International Journal of Technology and Engineering System (IJTES)
Vol 7. No.4 2015 Pp. 415-419
©gopalax Journals, Singapore
available at : www.ijcns.com
ISSN: 0976-1345

SOVEREIGN CONSUMPTION OF SENSORS FOR MAXIMIZING RANGE AND SUREFIRE CONNECTIVITY IN UASN

[1]C.GABRIELLA LEELA RACHE, [2]PRIYADHARSHINE,
[3]S.RAMYA, [4] M.VINOTH KUMAR,
[1,2,3]Dept of IT, [4]AssistantProfessor,
Rajiv Gandhi College of Engg
[1]gabriella.rocking@gmail.com , [2]priyameenu1393@gmail.com ,
[3]sekarramya1994@gmail.com[3] [4]vinothkumar2u@gmail.com

ABSTRACT

Underwater acoustic sensor network (UASNs) has been developed for a set of underwater applications including resource exploration, pollution monitoring, military and homeland security and tactical surveillance. In existing system, an acoustic signal is delayed due to long propagation in protocol design according to that network performance is undermined. The packet transmission time is long which increases the packet collision. The main drawback of the system is that there is minimum area of coverage, and also data transmission speed was very low. In proposed system, the coverage area is maximized and also increases the data transmission speed, in order to speed up the data transmission COPE- MAC (Contention based parallel Reservation Mac) protocol is used. The localization Algorithm is used to analyze the neighbor discovery position. A parallel reservation method is used to speed up the data transmission speed. The system implements Round-Robin scheduling method to schedule the tasks so as to improve the channel efficiency. The experiment results show that COPE-MAC can significantly increase the overall network throughput, and especially suitable for larger network with long distance.

Index Terms - COPE-MAC protocol, localization algorithm, Round-Robin method, parallel reservation method

I .INTRODUCTION

UNDERWATER acoustic sensor networks (UASNs) [1] are the technology that enables various underwater applications, and the interest in UASNs is growing. UASNs consist of underwater sensors (anchored nodes and surface sinks) that perform collaborative monitoring tasks over a three-dimensional (3D) deployment space. The measurements of environmental events are locally monitored by the anchored nodes, and transferred to a surface sink by multi-hops. Both electromagnetic waves and laser waves are not suitable for underwater transmission, and acoustic communication [4] is the typical physical layer technology in UASNs. In particular, various obstacles are distributed in underwater environments: thus, signals are more easily reflected, diffracted, or scattereddduring propagation [4], so probabilistic coverage and connectivity problems are more appropriate for acoustic detection applications. Signal irregularity directly or indirectly affects the performance of network protocols, such as the medium access control (MAC), routing, localization and topology control [1]. Therefore, signal irregularity is a non negligible issue, especially in UASNs. Moreover, the battery power of nodes is limited. Batteries usually cannot be easily replaced underwater, and solar energy is rarely exploited as well [3]. Under water communication is difficult due to factors like multi-path propagation, time variations of the channel, small available bandwidth and strong signal attenuation especially over long ranges. In underwater communication there are low data rates compared to terrestrial communication, since underwater communication uses acoustic waves instead of electromagnetic waves [2]. As a result, another primary aim of UASNs is to reduce energy consumption and increase network lifetime [7]. The node failure is another vital issue in UASNs, and this problem can be solved by increasing the radii of neighboring node or migrating autonomous underwater vehicles (AUVs) [10] to recover the topology. Topology formation and the problems of node mobility and node failure are ignored temporarily. In order to overcome the mobility problems Distributed Radius Determination (DRD) is performed [2]. In addition, hierarchical structure is very suitable for large scale network management, and the election of cluster-heads is the chief process of forming hierarchical topology [1]. The cluster-heads should be selected from all sensors to construct a topology backbone, while ordinary nodes (the nodes can't become cluster-heads) monitor events periodically and turn off the radio when idle [5]. This research explores topology control problem through complex network theory [8], [9] and distinguishes two kinds of cluster-heads to simultaneously preserve probabilistic connectivity and coverage. The scale-free structure is preferred in the topology control problem of UASNs, because in UASNs the upper nodes should bear heavier datarelaying mission, and the characteristic of power law distribution can help to achieve load balancing. However, the scale-free characteristic of UASNs structure has not been exploited adequately for the topology formation. Moreover, the topology control objective in UASNs, especially the probabilistic connectivity and coverage, has not been paid enough attention in most of the existing research. This model embodies most typical characteristics of UASNs, which is large propagation delay, signal irregularity, and rapid energy consumption, increase in coverage area, communication channel efficiency, and collision avoidance.

