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Extension of Dynamic Fault Detection Correction Routing in Wireless Networks

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***Abstract*— There is the requirement to optimize the communication in sensor network to improve the communication throughput as well as to improve the network life. One of the approach is about to improve the QoS in case of routing operation. In this present work, a session based communication approach is defined to perform the balanced communication over the sensor network. It means, instead of generating the individual path, multiple optimized path will be identified. Each path will be defined with distinct intermediate nodes. Each path will be considered for the specific session of communication so that balanced energy consumption and communication will be performed on all possible intermediate nodes. To generate this N path, the communication between the network will be divided in M regions based on the sensing range analysis. Now from each region an effective distinct node will be selected for the communication. The selection of this node will be done under energy, load and fault ratio analysis. Once these region based multiple paths will be identified, the next work will be defined a session effective scheduling to perform the communication over these multiple paths. The work will be implemented in MATLAB environment. The work is about to improve the network life and to improve the communication throughput**

***Index Terms*— Wireless Sensor Network, NTS, EDC**

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I. INTRODUCTION

Sensing is a technique used to gather information about a physical object or process, including the occurrence of events (i.e., changes in state such as a drop in temperature or pressure). An object performing such a sensing task is called a sensor. For example, the human body is equipped with sensors that are able to capture optical information from the environment (eyes), acoustic information such as sounds (ears), and smells (nose). These are examples of remote sensors, that is, they do not need to touch the monitored object to gather information. From a technical perspective, a sensor is a device that translates parameters or events in the physical world into signals that can be measured and analyzed. Another commonly used term is transducer, which is often used to describe a device that converts energy from one form into another. [1]. An example of the steps performed in a sensing (or data acquisition) task is shown in Figure 1.1. Phenomena in the physical world (often referred to as process, system, or plant) are observed by a sensor device. The resulting electrical signals are often not ready for immediate processing; therefore they pass through a signal conditioning stage. Here, a variety of operations can be applied to the sensor signal to prepare it for further use. For example, signals often require amplification (or attenuation) to change the signal magnitude to better match the range of the following analog-to-digital (ADC) conversion. WSN has being more advantageous in those areas which are hard to reach as these are deployed for the information surroundings.

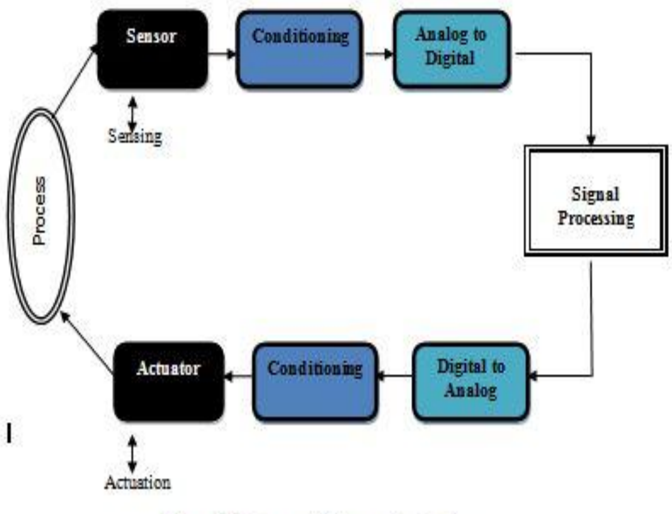

Figure 1.1 Data acquisition and actuation

One major challenge in a WSN is to produce low cost and tiny sensor nodes. There are an increasing number of small companies producing WSN hardware and the commercial situation can be compared to home computing in the 1970s. Many of the nodes are still in the research and development stage, particularly their software [2].

II. RELATED WORK

A. I.F. Akyildiz, W. Su, Y. Sankarasubramaniam, E. Cayirci (2001)* This paper describes the concept of sensor networks which has been made viable by the convergence of micro electro-mechanical systems technology, wireless communications and digital electronics. First, the sensing tasks and the potential sensor networks applications are explored, and a review of factors influencing the design of

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sensor networks is provided. Then, the communication architecture for sensor networks is outlined, and the algorithms and protocols developed for each layer in the literature are explored. Open research issues for the realization of sensor networks are also discussed[2].

