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ETDT-EFFICIENT AND TERRIFIC TRANSMISSION USING DYNAMIC ROUTING TECHNIQUE FOR UNDER WATER ACOUSTIC SENSOR NETWORK

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ABSTRACT: Underwater wireless sensor networks (UWSNs) have enlarged the responsiveness of the methodical and industrialized societies due their probable to observer and discover marine atmospheres. Underwater wireless sensor networks have been disclosed as a hopeful knowledge to observe and discover the oceans in lieu of customary submarine cable link gadgets. Nevertheless, the information collecting of UWSNs is still strictly imperfect because of the audile frequency communiqué individualities. And, sensors power proficient and life stage growth is the leading difficult, physically cannot revitalize the battery by going bottomless into the sea or ocean. In this study vigorous system prototypical for identifying the target. To recover the energy, communication and life time of Underwater Acoustic Sensor Network (UASN) established an Empirical Exploration System (Multi-population Synchronization Assessment Scheme) and Dynamic Routing Technique for energetically indicate to sleep or active a given set of sensors in order to refuge the specified set of goals. First, this effort reflects a dynamic problematic. Second, locations of some sensors are not static the planned process can dynamically apply the updated locations to make a new sleep schedule. By simulation, the proposed algorithm shows high performance in terms of extending network lifetime, throughput, and Reduced Delay.

Key terms: [Underwater wireless sensor networks, Empirical Exploration System, Synchronization Assessment Scheme, and Dynamic Routing Technique.]

1. INTRODUCTION

Acoustic communication has been considered as the only feasible method for underwater communication in USWNs. High frequency radio waves are strongly absorbed in water and optical waves suffer from heavy scattering and are restricted to short-range-line-of-sight applications. Nevertheless, the underwater acoustic channel introduces large and variable delay as compared with radio frequency (RF) communication, due to the speed of sound in water that is approximately temporary pathloss and the high noise resulting in a high bit error rate; severely limited bandwidth.Then strong attenuation in the acoustic channel and multipath fading; shadow zones; in this context, geographic routing paradigm seems a promising methodology for the design of routing protocols for Underwater wireless sensor networks. Geographic routing, also called of position-based routing, is simple and scalable. It does not require the establishment or maintenance of complete routes to the destinations. Moreover, there is no need to transmit routing messages to update routing path states. Instead, route decisions are made locally.

At each hop, a locally optimal next-hop node which is the neighbor closest to the destination is selected to continue forwarding the packet. This process proceeds until the packet reaches its destination. Geographic routing can work together with opportunistic routing (OR) (geo-opportunistic routing) to improve data delivery and reduce the energy consumption relative to packet retransmissions. Using opportunistic routing paradigm, each packet is broadcast to a forwarding set composed of neighbors. In previous work, Here used Geographic and opportunistic routing with Depth Adjustment-based topology control for communication Recovery over void regions (GEDAR) routing protocol. GEDAR utilizes the location information of the neighbor nodes and some known son buoys to select a next-hop forwarder set of neighbors to continue forwarding the packet towards the destination. However, in this method have some difficulties they are Limited bandwidth, impaired channel, High Propagation delay, Bit error rate is high, limited battery power, Failure of sensors due to fouling and corrosion. To overcome above difficulties and To recover the energy, communication and life time of Underwater Acoustic Sensor Network (UASN) established an Empirical Exploration System (Multi-population Synchronization Assessment Scheme) and Dynamic Routing Technique for energetically indicate to sleep or active a given set of sensors in order to refuge the specified set of goals.

2. RELATED WORKS

Underwater acoustic sensor networks: research challenges proposed by I. F. Akyildiz, D. Pompili, and T. Melodia In [1] Underwater sensor nodes will find applications in oceanographic data collection, pollution monitoring, offshore exploration, disaster prevention, assisted navigation and tactical surveillance.

Data collection, storage, and retrieval with an underwater sensor network proposed by I. Vasilescu, K. Kotay, D. Rus, M. Dunbabin, and P. Corke. In [2] a novel platform for underwater sensor networks to be used for long-term monitoring of coral reefs and _sherries.