II . RELATED WORK

In Existing system, they implement a novel remote deployment of acoustic sensors which can maximize the coverage in 3-D while guaranteeing the connectivity among the sensors and a surface sink node to collect data.

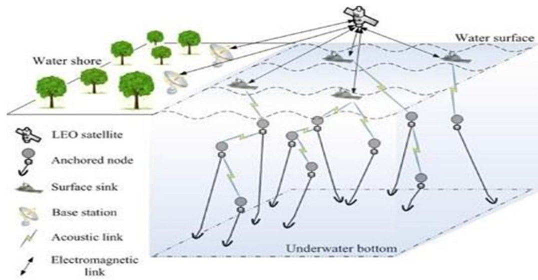

Fig. 1.Architecture of UASN

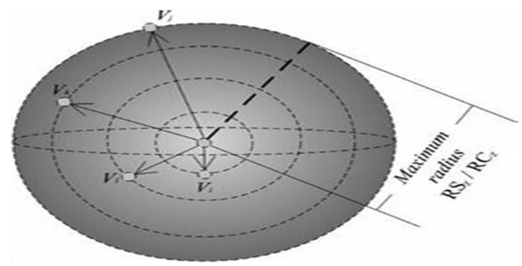

Fig.2.Probablistic Sensing and Communication

To determine a leader dominator by picking the lowest ID node or using a distributed leader election algorithm such as the one. Each dominator computes the depths of its dominator and dominates neighbors based on the location of these nodes. The packet Transmission time is long because of the long preamble in real all nodes in this system depends on Leader (Dominating holding node), In this case Leader node should fails means other cannot send the information to Surface Station. This performs minimizing the coverage overlaps among its dominates and neighbor dominators and preserving the communication links with them. Major challenges in the design of underwater acoustic networks are: Battery power is limited and usually batteries cannot be recharged, also because solar energy cannot be exploited. The available bandwidth is severely limited Channel characteristics, including long and variable propagation delays, multi-path and fading problems. High bit error rates. Underwater sensors are prone to failures because of fouling, corrosion, etc. They cannot able to maximize Sensor node coverage, and also they cannot able to minimize the power failure in 3-D Under Water Acoustic Sensor Network (UWASN).

III . SYSTEM DESIGN

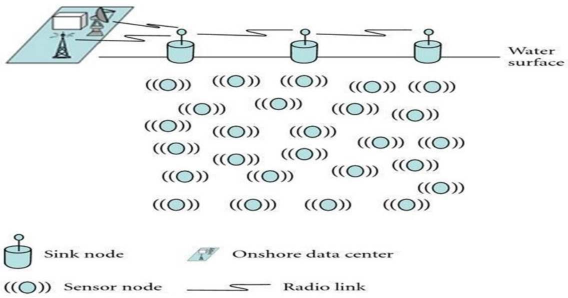

Fig. 3.Functional design of proposed architecture

In proposed system, the COPE-MAC (contention based parallel reservation) mac protocol is introduced. This COPE-MAC protocol works with two techniques ‘parallel reservation’ and ‘cyber carrier sensing’ which improves channel efficiency and avoids collision. After deployments, all nodes broadcast their position (to know there neighbor position) using Localization Algorithm. One of the nodes is selected as “Network Co-ordinater” (leader). The coordinator works out an order of transmission with their position and inform to the node by broadcasting. Then the broadcast information contains the initial order. All the control messages are broadcasted. They contain important information to let neighboring nodes be aware of the activities in the neighborhood. Round-Robin method makes nodes wait much less time than the maximum propagation of the network for their transmission, which is advantageous to improving the channel efficiency. The COPE-MAC protocols achieve a good tradeoff between the low network throughput in the contention-based MAC protocols and the long end-to-end delays in the schedulebased other protocols.

