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Hindrance Awareness in WSN

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***Abstract* - Recently, there has been a rapid growth in wireless communication technique. Inexpensive and low power wireless micro sensors are designed, deployed and widely used in wireless and mobile environment. Hindrance is one of the most common problems faced in the wireless networks now days. The data transmission in such network is much dependent on energy of each node. Over the time as the data transmission is performed over a node the energy of that node decreases gradually and the node start dropping the data packets. In this write-up we are working on same issue. We are comparing the nodes respective to some threshold value. If a node will lose more data packets then this threshold value the node will be represented as a block node and the data will be transferred from some other compromising node. The same solution is presented in this paper. The complete solution is defined in terms of two phases. In first phase we have to find the node that is responsible for packet loss over the network. Another phase is the development of algorithm or approach that will eliminate the node dynamically and get the reliable data transmission over the network.**

***Keywords* - WSN, Congestion free routing, Low energy node, Ad hoc network**

I. INTRODUCTION

Sensor network is made up of various detection stations called sensor nodes, each of which is small, lightweight and portable. The entire sensor node contains transducer, transceiver, microcomputer, and power source. The transducer generates electrical signals based on sensed physical effects and phenomena. The task of microcomputer is to process and store the outputs of sensor. The transceiver, that can be hard-wired, receives different commands from a central computer and transmits all the data to destined computer. The power for each sensor node is derived from the electric utility or from a battery [1]

A wireless sensor network (Fig. 1) as shown in the figure is a class of specialized transducers having a communications infrastructure used to monitor and record the conditions at different locations. Commonly monitored parameters are temperature, humidity, pressure, wind direction and speed, illumination intensity, vibration intensity, sound intensity, power-line voltage, chemical concentrations, pollutant levels and vital body functions.

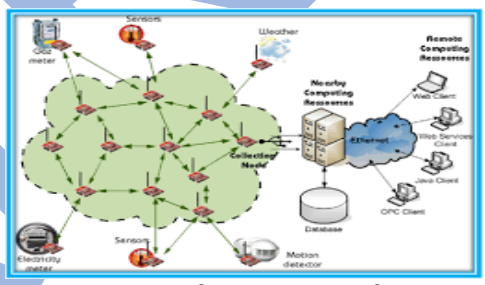

Fig .1 Wireless sensor networks

While consideration one of the biggest problems of sensor networks is consumption of power that gets affected by the communication between different nodes. To solve this issue, aggregation points are recommended to the network. This reduces the total number of messages exchanged between nodes and saves some energy [12]. Generally, the aggregation points are the regular nodes which receive data from neighboring nodes, perform some type of processing, and then forward the data after filtering to the next hop. Similar to aggregation points is clustering. Sensor hosts are combined into clusters, each cluster having a "cluster head" as the leader. The communication inside a cluster has to pass by the cluster head, which then is forwarded to a neighboring cluster head until it reaches its destination, the base station. Another method for saving energy is setting the nodes to go idle (into sleep mode) if they are not needed and wake up when required. . Now, the challenge is to find a pattern at which energy consumption in a manner so as to be same for all the nodes in the network.

Energy conservation in WSN is critical and has been addressed by substantial research. Generally, energy conservation is dealt with on five different levels:

1. Efficient scheduling of sensor states to alternate between sleep and active modes;
2. Energy-efficient routing, clustering, and data aggregation;
3. Efficient control of transmission power to ensure an optimal trade-off between energy consumption and connectivity;

4. Data compression (source coding) to reduce the amount of uselessly transmitted data;
5. Efficient channel access and packet retransmission protocols on the Data Link Layer.

A. PACKET LOSS DUE TO CONGESTION

There are mainly two causes for congestion in WSN. The first is due to packet arrival rate exceeding packet service rate. This mostly occurs at sensor hosts near to the sink because they generally have combined upstream relay traffic. The second is influenced by the link level performance such as contention, interference and bit error. This type of congestion occurs on the link. Congestion in WSN has a direct impact on energy efficiency and application's quality of services. First, the congestion can cause buffer overflow and furthermore lead to longer queuing time and more packet loss. Not only can the packet loss degrade reliability and application's quality of services, but also wastes limited energy and lowers energy-efficiency. Second, the congestion can still degrade link utilization. Third, the link-level congestion usually results in transmission collisions if contention-based link protocols, for example CSMA (Carrier Sense Multiple Access), are used to share radio resources. The collision in transmission results in increase packet service time and wastage of additional energy Therefore congestion in WSN must be efficiently controlled, either to avoid it or mitigate it. Usually there are three mechanisms that can deal with this problem: congestion detection, congestion notification, and rate adjustment.

II. LITERATURE SURVEY

Paper [1] provides details information about networking and applications of the Wireless Sensor Networks. They represent a new generation of real-time embedded systems with significantly different communication constraints from the traditional networked systems.