The sensor network consists of static and mobile underwater sensor nodes. The nodes communicate point-to-point using a novel high-speed optical communication system integrated into the Tinos stack, and they broadcast using an acoustic protocol integrated in the tiny os stack.

A survey of practical issues in underwater networks proposed by J. Partan, J. Kurose, and B. N. Levine.In [3] underwater sensor networks are attracting increasing interest from researchers in terrestrial radio-based sensor networks. There are important physical, technological, and economic differences between terrestrial and underwater sensor networks. In survey, highlight a number of important practical issues that have not been emphasized in recent surveys of underwater networks, with an intended audience of researchers who are moving from radio-based terrestrial networks into underwater networks.

Underwater acoustic communication channels: propagation models and statistical characterization proposed by M. Stojanovic and J. Preisig.In [4] Acoustic propagation is characterized by three major factors: attenuation that increases with signal frequency, time-varying multipath propagation, and low speed of sound (1500 m/s). The background noise, although often characterized as Gaussian, is not white, but has a decaying power spectral density.

Vector-based forwarding protocol for underwater sensor networks Tackle one fundamental problem in underwater sensor networks (UWSNS): robust, scalable and

energy efficient routing proposed by P. Xie, J.-H. Cui, and L. Lao. In [5] UWSNS are significantly different from terrestrial sensor networks in the following aspects: low bandwidth, high latency.
Depth-based routing for underwater sensor networks proposed by H. Yan, Z. J. Shi, and J.-H. Cui.In [6] providing scalable and efficient routing services in underwater sensor networks (UWSNS) is very challenging due to the unique characteristics of UWSNS. Firstly, UWSNS often employ acoustic channels for communications because radio signals do not work well in water.
Distributed localization algorithms for underwater acoustic sensor networks proposed by M. Erol, L. F. M. Vieira, and M. Gerla. In [7] Underwater acoustic sensor networks (UW-ASNS) consist of devices with sensing, processing, and communication capabilities that are deployed underwater to perform collaborative monitoring tasks to support a broad range of applications.
Energy-efficient routing schemes for underwater acoustic networks proposed by H. Yang, B. Liu, F. Ren, H. Wen, and C. Lin.In [8] Interest in underwater acoustic networks has grown rapidly with the desire to monitor the large portion of the world covered by oceans. Fundamental differences between underwater acoustic propagation and terrestrial radio propagation may call for new criteria for the design of networking protocols.
Performance and Trade-offs of Opportunistic Routing in Underwater Networks proposed by L. F. M. Vieira. In [9] Underwater acoustic channel imposes many challenges into underwater networks communication, such as high bit error, temporary losses of connectivity due to shadow zones, limited bandwidth capacity and communication signal spreading over large areas.
The WHOI Micro-Modem: An Acoustic Communications and Navigation System for Multiple Platforms proposed by L. Freitag, M. Grund, S. Singh, J. Partan, P. Koski, and K. Ball. In [10] The Micro-Modem is a compact, low-power, underwater acoustic communications and navigation subsystem. It has the capability to perform low-rate frequency-hopping frequency-shift keying (FH-FSK), phase-coherent keying (PSK), and two different types of long base line navigation, narrow-band and broadband.

3. PROPOSED METHODOLOGY

Underwater wireless sensor networks have been disclosed as a hopeful knowledge to observe and discover the oceans in lieu of customary submarine cable link gadgets. Nevertheless, the information collecting of UWSNs is still strictly imperfect because of the audile frequency communiqué individualities. And, sensors power proficient and life stage growth is the leading difficult, physically cannot revitalize the battery by going bottomless into the sea or ocean. Study vigorous system prototypical for identifying the target. To recover the energy, communication and life time of Underwater Acoustic Sensor Network (UASN) established an Empirical Exploration System (Multi-population Synchronization Assessment Scheme) and Dynamic Routing Technique for energetically indicate to sleep or active a given set of sensors in order to refuge the specified set of goals. First, this effort reflects a dynamic problematic. Second, locations of some sensors are not static the planned process can dynamically apply the updated locations to make a new sleep schedule.

