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SONOBUOYS ROUTING FOR UNDERWATER SENSOR

[1]INDHUMATHI.N,
PG scholar/CSE,
Tagore Institute of Engineering and Technology,
Salem, India.
indhume2693@gmail.com

[2]BALASUBRAMANI.K
Assistant Professor/CSE,
Tagore Institute of Engineering and Technology,
Salem, India.
kbsbala@gmail.com

Abstract — Opportunistic Void Avoidance Routing (OVAR) protocol has been proposed for Under Water Sensor Network (UWSNs). OVAR is a multicast, geographic and opportunistic routing protocol that passes information packets from sensor nodes to various sonobuoys (sinks) at the oceans exterior. OVAR protocol switches to revival mode which depends on the depth conformity of the void nodes. A protocol deal with keep up directing along void region by the utilizing handle messages. Under Water Remote Sensor Network appeared as an encouraging innovation to examine customary undersea wire line instruments. One approach to enhance the information gathering and the network execution in UWSNs is through considering the qualities of the underwater acoustic correspondence. The OVAR sturdily used in dynamic network topology, even in hard and troublesome mobile situations of extremely insufficient and thick networks. By using the OVAR routing protocol for the speed of the node will improved as well it prevents data loss compared to previous method.

Index Terms: OVAR, UWSN, Sonobuoys

I.INTRODUCTION

Seas speak to more than 2/3 of the Earth's plane. These situations are critical for human life in light of the fact that their parts on the necessary worldwide generation Carbon dioxide (CO_2) absorption and Earth's atmosphere control. In this setting, Under Water Sensor Network (UWSNs) has picked up the contemplation of the investigative and mechanical groups due their possible to screen and investigate oceanic situations. UWSNs have an extensive variety of feasible applications, for example, to observe marine life, toxin content, land forms on the sea depths, oilfields, ambiance, waves and seaquakes to gather oceanographic information, sea and seaward testing, route helped and acceptance being used for strategy observation applications.

Under Water Sensor Networks comprise of numeral underwater sensor nodes or just called sensor nodes which are equipped with acoustic handsets that empower them to each other to perform neighborhood oriented detecting assignments more than a given territory from shallow water and seabed. UWSNs have numerous impending applications in sea checking. For example - momentum stream, oil contagion, seismic and torrents are observed for supplying the high spatiotemporal resolve ability.

Using Opportunistic Routing (OR) paradigm, every packet is communicated to a distribution set made out of neighbors. OVAR protocol is a multi cast, that tries to converse a packet from a source node to some sonobuoys(sink). The proposed routing protocol employs the greedy forwarding strategy by means of the spot information of the present forwarder node, its neighbors, and the identified sonobuoys. Then the OVAR decides the eligible neighbors to keep distribution the packet towards some sonobuoys. For that they have to locate a next-hop forwarder penchant to forward the information

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packet. In OVAR protocols, next hop directing stand out neighbor is select to go about as a next-hop forwarder. In Opportunistic Routing paradigms every packet is communicate to a transfer set made out of a few neighbors. The packet will be retransmitted just if none of the neighbors in the set gets the information. In between the transmissions, each node locally figures out whether it is in a connection void area by analyzing its neighborhood. After, the void node decides another depth taking into account 2-hop accessibility with the end goal that it can continue the sending.

II. METHODOLOGY

OVAR Routing protocol is a multicast, that tries to communicate a packet of information from a source node to some sonobuoys(sink).The proposed routing protocol utilizes the greedy transfer methodology for the position data of the present forwarder node, its neighbors, and the well-known sonobuoys. The OVAR protocol decides the qualified neighbors to keep distribution the packet towards some sonobuoys. For that it has to locate a next hop forwarder choice to forward the information packet. In protocol multi hop routing, one and only neighbor is selected to go about as a next-hop forwarder. While the opportunistic routing takes communal transmission medium, every packet of information is converse to a sending set made out of a few neighbors. The packet of information will be retransmitted just if not any of the neighbors in the set get the information. In between the transmissions, every node locally facts out whether it is in a communication void region by looking at its neighborhood. On the off chance that the node is in a communication void region, that is whether it does not have any neighbor leading a positive improvement towards some surface sonobuoy. OVAR declares its order to the void area and holds up the void area data of two hop nodes with a specific end goal to choose which new depth it must to moved and the greedy sending methodology can be continued. After, the void node decides a different depth in view of 2-hop network with the end goal that it can continue the greedy forwarding.

