ENERGY EFFICIENT MULTIPLE SINK VARIATION TO THE DEPTH-BASED ROUTE PROTOCOL FOR UNDER WATER SENSOR NETWORK

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Abstract

There are number of traditional Network protocols available in the present Context, Underwater sensor Networks has been widespread global concern, acoustic channels feature much less bandwidths and several hierarchies or collection of magnitude longer distribution delays. Similar to ground based sensor nodes, under water sensors usually process with the batteries, even though which are difficult to recharge or replace in hash underwater Environments. Thus Energy performance is also important concern for UWSN routing. In the proposed mechanism based on Drawer are proposing a novel routing protocol DBMR (Depth Based Multi-hop Routing).Usually in this mode, each node to transmit the packets. By minimizing the communication cost. Moreover, our routing protocol can take advantage of multiple-sink underwater sensor network architecture without introducing extra cost Introduction.

Index Terms- *underwater acoustic sensor networks; node depth; routing protocols*

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1. INTRODUCTION

During the Recent network technology rapid growth, people achieved efficient transmissions through an optical or electrical on land, a wireless transmissions or satellites in the air People are interested to research on the ocean with accelerated pace of national ocean development authorities Underwater sensor networks acoustic networking technologies becomes a worldwide research focus. In this propose acoustic sensor networks important in use is under water early warning, Target detection parts of the marine aquatic environment analysis., ocean disaster prediction, military defence and tactical surveillance and so on. each node has different sensors, embedded processerors,low power modem and batteries. . How to balance the node energy conservation and energy efficient is the key of underwater acoustic sensor networks technology and protocols. Seaweb '98, Seaweb '99, and Seaweb 2000 begin a series of annual experiments incrementally advancing telesonar underwater acoustic signalling and ranging technology for undersea wireless networks. The constraints imposed by acoustic transmission through shallow water channels have yielded channel-tolerant signalling methods, hybrid multi-user access strategies, novel network topologies, half-duplex handshake protocols, and iterative power-control techniques. Seawebs '98 and '99 respectively included ten and fifteen battery-powered, anchored telesonar nodes organized as non-centralized hi-directional networks. These tests demonstrated the feasibility of battery-powered, wide-area undersea networks linked via radio gateway buoy to the terrestrial internet. Testing involved delivery of remotely sensed data from the sea and remote control from manned command centers ashore and afloat. Seaweb 2000 introduces new telesonar modem hardware and a compact protocol for advanced network development

2. LITERATURE SURVEY

Traditional routing protocols in wireless sensor networks can be into data-centric routing protocols; cluster-based routing protocols; GIS-based routing protocols and Qos-based routing protocols [3] [4] [5]. In which, SPIN algorithm and DD algorithm is a typical data-centric routing protocol; LEACH algorithm and GAF algorithm is based on clustering routing protocols and GIS-based routing protocols, respectively.

In underwater acoustic sensor networks, there are a number of the corresponding algorithms, for example, VBF [6], HHVBF [7] and the DBR algorithm [8], as well as some other improved land-based routing algorithms. DBR does not require full-dimensional location information of sensor nodes. Instead, it needs only local depth information, which can be easily obtained with an inexpensive depth sensor that can be equipped in every underwater sensor node. The basic idea of DBR is when a node receives a packet; it forwards the packet when its depth is smaller than that embedded in the packet. Otherwise, it discards the packet. Because it uses the flooding mode to send data, likely to cause a large number of redundant data forwarding and channel occupancy, therefore, based on the DBR, this article proposed.

In the proposed paper ,Assumptions are as follows :Initially all sensor nodes take the depth perception, They can make sure of detecting the distance to water surface, Secondly, A data packet only need to sent to the one of the sinks. Thirdly, Each and every node maintains its next hope node.

Underwater acoustic sensor network model is illustrated in Fig I.
There are two kinds of sensor nodes

- **Ordinary Nodes**

For ordinary communication purpose, Ordinary nodes have been deployed in underwater and only have acoustic communication module. They can collect data then send packets to its' neighbour nodes. They can forward other packets to neighbours too.

- **Sink Nodes**

Sink nodes are subjected in to the water layer, they contains the acoustic communication module and radio communication module and used in the communication between other sink nodes as well as the land-based base stations

Our propose mechanism elaborates underwater communications between ordinary nodes and sink nodes. As long as a packet is sent to any one sink node, then sink node can send to other sink nodes and the land-based base stations by via radio. Sound propagates five orders of magnitudes slower than radio.

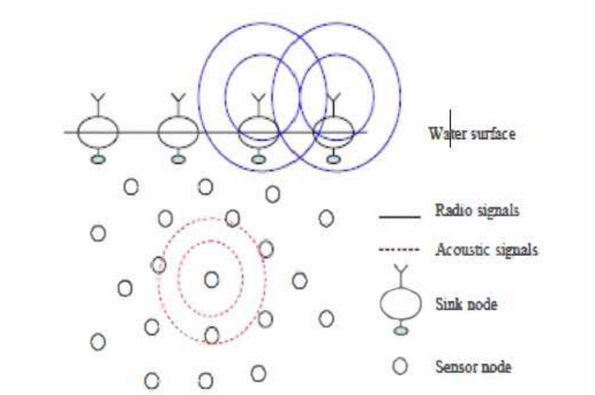

Fig1. Underwater acoustic sensor network model

3. DBMR PROTOCOL

In this process of routing protocol can be divided into two phases:

- The route discovery Process
- Transmission of packets

After all nodes deployed in the water, they will start to detect their underwater depth in the initial phase, and start the route discovery process to choose their next hop nodes for transmission. Finally, packet from the source node through the multihop sends to sink node.

