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Technique for Link Recovery in Underwater Acoustic Networks - A Review

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Abstract—A Wireless sensor Network (WSN) is gathered of countless cost sensor nodes (SNs) to joint screen certain physical or natural phenomena. WSNs is a on the most exciting research areas. It is an emerging technology that shows various applications both for public and military purpose. In order to operate these applications successfully, it is necessary that network must be energy efficient and long running. One of the significant features of SNs is their limited battery power dependent and it is sometimes not feasible to recharge or replace the batteries. Thus there must be best energy efficient routing algorithm to be implemented in every sensor network such that the network lifetime is increased many folds. In this report to reduce bit error rate in heterogeneous type WSN to increase bit error rate in WSN and implement existing & proposed technique. After that, analyze results in terms of bit error rate, throughput and packet loss.

Keywords-Wireless Sensor Network, Fixed Nodes, Stationery Nodes, Energy Consumption

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I. INTRODUCTION

The nodes are gathered in an organized manner into a cooperative network to for a wireless sensor network. The communication between nodes is done through wireless mode. The nodes self-organize themselves after being deployed in an ad hoc manner. The deployment of wireless sensor networks is increasing eventually. There are many low-power multi-functional sensor nodes present in the WSN which operate in the remote locations. The sensor nodes with their properties sense or measure the physical data in those areas where they are kept for monitoring purposes. Sensor nodes have properties such as small size, consumption of low energy, can be operated in high volumetric densities, and are autonomous and adaptive to environmental changes. The sensor nodes have limited battery and so the energy efficiency is a major concern for WSN [1]. The batteries of sensor nodes cannot be replaced as they require much effort. So, new methods were evolved to solve this issue. The static sinks of WSN result in increase in chances of early depletion of the nodes that are present close to the sink as compared to the rest of the nodes. This is known as a hotspot problem. The disruptions in the topology arises due to the node deaths and it also reduces the sensing coverage. Due to all such issues arising in the WSN, for immobile sinks the routing protocols are designed which have to take hold of the load balancing which will result in achieving uniformity in the energy consumption of the whole network. The mobile sinks are introduced in the network which can help in eliminating all such issues from the networks. The mobile sinks also provide load balancing within the networks [2]. The hotspots of the sinks change as per their mobility within the network. If there is any kind of increment in energy drainage near the sink, it will be spread all across the network. Uniform energy consumption is achieved due to the spreading of this energy across the network. This mechanism also results in improving the lifetime of the network. The mobile sinks can easily control the sparse and disconnected networks. Within the static sink case, the sensor data cannot be received from isolated areas which are possible in these cases. This results in improving the overall connectivity of the network [3]. With the help of mobile sink routing protocols, the data can be attained from loosely linked portions as well. There is very less effort required by these systems in comparison to the effort required by the traditional static sink rutting protocols which were costly as well. The number of hops on data routes can also be reduced with the help of sink mobility. The delay-tolerant applications use this type of strategies as they have data aggregation nodes [4]. The data is disseminated by the nodes to the sink only when the distance is very less. This however, results in causing delay within the network [5]

Literature Survey

Sharma, Gaffar.H, et.al, 2012 There are many complication associated matters in underwater sensor network and routing and routing protocols are used for such issues. These networks have different features such as limited bandwidth, high propagation delay, etc. Protocols like task routing protocols operate in underwater sensor network this research paper.

Restricted network problems were also resolved. This paper helps for finding the particular routing protocol for a particular purpose. There are some tough research operations that will be useful for UWSN system. All routing protocols are also been compared and Pros and cons are mentioned in this paper.

G.Divya ,Prakash, et.al, July 2011 This research paper proposed a new protocol named Vector based forwarding (VBF) to fulfill the routing challenges in Underwater Acoustic Networks. Various characteristics of VBF are also mentioned in this paper.

- It is modular, durable and valuable.
- It is expandable in matter of the network size.
- Data forwarding process is used.
- It utilizes the path redundancy.

This paper has forthcoming opportunities and gives various ways in UWSNs for forthcoming analysis as following:
1. MAC protocol is used in VBF simulations.

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2. Survey of constant transmission of data and traffic control issues.

K. Ramesh & K. Somasundaram, et.al, November 2011, this paper initiated, categorized and explained different clustering techniques with significance of cluster head selection strategies. These techniques are then needed as follows

(1) For selecting the cluster heads during each round
(2) After each rotation of the cluster head, clusters are formed.
(3) Cluster heads are distributed throughout the network,
(4) Creating the balanced clusters, the parameters used and
(6) The assistance while highlighting the effect of cluster head selection strategy on the performance of the given schemes is taken into care.

This research papers gave me the solutions about clustering techniques and cluster head selection strategies. It still needs to come up with more accessible, powerful and secure scheme for collecting data in WSN.

