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Survey On Underwater Acoustic Wireless Sensor Networks Of Routing Protocols

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***Abstract**: In the past few years wireless Sensor Network has been an emerging technology. As it is a permutation of computation, sensing, and communication. In the 70% of the earth, a huge amount of unexploited resources lies covered by oceans. To coordinate interact and share information among themselves to carry out sensing and monitoring function underwater sensor network consists a number of various sensors and autonomous underwater vehicles deployed underwater. This paper is concerned about the underwater acoustic wireless sensor network of routing protocol applications and UW-ASNs deployments for monitoring and control of underwater domains.*

Keywords: Underwater Acoustic Sensor Network, Wireless Sensor Network, Cross-Layer Protocol.

I. INTRODUCTION

Underwater wireless sensor networks deployed to perform tasks in a collaborative manner over a body of water. UW-ASNs applications allow monitoring and assisted navigation. The Underwater wireless sensor network consists nodes and connected to the acoustic communication, Autonomous devices can self-organize. Acoustic communication has been the knowledge of choice for decades when it comes to transmitting signals underwater. There are many applications of underwater wireless sensor network which can have very identical requirements: stable or mobile, short, or long-lived. The bandwidth available for UW-ASNs is partial and be determined on both range and frequency. As the bandwidth is limited, the acoustic signals are subject to time-varying multipath where the result is relative to radio channels. To increase the operation range of AUV's underwater networks can also be used. A Major challenge in the development of the underwater routing protocol is propagation delay, heavy multipath fading, and varying network. For the data transmission, acoustic communication in the ocean is feasible.

Fig 1. Underwater Acoustic Wireless Sensor Networks

This Fig1.shows underwater acoustic sensor network [`1].No uniform distribution the network fragmentation is occurring. By the directly transmitting the sensed data to the control station of the ocean shell the one way sensed data collected. Underwater objects intersect with another and forward sensory data to the sink nodes, which are typically son buoys on the water shell. In the underwater sensor networks, power consumption problems mainly occur. When deployed under the water, nodes can mainly be replaced or recharged in the harsh surroundings and ambient energy.In the acoustic communication data transmission is possible.

II. RELATED WORK

X. Burton et al. [1] Proposed a beginning to underwater acoustics in the monitoring aqueous environment. Underwater acoustic have been known. With a low bandwidth acoustic modem and with several sensors underwater hold up the time-critical application and each sensor are ready. The existing literature is clustering protocols, grid routing protocols and energy efficiency schedule [2], [4]. Ayaz et al. [5] Proposed a mobility-aware routing protocol which is known Temporary Cluster. In "spatiotemporal" multicast known a new multicast communication paradigm [6], [7] in wireless networks. Goyal et al. [8] Designed a fuzzy-bases clustering and aggregation method for underwater acoustic sensor networks, which selects the cluster-head node with the Fuzzy logic module. Traditional techniques have been residential to help the location-free and greedy hop-to-hop routing strategy [9],[10]

III.DESCRIPTION OF PROTOCOL

1. **DATA PULRP(Path Unaware Layered Routing Protocol)**: In the PULRP Protocol it has two stages:

I. Layering Stage- In this stage, approximately the sink node concentric layers of spheres are formed with each node belong to one of the spherical layers. Latency the radius of spheres are select from side to side the probability of doing well packet forwarding and packet delivery.

II. Communication Stage-In this stage, starting source to sink node across the concentric layer routing path is resolute to fly. From side to side the potential relay nodes diagonally the layers the communication between any source nodes will happen.

To determine the path from source node A to sink node S in PULRP is mentioned:

Node 'A' transmit a control packet, which has the source ID, the destination ID, packet ID and the distribution code which will be used for the data packet broadcast. Using a general distribution code it can be broadcast. If this control packet is inward properly, a collision-free broadcast will be ensured.

1. Formerly the potential relay node is well-known all other nodes can go back to sleep.
2. Exacting interval after the control packet is broadcast, the source sends the data packet, if the node 'B' successfully inward the packet, node 'B' will transmit control packet to search out another.