2.1 The route discovery Process

The whole route discovery process has several steps:
Step 1: node 1 detect its depth d I by its depth perception; after that, it broadcasts both d1 and its' lDl to its neighbours, Then waiting to receive feedback messages in time. Delay time t = R / V ; R is the maximal transmission range (communications radius). V is the underwater sound propagation speed, 1500m/s. T=2t. Therefore, if it receives feedback messages on time T, it has next hop node.

Step 2: assuming node 2 receives the broadcast message of node l. dz is the depth of the node 2. There are two cases. d, >= d I , node 2 is below node 1. At this point, node 2 discards the broadcast message without any response. If dz < d] ; node 1 is below node 2. At this point, node 2 is one of the candidates of node l Node 2 compute(JDl, then sends both F(JD2) and its' IDz to F(1D)□ EX' E node l. d,;'is the residual energy of the current node; d, is the depth of the current node.

Step3: In the T time, node 1 receives feedback messages, and then will be recorded in a stack, Q. After time T, if Q is null, it hasn't the next hop. In order to save energy, node 1 enters into sleep state. After a random period of time, it restart the discover route, and returns to Step 1. If Q is not null, it chooses the largest(JD), and adds to the routing table.F(ID).

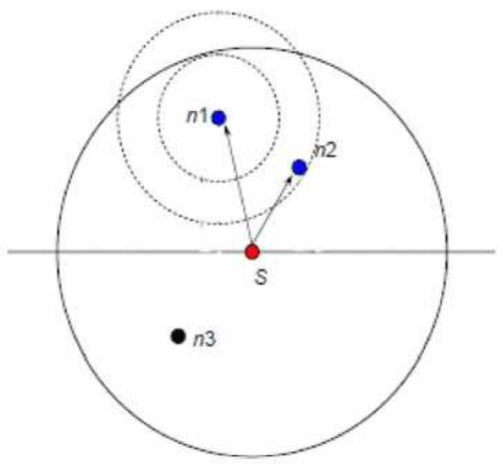

Fig2. The route discovery process of the node S

Fig2.as an example shows a whole route discovery process of node S. Node S detects its' depth, and then broadcast a message that it contains d s and IDs to its' neighbours. N1, n2 and n, receive the message. n3 is below node S, then discards the message. , nz compute their $F(ID_{n1})$ and

$F(ID_{n2})$,then feedback them to node S. Node S receive those feedback packets and record in Q. After time T, node S chooses MAX{<IDnl,F(IDn»,<lDn,,F(1D n,»,· · ·} and added it into the routing table of node S.

2.2 Transmission of packets

When one node transmits a packet to land-based base station. It ensures its' routing table, then Transmits the packet to its' next hop routing node. If it’s' next hop node does not exist or send fails, then it triggers the node route discovery process to find its' next hop node, and then transmit packets. When one node receives a packet, first of all, check out whether the node is a sink node or not. If it is a sink node, the packet send successfully, otherwise continue to forward packet until sent successfully. Repeat the whole process of sending packet from a source node to a sink node. The whole process does not use flooding approaches. So that it can balanced network of energy consumption.

3. EXPERIMENTAL ANALYSIS

In the proposed paper, We cannot Show some practical issues, Because of that reason, simulations are performed using VC++. From energy consumption and deliver ratio to analyse the DBMR in underwater acoustic sensor network. The radio is all sink nodes received packets number divides all source node generated packets number. Energy consumption is the total energy consumption of sensor nodes in the entire simulation process.

In the simulation, nodes are randomly deployed in 500m*500m*500m 3-D area. Sink nodes are deployed at the water surface. While we assume all sink nodes are stationary, other nodes follow the random-walk mobility pattern. Each node has the same communication spherical radium R, 100m. DBMR and DBR were set to one sink and 5 sink nodes. At the same time DBR was set threshold for R14. Deliver radio was show in Fig3. We can see the ratio of multi-sink nodes models were significantly higher than the case of one sink node. This is because multi-sink nodes have more paths. In the same conditions, the deliver rate of DBMR is higher than DBR.

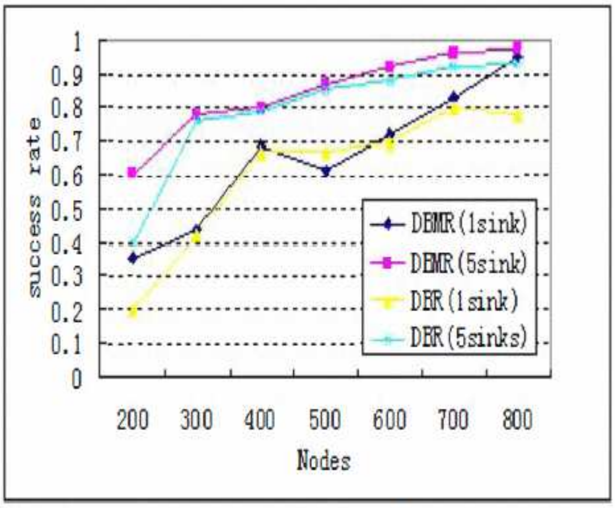

Fig3. Two algorithms delivery rate

4. CONCLUSION:

Our approach elaborates this novel routing protocol it requires only the depth information. When compare with the traditional approaches It improves the DBR and save much energy, while also reducing channel conflicts. Simulation results show that the algorithm has more efficiency

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BIOGRAPHIES

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