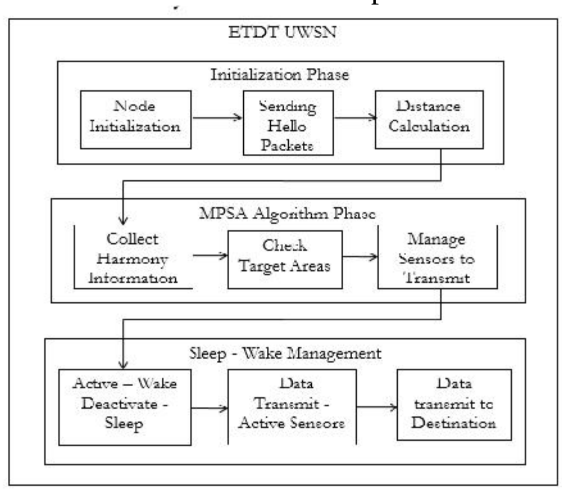


Figure 1: Proposed System

3.1 METHODOLOGIES

3.1.1 Initialization

Initialize the nodes in network topology. Here used network topology and topography for network animator window (name window). Have syntax for create nodes in network animator window. Then create nodes in two types like random and fixed motions.

In random motion fixed range for X and Y, fixed particular range then the nodes are randomly generate in that range of name window. In fixed motion give X and Y dimension position for all nodes then all the nodes are fixed in that particular dimension.

Here consider an underwater wireless sensor network sensor equipped aquatic (SEA) swarm architecture, in this architecture, have a large number of mobile underwater sensor nodes at the ocean bottom and sonobuoys, also named sinks nodes, at the ocean surface. They move as a group with the water current. This model consists of a set N= Nn U Ns of nodes with a communication range of rc so that Nn represents the set of sensor nodes, and Ns is the set of sonobuoys.

3.1.2 MPSA Algorithm Phase

The sensors are tied with a wire so that the height can be adjusted according to the target. The sensing range size of each sensor may differ due to its heterogeneous sensor type. Base station (BS) is placed, up above the sea level to collect the messages which is transmitted from the sea bed. At a particular time, each sensor could be in one of four modes: active, asleep, malfunctioned, and dead. Only active sensors will work to detect the targets and consume battery power. To save the battery power, sensors that are not active can be turned off. Sensor may be dead due to battery power depletion, or get lost due to external factors. By using different number of sensors and targets run the MPHSA algorithm to get various outputs. And the number of iterations can also be extended until get better solution to detect the target.

MPSA Algorithm

1. At the τ-th key time survival sensors are updated
2. Initialize the parent harmony memory HM.
3. Divide HM into sub-HM (sub-HM1, sub-HM2, …, sub-HMδ)
4. Initialize the current iteration number as 1(ie., η=1,2,….,n)
5. if rand(0, 1) < HMCR then
6. Choose two harmonies xnew1 and xnew2 from sub-HMi
7. if rand(0, 1) < PAR(η) then
8. Make a uniform crossover operator on xnew1 and xnew2, and replace the resultant value in ten places of xnew1 and xnew2.
9. End if
10. Let knew be the one of xnew1 and xnew2 with a better fitness value
11. Else
12. Randomly generate a feasible harmony as xnew
13. End if
14. If knew is better than worst harmony in sub-HMi, xnew replaces it
15. End for
16. η = η + 1
17. End while
18. Decode the best harmony among all sub-HMi’s
19. If number of covers is non zero, randomly choose one of the covers as the output, otherwise output is zero i.e., no solution.

Similarly, each sensor node embeds a sequence number, its unique ID and X, Y, and Z position information. Moreover, the beacon message of each sensor node is augmented with the information of its known sono buoys from its set Si(t). Each node includes the sequence number, ID, and the X, Y location of the its known sono buoys. The goal is for the neighboring nodes to have the location information of the all reachable sono buoys. GPS cannot be used by underwater sensor nodes to determine their locations given that the high frequency signals.