III. PROPOSED WORK

Opportunistic routing protocol utilizes the greedy distribution procedure by method for the position data of the present forwarder node, its neighbors, and the identified sonobuoys. The OVAR protocol decides the eligible neighbors to keep sending the packet of information towards some sonobuoys.

It is compatible in hard and troublesome mobile scenarios of unusually sparse and very dense networks and for high network movement loads. It enhances the network implementation when contrasted and the information routing in Under Water Sensor Networks.

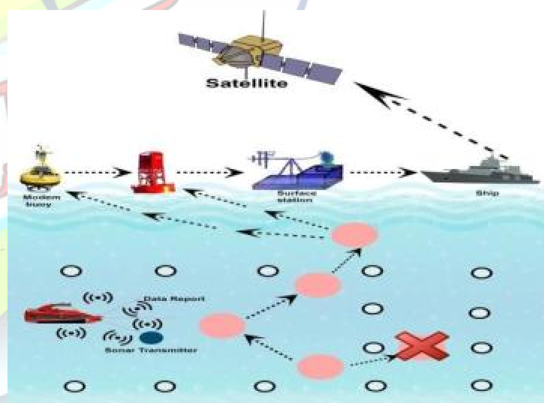

Fig.1: Proposed Architecture Diagram for Underwater Sensors Networks

IV PROPOSED ALGORITHM

In the OVAR routing algorithm, it select a forwarding set based on two metrics: packet delivery probability and packet advancement. In this section, OVAR first explain how the packet delivery possibility can be estimated from receiving beacons. OVAR specify how packet improvement is modeled in the routing algorithm. The OVAR routing algorithm is divided into

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each node, and using a heuristic, a clique sub-graph with the most expected packet advancement (EPA) is created to ensure that hidden nodes are detached from the forwarding set and the chance of successful delivery is increased.

```
procedure FORWARDPACKET(R_i,P)
    if forwarding timer expired then
        F(R_i)= Φ
        L(R_i)={n_k|1≤k≤c}
        G(L(R_i))= NeighGraph(L(R_i),Table(R_i))
        F(R_i)=ForwardingSetSelect(G(L(R_i),Φ*))
        for j=1 to r do
            Calculate EEPA(F,j)
        j_max = arg_j max EEPA(F,j)
        for all j>j_max do
            F(R_i) = F(R_i) -n_j
        P.ForwardingList ← F(R_i)
        Forward P
    else
        Drop P
    end if
end procedure
```

The forwarding set should be checked for different numbers of members to achieve the maximum possible value for EEPA. This can be done by examining EEPA for j = 1,..., r and, finally, picking the set with the largest value and, accordingly, removing other extra nodes from the forwarding set, if required. In this way, the OVAR start from an empty set and add nodes (ordered by their advancement) to the forwarding set one by one. Eventually, the optimal set is selected to relay the packet. In a sparse network, all nodes are held in the forwarding set to increase the reliability; however, in a dense network, some nodes are removed to control the energy dissipation. Eventually, node R i locally selects the forwarding set F(R) based on our criteria and broadcasts the packet. OVAR is a sender-based protocol in which the forwarding node decides which candidate nodes should take part in the packet forwarding. The packet header contains all IDs of members of F(R i). The receiver node should be in the forwarding set of the sender to accept the packet; otherwise, it drops the packet. Upon receiving a packet by a forwarding candidate, it sets a forwarding timer proportional to its fitness factor. Because it adopt the retransmission procedure in OVAR, if a node receives a repetitive packet, it should again set a new holding timer for this packet to be synchronized with other candidate nodes in the forwarding set.

A node with the highest priority has the lowest forwarding timer value among forwarding candidates, and if the packet is relayed by this node, other lower priorities candidates should discard the packet after hearing the packet transmission, where T Del ay is the predefined maximum delay, which should be set in a way that all forwarding candidates are able to hear the transmission of higher priority nodes before relaying the packet. R and *n* are the transmission range of the node and the propagation speed of sound in the water, respectively. J sound ~ SCj indicates the relative distance between the sending node S to the candidate node C, which can be estimated based on the received signal strength or time of arrival. The first part of the equation ensures that candidate nodes hold the packet based on their priorities (the greater the fitness factor value, the shorter the timer) and the second part of the equation is used to compensate the receiving delays resulting from the propagation delay between a forwarding node and its multiple candidate nodes. To satisfy the prioritization among candidate nodes after receiving the packet, T Delay.

