International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 03 Issue: 06 | June-2016 www.irjet.net p-ISSN: 2395-0072

DESIGN AND SIMULATION OF AN INTELLIGENT SYSTEM PROTOCOL FOR WIRELESS SENSOR NETWORKS

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Abstract- ***A wireless sensor Network is a very large collection of sensor nodes which organized into different form like tree, mesh etc. This sensor nodes are work on the power source i.e. battery which is essential for its communication. To save the power of the network we used the scheduling technique with WSN to increase the life of the network. In sleep scheduling most of the nodes are put into sleep mode to increase the lifetime of the network. sleep scheduling is very important to become a network more efficient and flexible. Main aim of sleep scheduling algorithm is to live the network for long period of time. The different technique is used with the sleep scheduling like routing and tree based algorithm which is really improve the performance of the network. In the tree based network sink node is used with other sensor node with sleep scheduling but the sink having the unlimited energy supply which is always in active mode. In tree network sleep scheduling is apply with only with the nodes other than sink. In this research we are study the different types of sleep scheduling techniques like Energy-efficient Scheduling, Energy Efficient TDMA Sleep Scheduling, Balanced-energy Sleep Scheduling, Optimal Sleep Scheduling, and Dynamic Sleep Scheduling and methods used in it which work with the wireless sensor network for saving the energy of the sensor nodes and prolong the life of the network. Each technique of sleep scheduling is used for improving the efficiency of the network and every technique having some limitation while prolong the of the network.***

Key words: Wireless Sensor Networks, design, sleep scheduling like routing, knowledge-based routing, soft computing.

1 INTRODUCTION

WSN could be a system of distributed autonomous devices referred to as sensors or nodes that are hand in glove sensing, computing and wirelessly act with one another. Nodes in WSN are severely unnatural in their power, memory and computations. The battery battery-powered nature of sensing elements vulnerable the sensor life time and thence the WSN life time. Size of the network will be flexibly modification by adding or removing nodes and this can erratically modification the topological construction of the network. The most challenges in WSN are battery capability, information measure and computing power. so as to increase network life time we

want to preserve the number of power and to conserve the network energy [1]. Hence, routing and bunch algorithms applied to provide long-range and large-scale WSNs communications. Routing in WSN is disagree conventional routing in fastened networks. Choosing the shortest path between supply and sink isn't invariably mean best routing in WSNs. The scarce power in sensors challenges the routing protocol in WSNs [2]. thus an influence awareness primarily based routing algorithms ought to be introduced to preserve WSN power and thence extend the network life time. As a result of WSNs constrains and limitations, style of routing protocols for WSNs is difficult. Classical WSN routing protocols are categorized to 3 main categories: flat-based routing, hierarchical-based routing and location-based routing counting on the network structure [3]. To beat WSN challenges, the intelligence and suppleness of soppy computing paradigms in process the paradox and uncertainty of the information in complicated atmosphere has attract researches` attentions to the thought of using embedded soft computing strategies in WSN once preparation. The characteristics of soppy computing show nice analogy and compatibility in wireless sensing element networks particularly in power management approaches, self-decision creating techniques; knowledge-based routing and nodes process

2. RELATED WORK

As wireless sensor network (WSN) is recently considered as one of the most important telecommunication technologies that proves its compatibility and reliability in many applications disciplines. Based on references [4] WSNs uniquely have the following distinctive characteristics:

· **Dense self-deployment:** WSN is a huge distributed computational system. Large number of sensors are scattered and densely randomly deployed in the network environment. Sensors are configured autonomously as each sensor independently manages its self communication in the network [5].

· **Limited processing and storage:** Sensor nodes are small battery powered autonomous physical devices that highly limited in, computational capabilities and storage capacity.

