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Comparison of two Algorithms used to improve the energy of Low energy Nodes in WSN

Preeti Dahiya
Student, M.Tech
PDM College of Engg. for Women,
B'Garh,
Haryana – India

Abstract: ***A wireless sensor network is composed of resource constrained sensor nodes and also some resourced base stations. All nodes in a network communicate with each other via wireless communication. Moreover, the energy required to transmit a message is about twice as great as the energy needed to receive the same message. The energy constraint sensor nodes in sensor networks operate on limited power resources, so it is very important to improve energy efficiency and reduce power consumption. Here, an energy efficient algorithm that is intended to provide a reliable transmission environment with low energy consumption is compared with another algorithm. This energy-efficient algorithm efficiently utilizes the energy that is available and the received signal strength of the nodes to identify the best possible route to the destination. Simulation results are used to show that the energy efficient algorithm achieves much higher performance than the classical routing.***

Keywords: BIS wireless sensor network, power consumption, energy-efficient algorithm.

I. INTRODUCTION

A sensor network is a deployment of massive numbers of small, inexpensive, self-powered devices that can sense, compute, and communicate with other devices for the purpose of gathering local information to make global decisions about a physical environment" [1]. Every sensor node is equipped with a transducer, microcomputer, transceiver and a power source. The transducer generates electrical signals based on sensed physical effects and phenomena. The microcomputer processes and stores the sensor output. The transceiver, which can be hard-wired or wireless, receives commands from a central computer and transmits data to that computer. The power of each sensor node is derived from the electric utility or from a battery [2]. WSNs [3] may consist of many different types of sensors such as seismic, magnetic, thermal, visual, infrared, acoustic and radar, capable to monitor a wide variety of ambient conditions.

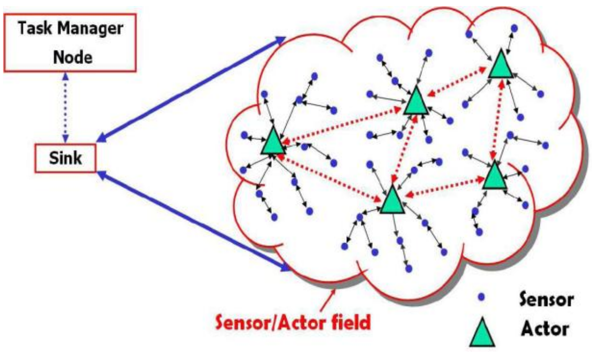

Figure 1. Network Model Of Wireless Sensor Network

II. EXISTING WORK

The key challenge in sensor networks is to maximize the lifetime of sensor nodes due to the fact that it is not feasible to replace the batteries of thousands of sensor nodes. That's why, computational operations of nodes and communication protocols must be made as energy efficient as possible. Among these protocols data transmission protocols have much more important in terms of energy, since the energy required for data transmission takes 70 % of the total energy consumption of a wireless sensor network [4]. Area coverage and data aggregation [5] techniques can greatly help conserve the scarce energy resources by eliminating data redundancy and minimizing the number of data transmissions. In this paper, we are going to discuss an energy efficient algorithm for node replacement.

```
{
1.    Find all the nodes that occur in path
      between source and the
      destination. These nodes are
      represented by Node List (1 to N).
2.    for i=1 to N
3.    {
4.    If ( Packet Loss Node List (i) ) >
      MAX_THRESHOLD_VALUE )
5.    {
6.    then Packet Loss Node = low energy
      node.
7.    }
}}
```

Existing Algorithm

III. SIMULATION OF EXISTING WORK

Simulation is done using NS2 (Network Simulator). Simulation of existing work is performed over 50 nodes. Nodes in the network are in random position. In this scenario there is a source node that will broadcast the data and all the neighbouring nodes will do the same after receiving it. When a particular node receives a fixed amount of data, it changes its color to show the energy loss. Some nodes became red due to receiving more broadcast and so more energy loss. Many nodes are in the critical situation. As the energy of the nodes decreases, packet dropping starts.

Figure 2. Number of packets lost over time

IV. PROPOSED ALGORITHM

The proposed work is divided into the following phases:

• Locating the Low Energy Node.

• Defining it in the list of Block Nodes/Critical Nodes.

- Find alternate node such that efficiency ofthe systemm should not degrade and transfer the packets of low energy node through this node.

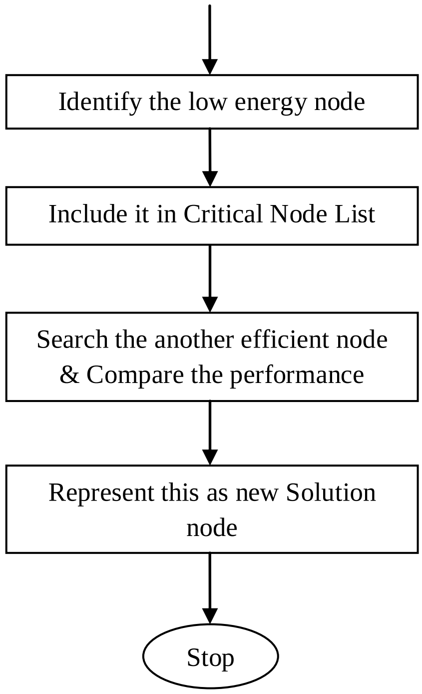

Figure 3. Flow chart of proposed algorithm

```
Main Algorithm(S,D)

/*S is the source node and D is the destination
node, the network defined is dynamic*/

{

1.      Find all the nodes that occur in path
        between source and the destination. These
        nodes are representing by NodeList(1 to N
        ).
    2.      for i=1 to N
    3.      {
    4.      if(PacketLoss(NodeList(i))>
            MAX_THRESHOLD_VALUE)
    5.      {
    6.      find the list of compromising nodes
            for Node NodeList(i). This list is
            represented by Compromising(1 to K)
    7.      Select any of the compromising node
            from this list and use it in place of
            node dropping the data packet
            NodeList(i)=Rand(Compromising,1,k)

    8.      if K= 0  /* if there is no compromising
            node*/
    9.      {
    10.     NodeList(i)=Include New Node
    11.     }}}
}
```

Proposed Algorithm

V. Simulation of Proposed Algorithm

The low energy nodes are replaced with high energy nodes in the network.

Figure 4. Number of packets lost over time

VI. Comparison of Existing work and Proposed Algorithm

The comparison of simulation results of existing work and proposed work show that the number packets lost have been decreased by a sufficient amount in the proposed work.

Figure 5. Number of packets lost over time

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Author(s) Profile

Preeti Dahiya, received B.Tech Degree in Information Technology from PDM College of Engineering, Bahadurgarh, MDU, Rohtak, Haryana, India and M.Tech in Computer Science from PDM College of Engineering for Women, Bahadurgarh, MDU, Rohtak, Haryana, India in 2011 & 2013 respectively.