Energy Consumption and Security On Underwater Sensor Network

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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.In Underwater Wireless Sensor Networks, there are challenges such as restricted network lifetime, poor video processing, high energy consumption, and difficulty replacing nodes. This research focuses on high energy usage while maintaining security. 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

Oceans, rivers, lakes, and other bodies of water make up two-thirds of the earth's surface. Acoustic is critical for monitoring the environment, pollution, oil levels, military purposes, and other applications [1]. The most common underwater exploration designs include monitoring temperature, water quality, pressure, and other factors.Data is initially sent to the sink node. Limited network lifetime, poor processing, high energy consumption, and other factors make UWSNs difficult to implement [2], [3].

Smart cities, traffic monitoring, data gathering, smart agriculture, and other applications employ IoT to enable data collection and efficient communication for a variety of functions. User interfaces, connectivity, nodes, and data processing modules are the four types of IoTs. In every circumstance, the modules are employed to cloud [4].

In depth-based routing systems, one of the shortest paths between the sink node and the data processing [5]. Typically, there will be a small number of routing protocols. Processing at the sink node and station data storage will be lowered to extend the lifetime of UWSN, which will be achievable in IoTs.

In this research, IoT enables smart sinks to transfer data to the station rather than storing it. It sends the information to the closest sink node [6]. The proposed method is to use cloud storage. The sink node in UWSN will respond to the data gathering via the cloud. It extends the life of the network as well as the security and accessibility of the data detected [7], [8].

II. IOT ENABLED DEPTH BASED ROUTING METHOD

One of the most prevalent UWSN routing techniques for making good routing decisions is the depth based routing protocol. Depth-based routing is a greedy approach for forwarding data packets. A sensor node compares the depth embedded in a depth of packets when transmitting or receiving data packets. If the packet's depth is less than one, it is sent to the next node; otherwise, it is dropped.Depth-based routing protocol optimises routing decisions by deciding whether to send data packets or process them depending on the depth information of the node [9], [10].

IoT enabled depth based routing protocol approach with IoT enabled sink nodes was introduced in our method. Typically, the sink nodes send data to the base station for processing and storage. Instead, it will send the observed data to the closest sink node for transmission. As a result, the power of a sink node drops during communication [11].With its IoT, it employs the cloud for data storage and processing.

III. ALGORITHM OF IOT ENABLED DEPTH BASED ROUTING PROTOCOL

Typically, a depth-based routing protocol makes routing decisions based on all available data. Depth-based routing transmits a protocol using a greedy mechanism that updates all hops while forwarding the information. It also sends data to neighbouring nodes. The routing decisions

 DOI : 10.35291/2454-9150.2021.0621

are improved in this manner. However, this might be pricey and require additional memory.

Sink nodes are introduced in our IoT depth-based routing architecture. It assists in forwarding data to the database station rather than keeping and processing it. The data is delivered to the nearest sink node, which then relays it to the base station. It stores data in the cloud and processes it using the IoT approach.

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 technique, nodes receive data packets in the first phase and then determine whether or not the data packets are qualified to be sent. The current node will then get the depth information from the preceding nodes (pd) (cd). Then, using T = the difference between the previous and current nodes, calculate the difference (pd - cd). The holding time is denoted by the letter T.If dt is less than T, it receives a node for passing data packets to the next step in the process. Otherwise, the node calculates the data packets' holding and transmitting times, as well as comparing T to dt.

In method 2, the sink node waits for the sensor nodes to provide data packets. Then it will compare its energy to the threshold value (SET). If the threshold value is less than the energy value, the data packet is sent to the base station; otherwise, it is sent to the nearest sink node.

The base station in method 3 waits for data packets from the sink node to arrive. The data packets are then sent to the cloud, where they are analysed, processed, and stored.

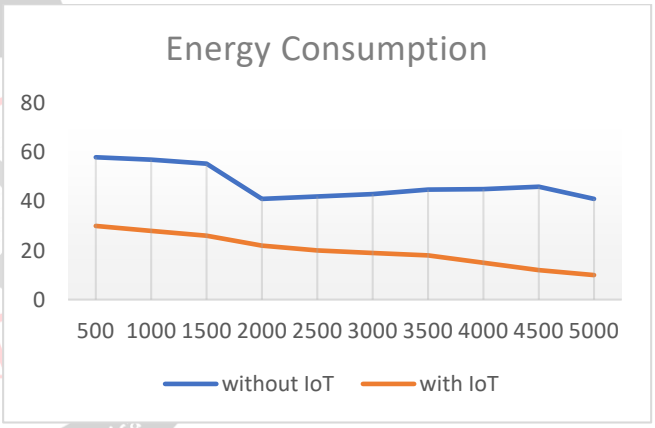

Figure 1: Energy Consumption

IV. CONCLUSION

For short network lifetime, poor processing capabilities, and high energy consumption, underwater wireless sensor networks can be employed to operate the routing protocol. In this study, we suggest that an IoT-enabled depth-based routing protocol be employed to efficiently consume energy. The suggested solution outperforms the depth-based routing protocol in terms of energy consumption and network stability when compared to the IoT enabled depth-based routing protocol. In addition, in UWSNs, to build an energy routing protocol with hybrid energy capabilities.

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