilize the energy consumed by sensor nodes as well as to the end to end delay between the sensor nodes. In this method every sensors and actors has regular sleep periods while transmission, so the energy lost is reduced.

V PERFORMANCE ANALYSIS

In this section, the performance of PLT protocol is discussed and experimentally tested. The algorithm was simulated on

Ns2 .In the simulation, we are considering N=50 sensor nodes.

Consider the first experiment for proposed protocol .In the simulation we are using number of nodes =50, Simulation parameters are mentioned as follows:

TABLE II
SIMULATION PARAMETERS

| Parameters | Value |
|-----------------|-----------|
| Packet Size | 1490 |
| Simulation area | 500m×500m |
| No of nodes | 50 |
| Traffic source | CBR |
| Simulation Time | 1500 |

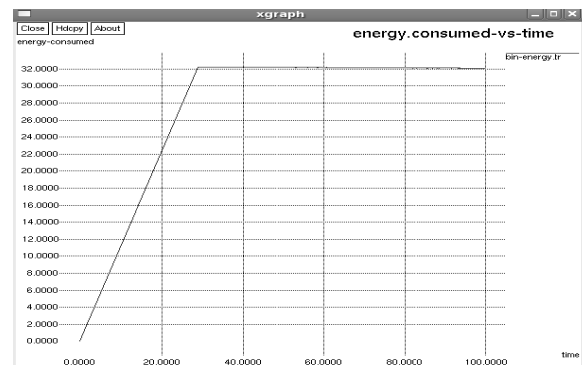


Figure 2:Graph for Energy-consumed vs. time

Figure 2 shows the graph of energy consumed by sensor nodes in wireless SAN for PLT protocol

Here in the simulation, we are using the parameters energy consumed by sensor nodes in wireless sensor – actor nodes verse the time parameter.

Figure 3 Shows the graph of delay by sensor nodes in wireless SAN for PLT protocol

Here in the simulation, we are using the parameters end to end delay by sensor nodes in wireless sensor –actor nodes verses the time parameter.

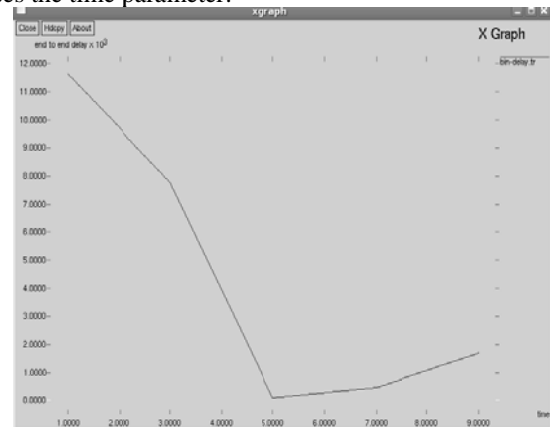


Figure 3: Graph for delay vs. time

VI CONCLUSION

In this paper, we proposed the PLT protocol for wireless sensor –actor network for real life applications. From the physical observation sensor nodes collect the information which is forwarded to actor node. Finally an actor node sends the data to base station. Here we used set of actor which controls group of sensor nodes in which sensor nodes active mode and deactivate mode of all sensor nodes that is already predefined in algorithm. Each actor as well as sensor node goes in deactivate mode for fixed amount of time. So energy consumed and end to end delay is reduced between the sensor nodes. As a future work we also aim to propose the actor – sensor nodes in which actors control sensor nodes active mode and deactivate mode for random amount of time in their non –busy hours.

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