A. SYSTEM MODEL

Regard as densely deployed 3D underwater sensor network planning, so that each node is well associated. It can also suppose that nodes transmit with equal and fixed power.

Propagation model

With the variety of few meters, it can suppose that the loss owing to spreading and refraction which is small and the sound has directly line propagation.

$$TL = 20\log R + \alpha R$$

Where α is the frequency charge, absorption coefficient. The path loss model is

$$P_R = P/R^2 10^{\alpha R}$$

i. Network model

In the region of concern is separated into a large amount of small virtual cubes the total volume will occupy by the UWSN so that the cube size of the sensor node is almost corresponding to the physical size. Each cube is either empty or occupies by a single node if N is the volume density of the nodes, then the probability of k nodes occupying a volume V is-

$$PR\ [x = k] = (NV)^K/k!$$

2. **E-CARP(Energy Efficient Routing Protocol)**

Since sensor nodes to the sink node E-CARP are an improvement upon CARP, in an energy proficient method is to expand a location-free and greedy hop-by-hop for forwarding packets. To decrease the routing of sensory data packets to the sink node. E-CARP tries to choose relay nodes by avoiding the forwarding of control packets.

a) Network Initialization

The network is initialized and hope counting is computed for all the nodes UV.

E-CARP protocol saves g (wavy) for each uv_Y€ UV, which served as the relay node for use, in terms of the set

$G_{nvsn} = <UV_{Y,}\, g\ (wavy_{)}>$

Where g<ivy> is set to 0 during the initialization phase, G_{nvsn} is an empty seat after initialization. The data which are collected from the network are cached in the recall gap of SN in terms of set CAH = {cah_{uvsn}}, where cah_{uvsn} is defined as the vector.

b) Control and Data Packets Forwarding

The domain claim may work when the variety of sensory data is surrounded by a firm threshold. The symbol α_{atr} applied to represent this threshold for a certain attribute.

According to the requirement of certain applications, the threshold α_{atr} is pre-determined.

c) Relay Node Selection

The previous time point relay nodes were selected and measured as the applicants when choosing a relay node at this phase, while the effort of finding a relay node at each phase point should be reduced.On the other hand, UV_Y which aided as the relay node in the previous phase point which is chosen as the relay node

EPING control packet:

EPING = <id $_{nvsn}$, id $_{uvy}$, g (uv_y), HC (nv_{sn}), pid, L $_{pkt}$>

3. Mobicast Protocol

A node gathers sensed data which typically held at sleep mode for power saving in the 3D USN and enables the AUV. The ocean current consequence and the whole problem are also measured.

The AUV brings a Mobicast message at phase to stir all sensor nodes which will be currently at phase within ZOR^3_{t+1} can remain well gather sensed data.

Two periods by which they can stir which:-

a. To control the size of ZOF^3_{t+1}.

b. To control how many sensor nodes within ZOF^3_{t+1} which are used to bring the Mobicast message.

- In the primary stage, the large size of ZOF^3_{t+1} which can stun the whole problem and can achieve successful delivery rate, but consumes much power and smaller size ZOF^3_{t+1} may not cover the whole problem also fail to wake up the sensor nodes. To overcome this tricky in a 3-D hole in short $_{+1}$ the major concern is drifted distance of sensor nodes. Therefore, the speed of ocean currents and the network density size can remain.
- In the secondary stage, the successful delivery rate within different parts is dissimilar. Therefore, keep a high successful supply rate and to save power the only nodes which are necessary to wake up.

Our Mobicast protocol split into three phases:-

i. **3-D ZOR $_t$ initiation phase: -**In this, the AUV makes the ZOR_t^3 at phase p to initiate the Mobicast routing and provides a Mobicast note and to stir sensor nodes which will be extant at time t + 1 in ZOR^3_{t+1}.

ii. **3-D ZOF $_{t+1}$ creation phase: -**To cover the potential hole ZOF^3_{t+1} is created with a proper size; meanwhile, ZOF^3_{t+1} for the Mobicast note transport and it will split into numerous segments.

iii. **3-D ZOR $_{t+1}$ collection phase: -** In the interior ZOR^3_{t+1} the AUV collects the sensed data.