A low priority candidate can become a forwarding node if all of the nodes in the forwarding set with higher

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with the aid of timer scheduling is repeated until the packet is successfully relayed to the next hop.

procedure RECEIVEDPACKET(R_i,PACKET)

if R_i.ID € header (packet) then

calculate α and T_{hold}

Set forwarding timer

else

Drop packet

end if

end procedure

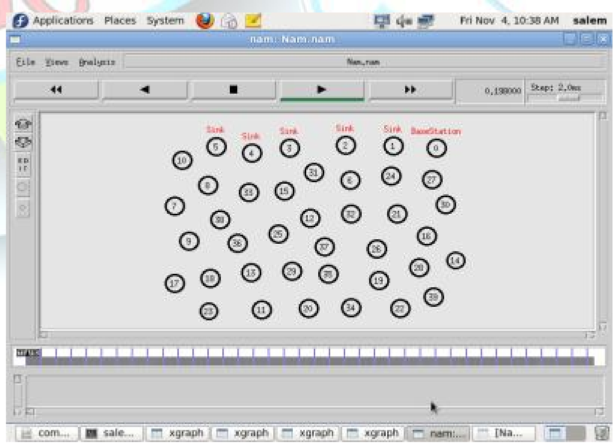
By using this mechanism, redundant transmissions are prevented, which leads to more energy savings for the whole network. Sometimes, especially in a dense network, there are too many nodes in a cluster resulting in wasting of energy. Hence, it introduced a new metric, expected energy and packet advancement (EEPA), to balance energy efficiency and routing efficiency. To devour energy more efficiently, it is assumed that nodes can only listen to a transmitted packet if the packet is destined for them. This is achieved by equipping the nodes with a low power receiver to stir them up to participate in the packet forwarding only by checking the header of the packets.

By following a local search after the construction phase, each clique sub-graph is expanded by a simple exchange approach in which a node is removed from the clique sub-graph, *F*, if its removal allows two adjacent nodes out of the clique with more contribution in EPA to be included in the clique. Thus, the local search phase can enhance the EPA of each cluster. The details of the local search are described in Algorithm. Now, using Algorithm, it is shown how these procedures can be used to find a cluster with maximum EPA to forward a packet. In this pseudo code, maxitr indicates the maximum number of iterations. Increasing the number of iterations leads to exploring a better solution. In this problem, note that the adjacency graphs usually include a small number of nodes, and the heuristic approach works very well in small graphs, since iterations can be accomplished more quickly. The main factor for the complexity of this heuristic is the size of the neighborhood and the search domain. By utilizing this approach, loss probability is decreased, and duplicate transmission paths can disappear efficiently without imposing a high cost to the system. [4] proposed a secure hash message authentication code. A secure hash message authentication code to avoid certificate revocation list checking is proposed for vehicular ad hoc networks (VANETs). The group signature scheme is widely used in VANETs for secure communication, the existing systems based on group signature scheme provides verification delay in certificate revocation list checking.

V.EXPERIMENTAL RESULTS

Network node

The network is framed with multiple sinks on the surface of sea level. Each Sonoboys (sinks) is equipped with a GPS and uses periodic beaconing to disseminate its location information to the underwater sensor nodes. The monitoring center keep tracks the periodic information's from sonoboys and deploy the sensor nodes



Forward Communication void region problem to its Neighbour Node

Packet forwarding is more likely to be successful if packets are relayed over multiple short distances instead