· **Limited energy resources:** Due to the tough nature of WSN applications environment and the fact that sensor nodes are battery powered devices, it is usually hard to change or recharge theses batteries [6].
· **Sensor heterogeneity:** Since sensor nodes existence is not guaranteed in the WSN lifetime, unreliable and inconsistent sensor nodes will prone due to physical damages or failures while harsh deployment [7].
· **Data redundancy:** Data can be sent differently by more than one node to central node due to the need of collaboration and communication of sensor nodes as well as the physical nature of the sensor nodes [8].
· **Application centric:** As it is always hard to change or modify in the wireless sensor network, the network is usually designed and deployed for a specific application. This mainly affects the design requirements, network size, energy consumption and routing constrains of network [9].
· **Broadcast communication:** Sensors in WSN usually depend on exchanging sensed data between multiple sensor nodes and particular sink node using different flooding routing techniques [10].
· **Topological inconstancy:** Due to power scarcity in sensor nodes as well as the harsh environment, Network topology will usually suffer frequent changes such as connection failures, node death, adding new node, energy consumption or channel fading [11].
· **Limited transmission range:** The limited physical characteristic of sensor nodes are usually limited strictly the network capabilities and affect the coverage range and Communication quality.
· **Network size, cost, resources:** WSN size mainly depends on the size and coverage of geographical area of the deployed network for a specific application. The number of sensor nodes varies to thousands and even more. Size of WSN mainly affects the required nodes number, cost, routing techniques and connection technology [12]. This also will directly affect the network scalability and feasibility.
· **Network topology:** One of the main aspects in the WSN design that affects network Capacity, complexity, delay and routing. The size of the network and the area of interest determine the network topology. WSN topology is a dynamic topology that may be simple with single or few numbers in direct communication hops between the nodes or complex with multi-hop complex topological architecture [13].
· **Power consumption:** The physical nature of the sensor nodes constrained it with very limited energy resources. Sensors mainly depend on batteries as power suppliers. According to the harsh environment for WSN, it's almost hard or even impossible to Change or replace these batteries. The overall network life time is a cumulative of its Sensors life [14]. Therefore, preserving network life urges researches to focus on the Development of an efficient power management approaches and routing protocols that manage and control the consumption of sensors` energy.
· **Coverage range:** In order to preserve the network consumed energy and to increase its productivity and reliability, network coverage range should be selectively determined. Small transmission range between nodes will decrease the amount of needed power for transmission between directly connected nodes. The huge coverage areas usually cased an eavesdropping.
· **Quality of service:** The area of WSN application restrains the provided quality of service in WSN. For real time applications, sensed data should be delivered as soon as it is sensed. The frequent changes in the sensed data are highly effected with the time factor. Reliability and usability usually depend on QoS [15].
· **Simplicity:** The heterogeneous and autonomous nature of sensors in WSN as well as the complex topological nature requires simple and convenient communication, processing and power consumption models in order to ease and increase the efficient utilization of the network.
· **Fault tolerance:** The ability to preserve the network performance and functionality even after individual node failure or congestion in some of parts of the network. The Adaptability of WSN can be achieved by using efficient routing protocols, power Management approaches and communication establishments [16].

3. Objectives.

The protocol has a different priority in intelligent efficient as reducing energy consumption in nodes, prolonging lifetime of the whole network, increasing system reliability, increasing the load balance of the network.

4. An Intelligent Routing Protocol Algorithm:

We live the performance of our projected protocol is activity comparative simulations. We have a tendency to generate a device field of 100m× 100m size. during this field we have a tendency to arbitrarily drop nǫ (100) device nodes with at the start energy[17].
In the active state, a node might sight targets inside its sensing radius r, and communicate with different nodes inside its communication radius R. assume that each node is attentive to its own location and is ready to see a target position at detection[18]. Additionally, assume that the detector nodes are domestically time synchronized employing a protocol. In fact, as long because the distance between to focus on is quite twofold of the communication radius of nodes, the sleep programming actions triggered by them won't overlap [19].

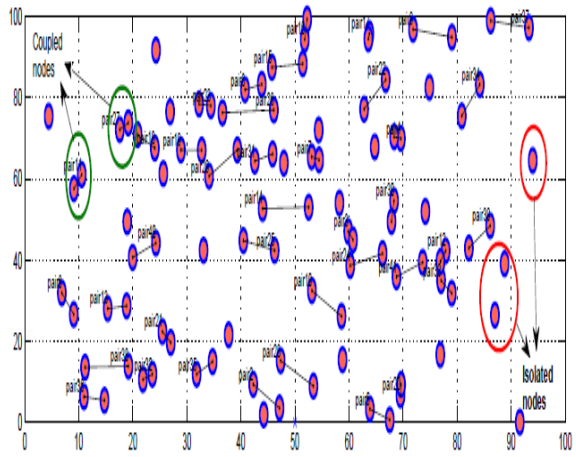

Fig.1. Advance Network Coupling Model

Target prediction: The planned target prediction theme consists of 3 steps: current state calculation, kinematics-primarily based} prediction and likelihood based prediction [20]. When scheming this state, the mechanics based mostly prediction step calculates the expected displacement from this location inside successive sleep delay, and therefore the likelihood models for scalar displacement and therefore the derivation.