Paper [2] discuss the introduction of wireless sensor network, how it works, WSN nodes architecture, WSN architecture, power consideration WSN and applications of wireless sensor network.

In paper [3] we have studied the WSN hardware platforms and secondly about the software platform. Then we study the details information about networking and applications of the Wireless Sensor Networks. At last, idea of the future application of the wireless sensor networks is given.

In paper [4] a routing-aware predictive congestion control (RPCC) yet decentralized scheme for WSN is presented that uses a combination of a hop by hop congestion control mechanism to maintain desired level of buffer occupancy, and a dynamic routing scheme that works in concert with the congestion control mechanism to forward the packets through less congested nodes. We study adaptive approach that restricts the incoming traffic thus preventing buffer overflow while maintaining the rate through an adaptive backoff interval selection scheme.

Paper [5] investigates the load balancing in sensor nodes and wireless link based on the performance of wireless sensor networks. The dynamic scheme of data collection and forwarding scheduling between grid-quorum is derived. Leveraging the property of dissimilarity distribution, a method to quantitatively evaluate the benefits of load balancing is presented. It gives Dynamic Load Balancing of Overlay-based WSN (DLBO).

Paper [6] give the hole detection algorithm and also give procedure to identify nodes near the boundary of the sensor field as well as near hole boundaries.

In Paper [7] we studied the problem of determining the node locations in wireless location network and brings forward a new locating algorithm of nodes, information, we can determine what and how WSN nodes are which requires some fake nodes that know themselves position information in advance, then realizes positioning node by clock locating algorithms. It can be used for wireless sensors network application.

Paper [8] discusses two points. First, the packet losses suffered by different receivers in a wireless broadcast are dependent in both indoor and outdoor environments. In other words, different receivers are likely to experience simultaneous losses. Second, manufacturing differences of wireless sensor nodes can be significant.

Paper [9] Congestion in wireless sensor networks (WSN) may lead to packet losses or delayed delivery of important information rendering the WSN-based monitoring or control system useless. In this paper a routing-aware predictive congestion control (RPCC) yet decentralized scheme for WSN is presented that uses a combination of a hop by hop congestion control mechanism to maintain desired level of buffer occupancy, and a dynamic routing scheme that works in concert with the congestion control mechanism to forward the packets through less congested nodes. The given approach restricts the incoming traffic thus preventing buffer overflow while maintaining the rate through an adaptive backoff interval selection scheme.

In Paper[10] authors concentrate on the energy efficient protocols that have been developed for WSNs and classified them in flat, hierarchical, query-based, coherent and non- coherent-based, negotiation-based, location-based, mobile agent-based, multipath-based, QoS-based.

III. PROBLEM DEFINITION

When we work with a large sensor area network with dense sensors , there are some nodes that has to bear the heavy traffic load (Fig. 2), then over the time such sensor goes weak and they start losing the packet. This packet loss is bearable up to some threshold value, but as the packet loss exceed this level it disturb the whole network

and now any kind of data transfer over this node is not reliable. Because of this there is the requirement of some such approach that can resolve this error.

If this node is the center node or some other maximum load nodes, the problem is very critical. It starts losing useful information. So we need to use some approach to overcome this problem.

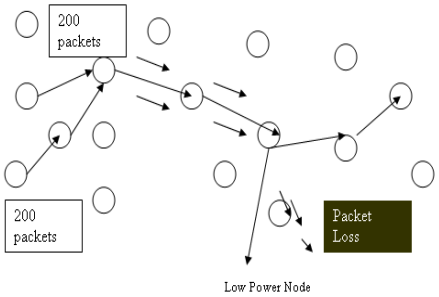

Fig. 2 Heavy traffic load on low energy node

Now the proposed system will solve the problem by using following system:-

1. Identifying the low power nodes, because in sensor area network it is not possible to track all the nodes always
2. Another problem is to find other sensor node such that data of low energy node (weak sensor) pass through this node and efficiency of system should not degrade and we get required output.

IV. PROPOSED SYSTEM

The proposed work is divided in two parts:

1. Locating the Low Energy Node Define it in the list of Block Nodes/Critical Node.
2. Find alternate node such that efficiency of system should not degrade and transfer the packets of low energy node through this node.

In this proposed work we have defined the work respective to the packet loss on each node but still there is requirement of lot of work on such problem. We can enhance our work by including the detection of different kind of attacks on each node. These attacks can include the rushing attack, black hole attack etc. We can also enhance the work respective to the congestion avoidance algorithm.

V. CONCLUSION

The energy efficiency is a very important issue for the networks especially for WSNs which are characterized by limited battery capabilities. The complexity and reliance of corporate operations on WSNs require the use of energy-efficient routing techniques and protocols, which will guarantee the network connectivity and routing of information with the less required energy. the application of the proper routing protocol will increase the network lifetime and at the same time it will ensure the network connectivity and efficient data delivery. In our proposed strategy, the stability period of network and network life span have been optimized.

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