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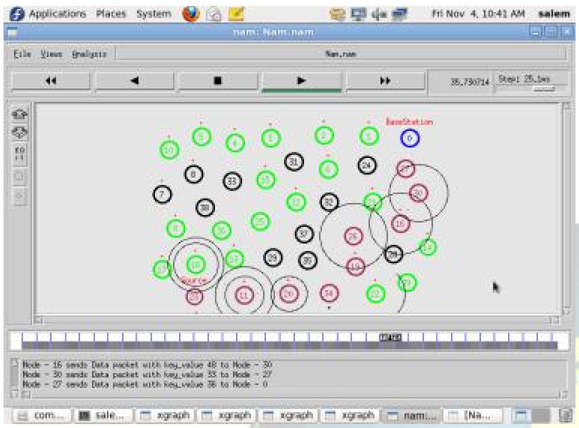
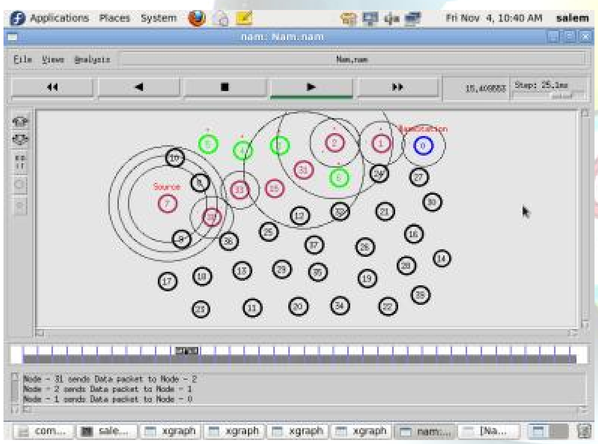
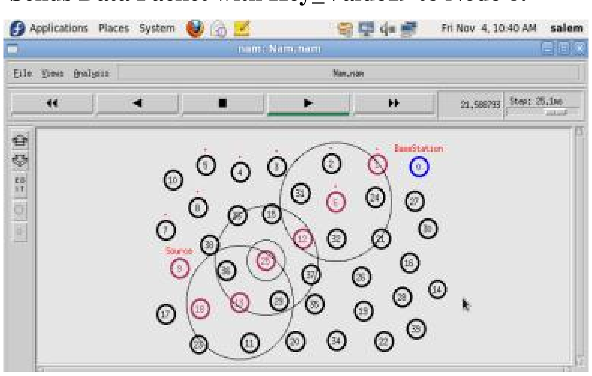
for communication recovery over void region. The problem occurs whenever the current forwarder node does not have a neighbour nodes closet to the sonoboys. To avoid unnecessary transmissions, low priority nodes suppress their transmissions whenever they detect that the same packet was sent by a high priority node.



Node 31 Send Data Packet to Node 2

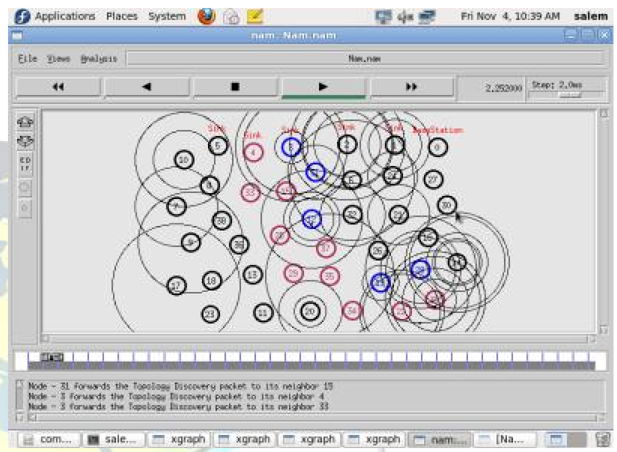


Sends Data Packet with Key_Value19 to Node 6:



Forward Topology Discovery Packet to its Neighbor:

The aim of the topology control algorithm is to move void nodes to new depths to resume the Geographic routing whenever it is possible. The depth adjustment is based on the neighbour nodes closet to the sonoboys location in order to organize the network topology and improve the routing task. The current forwarder node forward the packet to neighbour node closet to the sink based upon the energy based routing.



VI. CONCLUSION

OVAR protocol is proposed to develop the data routing in Under Water Sensor Networks. OVAR is a simple and scalable geographic routing protocol that uses the position information of the nodes and takes advantage of the broadcast communication standard to greedily and opportunistically forward data packets towards the sea surface sonobuoys. Furthermore, OVAR provides a novel depth adjustment based topology manage mechanism to move void nodes to new depths for overcoming the communication void regions. Simulation results shows that opportunistic routing protocols based on the position location of the nodes are more competent than other routing protocols. Moreover, Opportunistic routing proved crucial for the performance of the network besides the number of transmissions necessary to deliver the packet. The use of node depth adjustment to handle with communication void regions improves significantly with network performance.

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REFERENCE

[1].Rodolfo W.L. Coutinho, Azzedine Boukerche, Luiz F.M. Vieira, and Antonio A.F. Loureiro,‖ Geographic and Opportunistic Routing for Underwater Sensor Networks‖, 2016.