Localization Algorithm

Localization algorithms can be classified into three categories based on sensor nodes’ mobility: i) stationary localization algorithms, ii) mobile localization algorithms and iii) hybrid localization algorithms. Moreover, the system will compare the localization algorithms in detail and analyze future research directions of localization algorithms in UWASNs. This is mainly used in discovering the neighboring nodes in the underwater acoustic sensor networks. The existing localization algorithms for terrestrial WSNs cannot be applied to UWSNs. Currently, many localization algorithms have been proposed for UWASNs. These localization algorithms into two categories: distributed and centralized localization algorithms, based on where the location of an unknown node is determined.

1.Parallel Reservation Method

Long propagation delays of acoustic signals in underwater networks pose grand challenges in medium access control (MAC) protocol design.

In COPE-MAC, we introduce “parallel reservation” techniques. This method improves communication efficiency. The performance of the proposed protocol is evaluated via simulations. Experiment results show that COPE-MAC can significantly increase the overall network throughput, and is especially suitable for larger networks with long distances.

2.Cyber Carrier Sensing

In COPE-MAC, we introduce “cyber carrier sensing” as the second techniques. With rapid advancements in sensing, networking, and computing technologies, recent years have witnessed the emergence of cyber-physical systems (CPS) in a broad range of application domains. This one can detect and avoid collisions by mapping a physical channel to a virtual one in the cyber space. CPS is a new class of engineered systems that features the integration of computation, communications, and control. In contrast to general-purpose computing systems, many cyber-physical applications are safety-crucial. These applications impose considerable requirements on quality of service (QoS) of the employed networking infrastructure.

IV.SIMULATION RESULT

This simulation result was describes about node determination and information transfer. The fig. 4.Nodes present in UASN, describes the nodes placed in the underwater acoustic sensor networks. Then fig. 5.Nodes discovering the Neighboring Nodes When Damaged, this phase denotes that when in some case if any nodes are damaged automatically the damaged node transfers the information to its neighboring node, so no information will be lost. Then finally fig.6. It will be explained the communication channel and the communication efficiency within the Nodes.