*B. Adrian Perrig, Robert Szewczyk, J.D. Tygar, Victorwen And David E. Culler (2002)*Wireless sensor networks will be widely deployed in the near future. While much research has focused on making these networks feasible and useful, security has received little attention. We present a suite of security protocols optimized for sensor networks: SPINS. SPINS has two secure building blocks: SNEP and TESLA. SNEP includes: data con-dentiality, two-party data authentication, and evidence of data freshness. TESLA provides authenticated broadcast for severely resource-constrained environments. We have identi-ed and implemented useful security protocols for sensor networks: authenticated and con-dential communication, and authenticated broadcast.[3]

C. Joohwan Kim, Xiaojun Lin, Ness B. Shroff, Prasun Sinha (200)8 In this paper, we are interested in minimizing the delay and maximizing the lifetime of event-driven wireless sensor networks, for which events occur infrequently. In this paper, we first study how to optimize the anycast forwarding schemes for minimizing the expected packet-delivery delays from the sensor nodes to the sink. Based on this result, we then provide a solution to the joint control problem of how to optimally control the system parameters of the sleep-wake scheduling protocol and the anycast packet-forwarding protocol to maximize the network lifetime, subject to a constraint on the expected end-to-end packet-delivery delay.. This develops an anycast packet-forwarding scheme to reduce the event-reporting delay and to prolong the lifetime of wireless sensor networks employing asynchronous sleep-wake scheduling.[4]

D. Benahmed Khelifal, H. Haffaf , Merabti Madjid, and David Llewellyn-Jones (2009) It is important to have continuous connectivity in a wireless sensor network after it is deployed in a hostile environment. In this paper, we present a method for monitoring, maintaining and repairing the communication network of a dynamic mobile wireless sensor network, so that network connectivity is continuously available and provides fault tolerance. The main advantage of our approach is the ability to anticipate disconnections before they occur. It also reduce the number of monitoring node and assume mechanisms for fault tolerance by auto organization of nodes to increase connectivity[5].

III. METHODOLOGY/PLANNING

1. deploy N sensors randomly over an area
2. select a sender and a receiver
3. The sender will become the master node which will check the validity and authentication of all the nodes. it will decide which nodes are faulty by sending an acknowledgement message to all the nodes
4. now we have a database of all the healthy nodes and all the faulty nodes
5. this will help us to plan our route from sender to receiver
6. Throughout the route, nodes will be constantly checked for faulty behavior. and this checking will be done only in the direction of the receiver so as to get the shortest path
7. Hence, even after faulty nodes in the way, our scenario will get the shortest path from sender to receiver.

Total of 3 scenarios will be implemented

1. the one with no faulty nodes (ideal situation)
2. the one where information will stop when a faulty nodes occur
3. the one where faults will be detected and accordingly shortest path will be made

IV. RESULT AND DISCUSSION

Following are the implementation results for the scenario. we took the scenario for 100 nodes and following result will show the information about that placement.

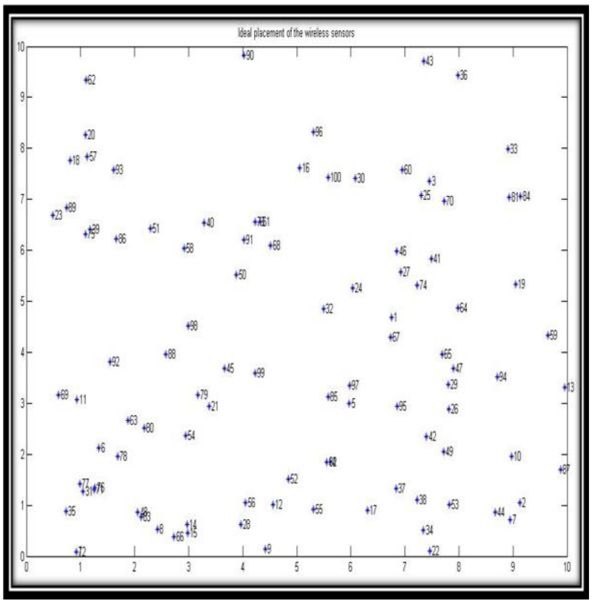

Figure 1.2 Ideal Placement of wireless sensor nodes

The above figure, displays how the sensors are being deployed in an area. Sensors are randomly spread over the area. Each sensor has a sensor ID shown along with it. It will be used to address any sensor throughout the process.

After the deployment of the sensor nodes, the system will ask you to enter 1 sender and 1 receiver. That sender will become the master node and will send acknowledgement request to all the other nodes in the scenario. The nodes which will be able to reply back properly will be the non-faulty nodes, rest all the other nodes will be declared as faulty nodes

In the ideal scenario. Here, we assume that there are no faulty nodes. All the nodes are authentic and fault free. Information is securely transferred from sender to the receiver. We have selected the shortest path from sender to receiver.

