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Energy Use and Underwater Sensor Network Security

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Abstract
Underwater Wireless Sensor Network is focused on research in a variety of sectors. Environmental monitoring, underwater oil and gas extraction, military surveillance, smart farming, communications, and other applications are just a few of the key applications that Underwater Wireless Sensor Networks are used for. There are difficulties in replacing nodes in underwater wireless sensor networks, as well as limitations on the network lifetime, poor video processing, high energy consumption, and so on. High energy consumption while preserving security is the emphasis of this research. IoT is being used by developing depth-based routing algorithms. IoT depth base routing is used to save energy and improve security. It assesses energy usage, alive node counts, sink utilisation, and end-to-end latency in this section. The data security, network longevity, and accessibility are all improved by the work processes.
Keywords: *sink utilization, energy consumption, depth-based routing protocol.*

I. Introduction

Two-thirds of the surface of the globe is covered by oceans, rivers, lakes, and other bodies of water. Acoustic is essential for a variety of applications, including environmental, pollution, and oil level monitoring [1]. The most typical plans for underwater exploration involve keeping an eye on things like pressure, temperature, and water quality. Initially, data is sent to the sink node. UWSNs are challenging to deploy due to characteristics including short network lifetime, poor processing, high energy consumption, and others [2,3].

IoT is used in a range of applications, including smart agriculture, smart cities, and traffic monitoring, to enable data collecting and effective communication. The four different categories of IoTs are user interfaces, connection, nodes, and data processing units. The components are used to cloud in any situation [4].

One of the shortest paths between the sink node and the data processing in depth-based routing systems [5]. There will often be just a few routing protocols. IoTs will be able to extend the lifetime of UWSN by lowering processing at the sink node and station data storage.

IoT is used in this study to allow smart sinks to send data to the station rather than storing it. The nearest sink node receives the information [6]. The suggested approach makes use of cloud storage. The UWSN sink node will respond to data collection made possible by the cloud. It increases the network's lifespan and improves the security and usability of the identified data [7,8].

IoT enabled Depth based routing method

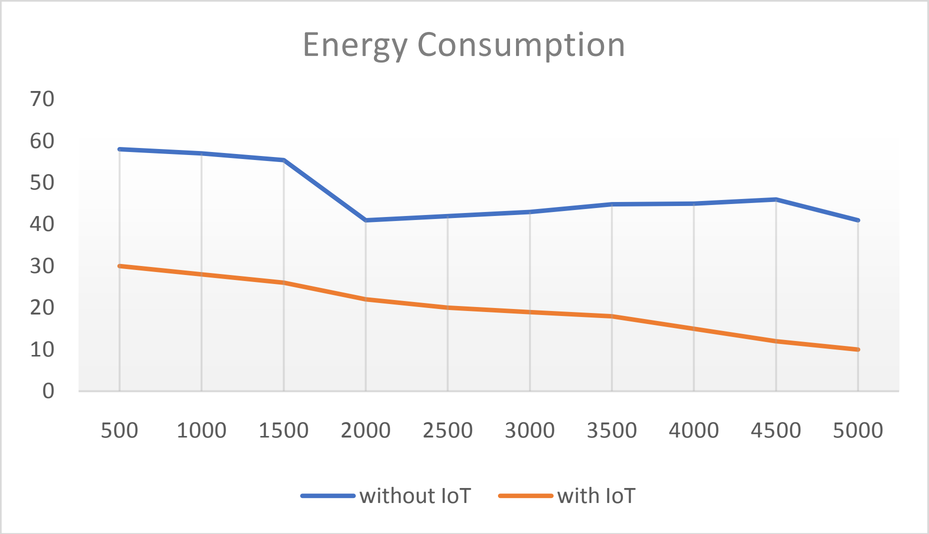
The depth-based routing protocol is one of the most widely used UWSN routing strategies for making smart routing decisions. Data packets are forwarded using a greedy method called depth-based routing. When sending or receiving data packets, a sensor node compares the depth included in the packets. The following node receives the packet if its depth is less than one; otherwise, it is dropped. Depending on the node's depth information, the depth-based routing protocol decides whether to forward data packets or process them, optimising routing decisions [9,10].

Our solution introduced IoT enabled sink nodes and a depth-based routing protocol methodology. The base station receives data from the sink nodes and processes and stores it. The observed data will instead be transmitted to the closest sink node. As a result, during communication, a sink node's power decreases [11]. It uses the cloud for data processing and storage with its IoT.

Algorithm of IoT enabled Depth based routing protocol

A depth-based routing protocol often bases routing decisions on all information at hand. Through the use of a greedy technique, depth-based routing sends a protocol that modifies each hop as it is forwarded.

Additionally, it transmits data to nearby nodes. In this way, the routing choices are enhanced. However, this could be expensive and call for more memory.
In our IoT depth-based routing design, sink nodes are introduced. Instead of storing and processing data, it helps forward it to the database station. The closest sink node receives the data, which it passes to the base station. It uses the Internet of Things to process data that is stored in the cloud.
Algorithm 1.Data packet forwarding algorithm using sensors node
Read
Declare and Initialize
T = (ps- cd)
if (T
forwards data packet to sink node & saves sending time
else
save data packet sending time for further process
Goto 2
End
where as,
pd is depth of previous node
cd is depth of current node
df = depth threshold
T = holding time
Algorithm 2. Packet forwarding using sink node
Read
Np = node packet, SET = energy threshold
Initialization
Packet recieving by sink
if sink energy SET
Packet forward
Else
Sends the packet to the nearest sink
End
Algorithm 3. Packet forwarding using base station
Read
SP = sink packet
Initialize
Packet received by base station
if packet receives
Then
Send packet to cloud
End
In this method, nodes first receive data packets before determining whether or not they are eligible for transmission. Following that, the current node will obtain the depth data from the preceding nodes (pd) (cd). Then, compute the difference using T = the difference between the prior and subsequent nodes (pd - cd). The letter T stands for the holding time. It gets a node to pass data packets to the following stage of the operation if dt is smaller than T. Otherwise, the node determines the holding and transmission timings for the data packets and compares T to dt.
In approach 2, the sink node waits for data packets to come from the sensor nodes. Then, it will assess its energy in relation to the cut-off value (SET). The data packet is forwarded to the base station if the threshold value is less than the energy value; otherwise, it is routed to the closest sink node.
In method 3, the base station watches for data packets to come from the sink node. The data packets are subsequently transmitted to the cloud, where they are processed, stored, and subjected to analysis.



II. Conclusion

Underwater wireless sensor networks can be used to run the routing protocol in situations where the network lifetime is short, the processing capacity is low, and the energy consumption is high. In this study, we recommend using a depth-based routing system that is IoT-enabled to efficiently use energy. When compared to the IoT enabled depth-based routing protocol, the suggested method performs better in terms of energy usage and network stability. Additionally, to develop a hybrid energy capable energy routing system for UWSNs.

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