[2].Anumol Stanly,‖ A New Approach of Opportunistic Routing for Bypassing Void Region in WSNs‖ , Vol. 4, Issue 6, June 2016.

[3].P.Roselin and G.Annalakshmi,‖ Active Opportunistic Routing In Underwater Sensor Networks‖, Volume 21 Issue 3 – APRIL 2016.

[4]. Christo Ananth, M.Danya Priyadharshini, "A Secure Hash Message Authentication Code to avoid Certificate Revocation list Checking in Vehicular Adhoc networks", International Journal of Applied Engineering Research (IJAER), Volume 10, Special Issue 2, 2015,(1250-1254)

[5].Hao, Kun Zhigang Jin , Haifeng Shen and Ying Wang,‖ An Efficient and Reliable Geographic Routing Protocol Based on Partial Network Coding for Underwater Sensor Networks‖,2015.

[6] P. Xie, J. hong Cui, and L. Lao, ―VBF: vector-based forwarding protocol for underwater sensor networks,‖ in Proc. 5th Int'l IFIPTC6 NETWORKING, 2006, pp. 1216–1221.

[7].H. Yan, Z. J. Shi, and J.-H. Cui, ―DBR: depth-based routing for underwater sensor networks,‖ in Proc. 7th Int'l IFIP-TC6 NETWORKING, 2008, pp. 72–86.

[8].U. Lee et al., ―Pressure routing for underwater sensor networks,‖ in Proc. IEEE INFOCOM, 2010, pp. 1–9.

[9].Y. Noh, U. Lee, P. Wang, B. S. C. Choi, and M. Gerla, ―VAPR: voidaware pressure routing for Comput., vol. 12, no. 5, pp. 895–908, 2013.

[10].D. Chen and P. Varshney, ―A survey of void handling techniques for geographic routing in wireless networks,‖ IEEE Commun. Surveys and Tuts., pp. 50–67, 2007.

[11].Heidemann, J.; Ye, W.; Wills, J.; Syed, A.; Li, Y. Research challenges and applications for underwater sensor networking. In Proceedings of the IEEE Wireless

pp. 228–235.

[12].Akyildiz, I.F.; Pompili, D.; Melodia, T. Underwater acoustic sensor networks: Research challenges. Ad Hoc Netw. 2005, 3, 257–279.

[13].Akyildiz, I.F.; Pompili, D.; Melodia, T. Challenges for efficient communication in underwater acoustic sensor networks. ACM Sigbed Rev. 2004, 1, 3–8.

[14].Vasilescu, I.; Kotay, K.; Rus, D.; Dunbabin, M.; Corke, P. Data collection, storage, and retrieval with an underwater sensor network. In Proceedings of the 3rd International Conference on Embedded Networked Sensor Systems, San Diego, CA, USA, 2–4 November 2005; ACM: New York, NY, USA, 2005; pp. 154–165.

[15].Ayaz, M.; Baig, I.; Abdullah, A.; Faye, I.A survey on routing techniques in underwater wireless sensor networks. J. Netw. Comput. Appl. 2011, 34, 1908–1927.

[16].Pompili, D.; Akyildiz, I.F. Overview of networking protocols for underwater wireless communications. IEEE Commun. Mag. 2009, 47, 97–102.

[17].Kheirabadi, M.T.; Mohamad, M.M. Greedy routing in underwater acoustic sensor networks: A survey. Int. J. Distrib. Sens. Netw. 2013, doi:10.1155/2013/701834.

[18].Noh, Y.; Lee, U.; Wang, P.; Choi, B.S.C.; Gerla, M. VAPR: Void-aware pressure routing for underwater sensor networks. IEEE Trans. Mob. Comput. 2013, 12, 895–908.

[19].Fang, Q.; Gao, J.; Guibas, L.J. Locating and bypassing holes in sensor networks. Mob. Netw. Appl. 2006, 11, 187–200.

[20].Chen, D.; Varshney, P.K. A survey of void handling techniques for geographic routing in wireless networks. IEEE Commun. Surv. Tutor. 2007, 9, 50–67.

BIOGRAPHY

INDHUMATHI.N is a Research Assistant in the Computer Science Department, College of Tagore Institute of Engineering and Technology, Salem, Tamil Nadu, India.

BALASUBRAMANI.K is a Assistant Professor in Department of Computer Science, College of Tagore