The faults that were detected earlier are now into play in this scenario. The information starts from the sender, but as soon as an error occurs, the information flow stops and data is lost.

when the sender finds more than 1 route to the receiver. And even after occurrence of a faulty node, the information

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loss does not intervenes in the route formation. The route is still completed even after a faulty node occurs. This scenario is meant to show the path hopping between sender and receiver. Information can be transferred from more than 1 route also.

In the final scenario. Here, the faults are detected and the route will change accordingly. The system will find the shortest path between sender and receiver despite of fault occurrence. Shown in the figure 1.3.

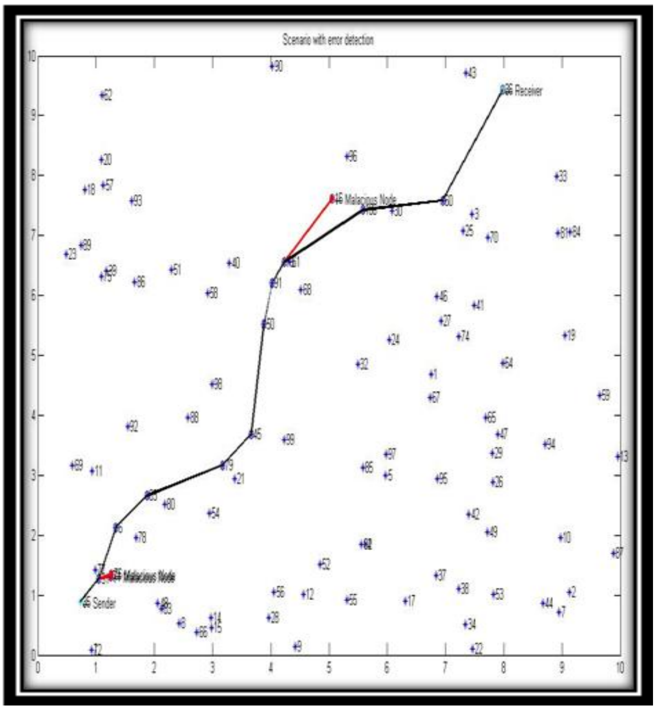

Figure 1.3 Fault detection

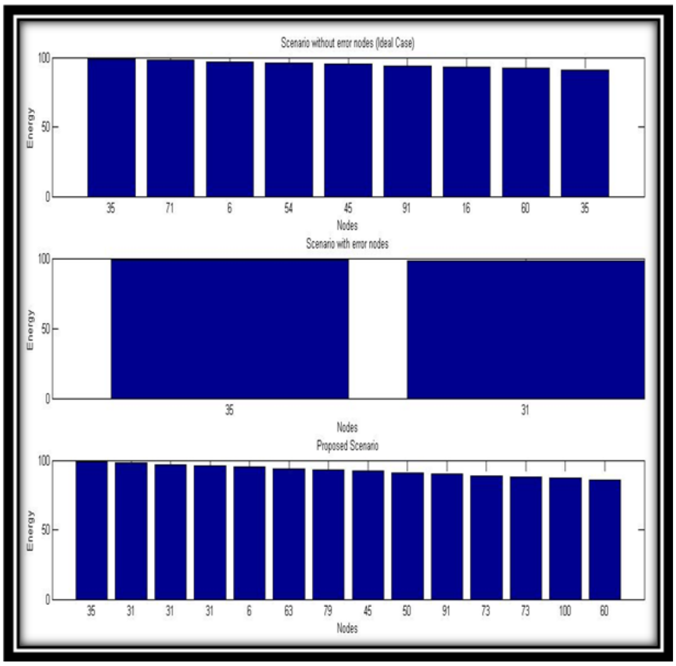

Figure 1.4 Energy Distribution

Figure 1.4 shows how the energy is being depleted in the above scenarios when information is transferred from 1 node to other.

V. Conclusions

In the Distributed Fault Detection (DFD), there are various algorithm to determine the faulty nodes. we assume the case of power failure as there is to recovery techniques in those area. Therefore we have to change the direction of information when transmitted from a Sender Node to the Receiver Node. This chapter has presented a new strategy for power control in WSNs where operational longevity is an issue. As the deployment of Thousand Numbers of Sensor Nodes in Area needs Energy Performance And better Packet Delivery From the Sender to the Receiver The new approach provides a methodology for the Retracing of Path having good Packets with an Energy Efficiency and Accuracy.

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