Awakened node reduction: the quantity of woke up nodes is reduced with 2 efforts: dominant the scope of woke up regions, Associate for a set of nodes in an woke up region.

Active time management: supported the probabilistic models that are established with target prediction, schedules Associate in Nursing woke up node to move, in order that the likelihood that it detects to focus on is near one [21].

7. RESULT

Average packets sent to BS are assessed through extensive simulations. We analysis the performance of Energy Efficient Sleep Awake Aware Routing Protocol with 3000 rounds and 100 nodes. Fig.6.1 shows the Advance Network Coupling Model with 3000 rounds. Fig. 8 demonstrates the Dead Nodes for 100m × 100m Network with 100 nodes with 3000 rounds. Fig. 9 depicts the Alive Nodes for 100m × 100m Network with 100 nodes with 3000 rounds. Fig. 10 shows the Packet to BS Nodes for 100m × 100m Network with 100 nodes with 3000round. Fig. 11 depicts the Count of Cluster Head per round for 100m × 100m Network with 100 nodes with 3000 round.

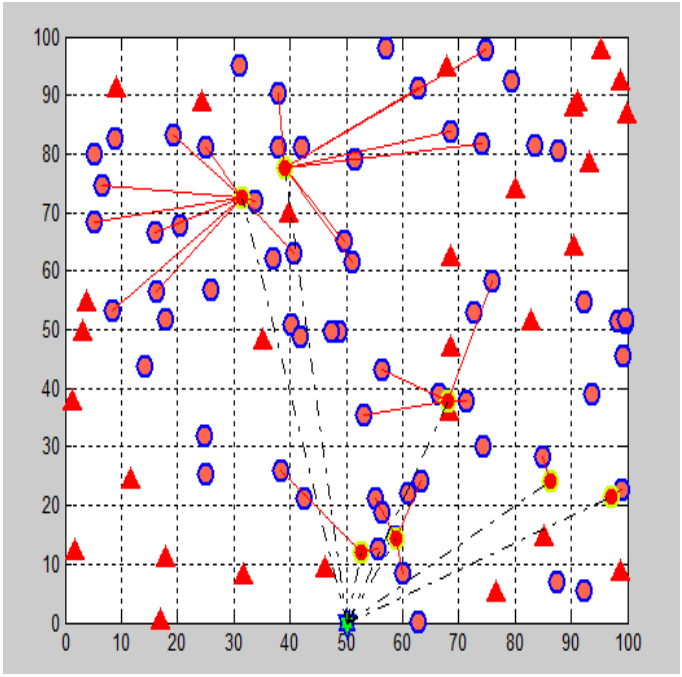

Fig.2. Advance Network Coupling Model with 3000 rounds

8. CONCLUSION

In this paper, This observation depicts that in Energy Efficient Sleep Awake Aware energy dissipation is properly distributed among all the nodes in the network which in result increases network lifetime. efficient CHs selection algorithm helps it in better and constant data rate transmission to BS. Although has sleep-awake policy for nodes and less number of data is transmitted to BS. Other main reason of higher data rate achievement is longer network life time. Main focus was to enhance cluster-head selection process. CHs ale selected on the basis of remaining energy. In nodes also switches between sleep and active modes in order to minimize energy consumption. In our proposed strategy, stability period of network and life time has been optimized. Simulation results shows that the number of alive nodes varies as network evolves and first node dies around 1800 round. Result also shows that in instable region starts very later as compare to other protocols. Results show that in nodes die at a constant rate. a novel sleep scheduling method introduced which is based on the level-by-level offset schedule, to achieve low broadcasting delay in a large scale WSN.

10. FUTURE WORK.

The concept of characteristically pairing among sensor nodes energy utilization is optimized. Simulation the network parameters and can be a useful approach for WSNs.

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