This signal is rapidly absorbed and cannot reach nodes even localized at several meters below the surface. Thus, each sensor node knows its location through localization services, such as. Localization services incur additional costs in the network. However, the knowledge regarding the location of sensor nodes can eliminate the large number of broadcast or multicast queries that leads to unnecessary network flooding that reduces the network throughput. In addition, the location information is required to tag the collected data, track underwater nodes.

3.1.3 Sleep-Wake Management

Sensors that are active or asleep are called as surviving sensors and sensors that are malfunctioned or deadlines are called to fail. Sensor modes vary, based upon the active sensors vary at each and every time. So, in this work propose a method to decide a sleep schedule at each and every key time.

The 1st key time is the initial time, at which each sensor is works with the initial battery power. Here the sleep schedule is initialized. During the 1st key if some targets are not covered mean the 2nd key time is started. At the 2nd key time, the sensors information is updated and sleep schedule is followed to cover all targets.

Similarly, the 3rd key time, 4th key time and so on can be followed. And, a sleep schedule is followed at each key time until survival sensors cannot cover all targets. After computing the forwarding set, the current forwarder node includes the address of the next-hop forwarder nodes in the packet and then broadcast it.

4. EXPERIMENTAL RESULT AND DISCUSSION

This section evaluate the performance of proposed protocol against the simple geographic and opportunistic routing protocol without recovery mode and the two other most popular previously proposed routing protocols for UWSN.

PERFORMANCE ANALYSIS

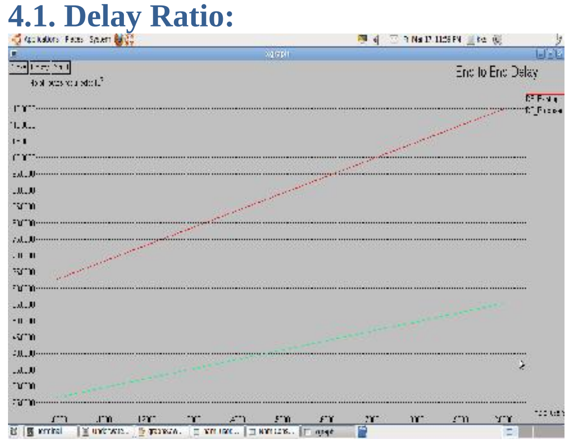
This research work used ns-2 as the network simulator and conducted numerous simulations to evaluate the underwater wireless sensor network performance. All sensor nodes are randomly scattered with a uniform distribution. The location of the sink is randomly determined. This study evaluates the routing performance under scenarios with different numbers of sensor nodes. This research work evaluates the following main **performance metrics:** Energy Consumption ratio: measures the mean value of the usage energy of all alive sensor nodes when simulation terminates.

Throughput ratio: Means the Networks successive rate, here improves that network lifetime.

End-to-end Delay: means the time delay experienced by the source node while transmitting a report message to the sink.

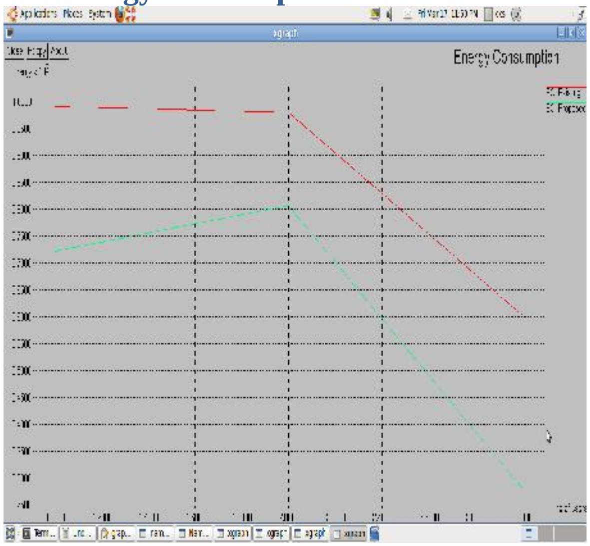
Packet Delivery Ratio: It calculates the generated data, received data and delivered packet ratio