B. SYSTEM MODEL

Nodes are arbitrarily deployed in the ocean. Through ocean currents, the sensor nodes may be drifted. The AUV travels with a user-defined route with a constant velocity and collects sensed data. When the AUV returns to report collected data to a control station, the user-defined response time the AUV should achieve the route. The speed of AUV to be contingent during the user-defined response time and it can calculate a proper speed using the reserve distributed by response time, which is based on the expense of user-defined path and response time. The sensor nodes cannot stir instantly as the AUV arrived through the long transmission delay. The nodes should wake up to sensed data and also should found at right “place” and at right “time”. Here the meaning of at right “place” and at right “time” is the AUV is impending or arrives. When the schedule is previously transmitted from central station and the AUV meet to the other sensor nodes which do not stir the schedule then the AUV is failing to collect data.

4. Energy efficiency, reliable data Transmission:

In this, it integrates multiple techniques for underwater data transmission. With the integration of multi-hop, duty cycle and a proper energy-efficient protocol altogether in network model it provided 3D big cube. It is based on 3D cubes, which can be useful in underwater situations. It focuses on 3D Geospatial merge as well as additional complex properties of the underwater medium. A node with high energy and a short distance to the base station is chosen as a cluster-head node in charge of data aggregation.

C. SYSTEM MODEL

i. **Network Model: -**When the 3D underwater network is set and merge into SCs and SC spaces logically, Data Packets are collaboratively transmitted as units. Node density varies with the changing of SC’s size. In monitoring area sensor nodes are deployed accidentally. All the sensor nodes have a unique identifier and the same initial energy, transmission power, and communication. Energy can be provided constantly to the base station.

ii. **Energy utilization Model:-**

An energy utilization model with space and multipath broadcast which is similar to LEACH. Energy utilization for a node to broadcast bit data packets to another node is set to

$$E_{tx} = \begin{cases} L\epsilon_{elec} + l\epsilon_{fs}d^2, & d<d_o \\ L\epsilon_{elec} + l\epsilon_{mp}d^4 & d\geq d_o \end{cases}$$

iii. **Delay Model:-**

There will be an end-to-end delay when a packet is sent from the source node to any destination. The end-to-end delay consists following types

a. Transmission and reception time

b. Propagation time

c. Byte alignment time

iv. **Cluster-Head selection:-**

There are two phases for the Cluster-Head selection.

a. Choose cluster head node.

b. Form a cluster.

In this whole network is merged into several SCs and these SCs are regarded as a cluster.

v. Data Transmission Mechanism

This mechanism is usually merging into two phases.

a. Broadcast from a normal node to cluster-head node
b. Broadcast from cluster-head node to BS.

In this cluster-head node broadcast data packets to BS by multihop.

RESULT

To estimate the performance of the PULP general model have been agreed out. As the ratio of total packets deliver to be submerged and the entire packets generate in the source distinct the success rate. Owing to the uniqueness of acoustic and underwater environments, location based, end-to-end routing is usually quite an energy intensive for the path. Along with underwater sensor nodes, which are accidentally spread in a 3-D water surroundings and the Mobicast protocol is replicated compare as direct delivery to ZOF^3_{t+1}. To form a cluster all the 3D network is merged into several SCs and SC.

CONCLUSION AND FUTURE SCOPE

By selecting potential relay nodes PULRP ensures a high success rate which has sufficient energy for packet forwarding. It does not require any localization or routing table maintenance. There is no need for any localization or routing table maintenance. In the E-CARP protocol, the ratio of packet size between control packets and sensory data packets is fairly huge when it reduce the communication cost and raise the network capability. Due to ocean current, the model is starting sensor nodes are drifting in the Mobicast protocol. In the EGRC it saves more energy and has a longer network. The route, duration, route length and success rate of statistical analysis are being measured for further research. As in the E-CARP, this technique does not differentiate he priority of different attributes. In the Mobicast it expands the constant size of forwarding zone. For the further improvements and verification in EGRC are needed in the aspects of applying it to industrial plants.

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