

A Theoretical Approach to Propose an Alternative Method for Improving the Utility of Cluster Heads by Using Nano Sensors in Wireless Sensor Networks

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ABSTRACT

The present paper aims to improve the utility of the sensor nodes specially the CHs used in WSNs. In general, Sensor network consists of tiny sensors with general purpose computing elements in order to monitor physical or environmental conditions. As, WSNs have little power their CHs are declared as dead after selecting it once for the operation. This results in wastage of the partial energy remaining in them. So, avoiding this wastage is necessary. One such possible solution is suggested here in this paper, The aim of this work is to propose nanosensors designed as per the average energy required to carry out the operation. Thenano sensors assures reduced cost, reduced power consumption and larger exposure to environment. It is also proposed to use a Back Up unit (Power unit), where the discharged nanosensors will get recharged and then come back to the operation cycle. Asnanosensors contains nanocell, so recharge time of their batteries will also be less as compared to the normal sensors. This method is proposed by deeply analyzing the existing WSNs protocols and is purely a theoretical approach to make the sensing process efficient and cost effective. It is however assumed that if it is being implemented practically, It would yield better results for sure and boost up the existing system.

Key Words: (CHs) Cluster heads; Nano Sensors; Partial Energy; Protocol; Wireless Sensor Networks

1. INTRODUCTION

A particle which is able to sense any properties like physical property or other properties related to environment viz Temperature, Air Quality and similar ones, basically at nano scale level is known as nano sensors. It detects different events in nanoscale. It is also useful in the process of communication where it has all attributes one sensor needs to have, Some of which mainly includes Sensing unit, Actuation unit, Power unit, Storage unit and Communication unit. Wireless Sensor Networks refers to the spatially dispersed and dedicated sensors for monitoring and recording



the physical conditions of environment and organizing the collected data at central location. WSNs divides cluster each having a co ordinating node known as cluster head which is responsible for collecting data from other sensor nodes and send it to the sink base station, One node will be termed as an ideal cluster head, if it possess highest residual energy, maximum near to other sensors for coordination and at least distance from the base station.

2. PROBLEM STATEMENT

The known Protocols of WSNs arranges the nodes in the network into small clusters and chooses one of them as the cluster-head. Node first senses its target and then sends the relevant information to its cluster-head. Then the cluster head aggregates and compresses the information received from all the nodes and sends it to the base station. The nodes chosen as the cluster head drains out more energy as compared to the other nodes as it is required to send data to the base station which may be far located. The cluster head is declared as dead node once the operation cycle ends irrespective of seeing the residual energy it has, which results in the wastage of energy. The other problem is that using normal sensors provides lesser exposure to environment for every nodes. The operation is carried on by the following two phases.

1. Set Up Phase
2. Steady Phase

In the setup phase, the clusters are formed and a cluster-head (CH) is chosen for each cluster. While in the steady phase, data is sensed and sent to the central base station. The steady phase is longer than the setup phase. This is done in order to minimize the overhead cost.

Authors whose paper are taken in reference here had tried to resolve few of these issues uniquely, but there is need of resolving all issues at once. By analyzing work of a number of simulations by the authors, it was found that only few of the total number of nodes needs to act as the cluster-heads. So, in order to resolve this a possible theoretical alternative is proposed here by analyzing work of other authors and the known data collected and related to the WSNs.

3. PROPOSED SOLUTION

Here, Through this paper a possible alternative to resolve the concerned issue has been tried by proposing a suitable algorithm in addition with the reference algorithm as follows;

Algorithm

ROUND 1: /** As per reference papers and is common part */

1. For the first round all the sensor node generates a random number between 0 and 1 and if it is equal to $T(n)$, then elected as cluster head.

2. CH (CLUSTER HEADS) broadcasts the advertisement.

3. Sensing and reporting totally based on the transmission mode.

ROUND2: /** Alternative Solution Proposed */

4. For every next round, it has to check

If energy of cluster-head < threshold

Then, bring it to the power unit for charging it again

Also, Consider the other node for cluster head formation

Or,

If energy of cluster-head > threshold

Consider it again for the operation and give priority to it, then to the node having energy = Threshold

Or a previous recharged node can be taken into consideration if it is also there, and as its being fully charged, it will be given highest priority amongst all.

5. Election of the cluster head from above as per FCFS (First Come First Serve) or higher priority node if it is also there.

6. CH broadcasts the advertisement.

7. Round Completed, Go to 1. and Repeat the same for all upcoming rounds.



Description

- **Event No. 1:** When energy level of a node is below a threshold, it turns all its sons to SLEEP and sends a report to the base. When the base gets the report, it performs the processing phase with dead node are brought to the power unit for recharging and other nodes will be assigned tasks to become CH. . /** As per reference papers and alternative proposed **//
- **Event No. 2:** After an interval (long period: hours or days), nodes require their sons to send their ID (small size message) to them → They can detect dead node IDs to manipulate which node is at which stage i.e whether the node is in queue to become CH, whether the node is serving as a CH or whether the node is carrying out the operation as a normal node just by collecting data from environment and sending it to its cluster head. . /** Alternative Proposed **//
- **Event No. 3:** When a node changes position, it automatically turns to recharging mode → Become event No. 2. . /** Alternative Proposed **//

4.RESULT AND DISCUSSIONS

Through this proposed model the utility of the sensor nodes of WSNs gets improved as by using nano sensors, One can get many advantages like proper exposure to the environment to perform various sensing activities, Increase in no. of sensing nodes, Lower power consumption and full power utilization, Lower cost of the Set Up, Adequate and easy configuration and implementation of the network attributes.

5.CONCLUSION

This work is totally a theoretical approach and is suggested after analyzing the existing WSNs protocols through the reference papers and other data available till now. It has been tried by mentioning the effort of other authors whatsoever type is of throughout the paper at different places inside the paper and in reference section as well as much as possible. It is believed that if this model is practically implemented it can yield better results for sure.

6.ACKNOWLEDGEMENT

I would like to extend gratitude to the authors whose paper, I have taken here into consideration as a reference to dig deep into the problem and to propose this alternative solution.

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