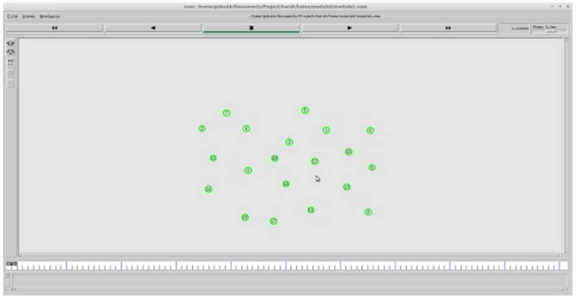

Fig. 4.Nodes present in the UASN

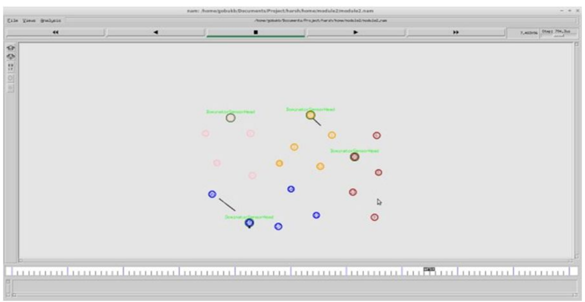

Fig. 5.Nodes Discovering the Neighboring Nodes when Damaged

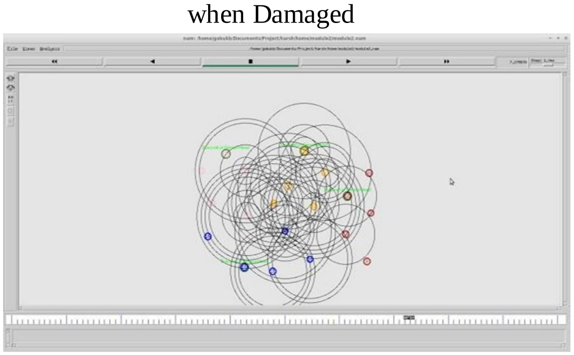

Fig. 6.Communication within the Nodes in UASN

V.CONCLUTION AND FUTURE ENHANCEMENT

By introducing contention-based medium access control protocol with parallel reservation (COPE-MAC) for underwater acoustic networks manages to improve the handshake efficiency with long propagation delays. We propose parallel reservation to establish communications with fewer rounds of handshakes. Cyber carrier sensing is used to detect and avoid collisions with computation rather than physical carrier sensing. Simulations show that the overall network throughput can be greatly improved by the parallel method. Energy efficiency of COPEMAC is also very good compared with another efficient underwater MAC protocol. As future work, this will further explore the effect of parallelism on the network performance and plan to combine our protocol with some coding schemes to make it more efficient in the error-prone underwater communication channel. This can also be performed with hybrid protocols based under heterogeneous and homogeneous.

REFERENCES

[1] Linfeng Liu, Ye Liu, and Ningshen Zhang,A Complex Network Approach to Topology Control Problem in UASN ,vol25,
NO. 12, Dec 2014

[2] L. Liu, R .Wang, and F .Xiao, "Topology control algorithm for UASNs using GPS-free Mobile sensor nodes ", *Elsevier J. Network and computer Applications vol.35,no.6,pp.1963,2012.*

[3] I. Jawhar, N. Mohamed, and D.P. Agrawal,"Linear wireless sensor Networks: Classification and Applications," *Elsevier J. Network and Computer Applications, vol.34, no.5, pp.1671-1682.2011*

[4] Q. Gao and H. Zou," Improving probabilistic coverage and connectivity in wireless sensor networks: Cooperation and mobility", *Proc. Int'l Conf. Wireless comm. and signal processing pp.1-6, 2010* [5]Z. Zhou, S.R. Das, and H. Gupta, "Variable Radii Connected Sensor Cover in Sensor Networks," *ACM Trans. Sensor Networks vol. 5, no. 1, article 8, 2009.*

[6] G.Zhou and T. Shim, "Simulation Analysis of High Speed Under-water Acoustic Communication Based on a Statistical Channel Model," *Proc. Congress on Image and Signal Processing, pp. 512-517, 2008.*

[7] *J. Dong, Q. Chen, and Z. Niu,* "Random Graph Theory Based Connectivity Analysis in Wireless Sensor Networks with Rayleigh

Fading Channels," *Proc. Asia-Pacific Conf. Comm. (APCC '07),pp. 123-126, 2007.*

[8] *X. Bai, S. Kumar, and D. Xuan,* "Deploying Wireless Sensors to Achieve Both Coverage and Connectivity," *Proc. ACM MobiHoc, pp. 131-142, 2006.*

[9] *I. Akyildiz, D. Pompili, and T. Melodia,* "Underwater Acoustic Sensor Networks: Research Challenges," *Elsevier Ad hoc Networks,vol. 3, no. 3, pp. 257-279, 2005.*

[10] F. Ye, G. Zhong, S. Lu, and L. Zhang, "PEAS: A Robust Energy Conserving Protocol for Long-lived Sensor Networks," Proc. 23rd Int'l Conf. Distributed Computing Systems, 2003.