Manjula.R.B, et.al, 2011 The significance of oceans is not examined appropriately. Due to the circumferences when disaster occurs, people became more concerned in observing the surroundings and conditions of oceans for technical, commercialized, security, habitat and the army services. Many industries focus on sensor networks. Sensor networks are expensive and can be achieved easily. In this research paper underwater sensor networks are used for various applications like oil spill, nutrition production and transporting.

This research paper also makes aware that the underwater environment is relation with terrestrial radio environment regarding its cost of energy and occurrence of channel propagation. The underwater channel is distinguished by its extensive propagation intervals and diminished frequency dependent. There are some more complications in which they both are different such as restricted bandwidth, restricted battery life, unsuccessful sensors etc. This paper also gives major characteristics and building design of underwater sensor networks, arising exploration problems and informs about the investigators for inspiring the observation and exploring the ocean.

Wahid, Dongkyun, et.al, December 2010 underwater sensor networks are similar to terrestrial sensor networks in numerous methods. The top position of propagation delay and the restricted bandwidth makes terrestrial protocols inappropriate for UWSN. Thus, big attempts have been made for making the efficient protocols including the features of underwater network communication. In this paper a new protocol named state of art is proposed for UWSN. The important routing protocols are taken into account and each protocol was further described in detail.

This protocol is examined, described and focused for UWSN in detail. Chose protocols are categorized depending upon the techniques used for routing. The various categories list the protocols that engage a distinct approach excluding beginning three mechanisms. The specific explanation of the chose protocols contributes in knowing the order of the ongoing research on the routing layer in USWN. The operations of superior protocols from each class is given in the approaching work and approaches are provided to measure and differentiate the achievement of diverse approaches that is engaged in UWSN.

Zheng, Hou, Li, et.al, 2010 This chapter described the energy utilization aspects of wireless sensors and devices, and determines that the power is utilized by the wireless transmitters.

Power management is a system which put off the radio electronic and put the wireless sensors into low power phase at correct time. On the other hand the power control either use the many coding strategies and correspondingly reduce the power consumed in transmission. In this paper author has stated important performance objectives for each category of techniques given and also presented the representative protocols and algorithms in both wireless infrastructure and infrastructure less networks, and discussed their advantages and disadvantages.

From this book chapter, the author has provided the classification of various power management and power control methods and protocols for wireless networks. Though, there is a choice to use them which is based on the environment properties and restrictions and the available hardware devices and their costs. This chapter of the book gives the origin to know and differentiate about the benefits and drawbacks of and analysis on the various power management and control approaches.

Buttyan, Holczer, et.al, 2009 this paper tells that clustering is a beneficial technique used in wireless sensor networks. It helps to manage the adaptive issues and it may expand the energy efficiency of the whole network if combined with in network data gathering. Cluster heads plays a vital role and clustering makes network prone to many attacks. Cluster head node is deactivated by physical shattering and it makes the whole cluster non -active till any issue is established and a new cluster-head is picked. Cluster heads are targeted for attacks and one would make it hard for an opponent to recognize them. Then the opponent try to recognize the cluster head nodes applying various techniques. The author focused on the private cluster head election problem in this research paper and then authors presented a protocol named private cluster head election protocol for the wireless sensor networks which is created in such a way so as to secrete the information of the elected cluster heads from an opponent who keeps an eye on the execution of the protocol.

There are two main contributions in this paper to my knowledge. First, it cleared the doubt in case when the cluster head node is analyzed by an opponent then it adequately pounce the network when the cluster head is damaged. Therefore, a private cluster head election protocol is preferable. Second, it proposed the private cluster head election protocol which is simple and is suitable for clustering techniques. Author also proposed an addition to the primary protocol and displayed how to adjust its variables in such a way that the amount of data a protocol leak in recognizing the cluster head nodes is reduced.

Jiang, et.al, 2008 This paper taught me that Underwater Acoustic Networks (UANs) are unique and can be used for trading, military or meteorological uses. Firstly it introduced the theory of these networks and then it surveyed some current evolution inside the exploration region. Some actual and probable evolution difficulties about these networks is also listed in this paper. For such difficulties some advices and results are mentioned.

It also proposed cross-layer approaches to improve the network efficiency for ground-based wireless networks. A linked representation of distinct network performances is authorized in such process and it can defeat the drawback of the unavailability of sharing information among different layers. Sometimes it becomes very demanding as it needs the awareness over the layers and combination among different areas. In contrast with ground based, UANs distress from much smaller bandwidth, longer propagation delays and poor channel stability. Cross-layer design is a best solution to make efficient utilization of the tremendously restricted resource and to make the network in sub-optimal mode.

II. CONCLUSION

In this work, it is been concluded that underwater acoustic network is the type of sensor network which is deployed under the oceans to sense under water conditions. The whole network is divided into fixed size clusters and cluster heads are selected in each cluster on the basis of distance, energy. In this work, the improvement in the existing scenario is applied which select cluster head using neural networks. This leads to reduction in energy consumption and increase network lifetime. In future, the proposed technique can be further improved to increase network security.

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