4.1. Delay Ratio:



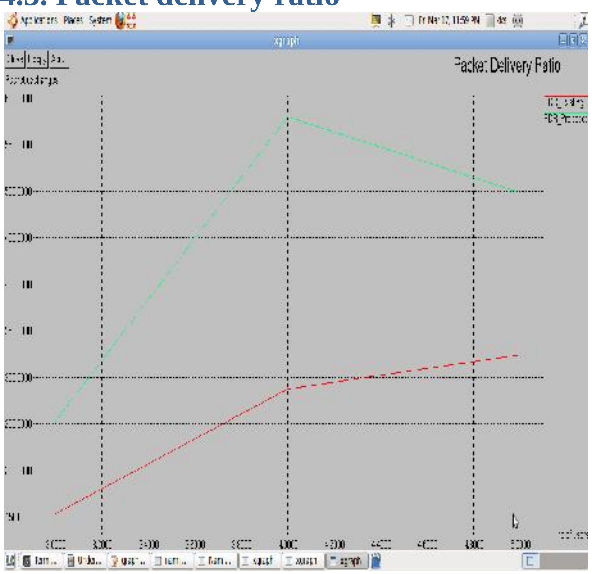
Above figure mention energy Consumption ratio of proposed and existing comparison. In this work compare previous and present process of energy Consumption rate, here green line mention proposed energy ratio and red line is existing energy ratio. Proposed work reduces consumption of energy compared to existing process.

4.2. Energy Consumption rate:



Above figure mention energy Consumption ratio of proposed and existing comparison.In this work compare previous and present process of energy Consumption rate, here green line mention proposed energy ratio and red line is existing energy ratio.

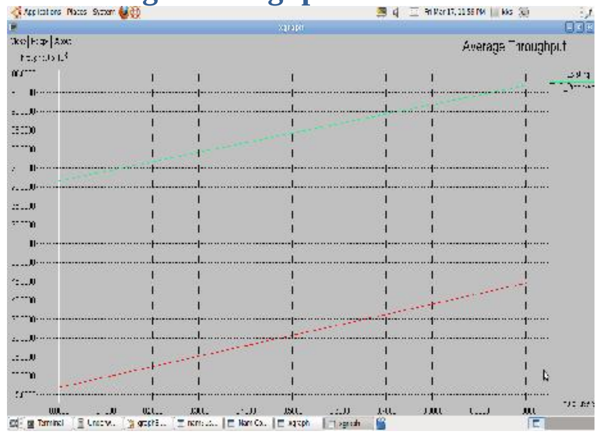
4.3. Packet delivery ratio



Above figure mention Packet delivery of proposed and existing comparison.

In this work compare previous and present process of Packet delivery, here green line mention proposed ratio and red line is existing packet ratio. In proposed work improves Packet delivery rate compared to existing process.

4.4. Average Throughput ratio:



Above figure mention Throughput ratio of proposed and existing comparison.

In this work compare previous and present process of Throughput ratio, here green line mention proposed, red line is existing ratio, in proposed work improved Throughput ratio compared to existing and previous process.

5. CONCLUSION AND FUTURE WORK

Underwater wireless sensor networks have been disclosed as a hopeful knowledge to observe and discover the oceans in lieu of customary submarine cable link gadgets. Nevertheless, the information collecting of UWSNs is still strictly imperfect because of the audile frequency communiqué individualities.

To recover the energy, communication and life time of Underwater Acoustic Sensor Network (UASN) established an Empirical Exploration System (Multi-population Synchronization Assessment Scheme) and Dynamic Routing Technique for energetically indicate to sleep or active a given set of sensors in order to refuge the specified set of goals. First, this effort reflects a dynamic problematic. Second, locations of some sensors are not static the planned process can dynamically apply the updated locations to make a new sleep schedule.

As future work, plan to apply this topology control of new data learning protocol with adjustment principles to the design of opportunistic routing protocols for UWSNs. Considering different QoS requirements for data delivery, the cost for reaches a neighbor node, and the lifetime of the network. And also improve this process security as digital signature security frame work and proposed security scheme for centralized topology networks, so in future work improve this security using digital signature security technique for decentralized large level networks topologies.

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