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Design Of Antro Routing Protocol for Underwater Wireless Sensor Network

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Abstract-: Existing routing algorithms are not effective in supporting the dynamic characteristics of underwater wireless sensor networks (UWSNs) and cannot ensure sufficient quality of service in UWSN applications. This project proposes a probabilistic technique for solving computational problems which can be reduced to finding better paths through graphs. . This algorithm is a member of an ant colony algorithms family, in swarm intelligence methods, the algorithm was aiming to search for an optimal path in a graph.

Keywords: UWSN, Routing protocol

I. INTRODUCTION

The earth is a water planet, because more than 70% of its surface is covered by the sea and ocean, the remaining part are covered by human being. Several reasons attract to discover this underwater world such as the still large unexplored surface, the biological and geological wealth, the natural and man-made disasters, which have given rise to significant interest in monitoring oceanic environments for scientific, environmental, commercial, security and military fields .Due to these reasons, underwater wireless sensor networks (UWSN) are very promising to this hostile environment. They have many potential applications, including ocean sampling networks, undersea explorations, disaster prevention, seismic monitoring, and assisted navigation. The function of a routing protocol in UWSN is a fundamental part of the network infrastructure to establish routes between different nodes. UWSN routing protocols are difficult to design in general. It is a challenging task, caused by the aquatic environment. UWSN are significantly different from the terrestrial sensor technology. First, the suitable medium of communication in underwater networks is the acoustic waves and is preferred to both radio and optical waves because they have great drawbacks in aquatic channel.

II. DESIGN COMPONENT FOR UNDERWATER WIRELESS SENSOR NETWORK

A. Noise: It is divided into two ways as ambient noise and manmade noise. This in mainly focus on the shipping activity and machinery noise.

B. High delay: The propagation speed in the underwater sensor magnitude is less than compare to the radio channel.

C. Multipath: Basically this term is refer to as more than one way for degradation of the acoustic communication signal that generates that is refer to as Inter Symbol Interference.

III. MAJOR CHALLENGES IN THE DESIGNING OF UNDERWATER ACOUSTIC NETWORKS ACCORDING TO THE EXISTING SYSTEM

- Battery power is limited and usually batteries cannot be recharged, also because solar energy cannot be exploited;
- The available bandwidth is severely limited;
- Channel characteristics, including long and variable propagation delays, multi-path and fading problems;
- High bit error rates;
- Underwater sensors are prone to failures because of fouling, corrosion, etc.
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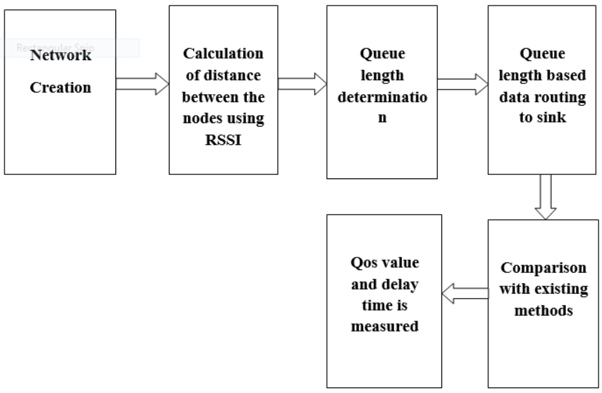
IV. WORKING

Routing is determined by means of very complex interactions of *forward* and *backward* network exploration agents ("ants"). The idea behind this subdivision of agents is to allow the backward ants to utilize the useful information gathered by the forward ants on their trip from source to destination. Based on this principle, no node routing updates are performed by the forward ants. Their only purpose in life is to report network delay conditions to the backward ants, in the form of trip times between each network node. The backward ants inherit this raw data and use it to update the routing table of the nodes.

A. Block Diagram



B. Equations

In proposed Algorithm, based on the packet header, the packet size is being increased and priority bit is being added which leads to faster data transfer rate and effective data transfer.

Validity time:
Validity time indicates a time limit, which states and specifies the time for packet to be transferred and delivered at the destination end. The destination node always specified with the certain time limit for receiving data,

$$VT = C * (1 + a/16) * 2^b$$

Where C is a scaling factor for the "validity time" calculation

A is the higher order bit
B is the lower order bit

$$V\ time = 0.0625 * (1 + 2/16) * 2^2 = 0.281\ sec$$

As validity time decreases, we need to process the packet very quickly with the help of priority, so that we can increase the performance. The MPFR protocol does the job here.

Packet Delivery Fraction (PDF):
The PDF states number of packets delivered successfully at the receiver which is transmitted from the sender

$$PDF = \frac{\text{Number of received packets}}{\text{Number of sent packets}}$$

This estimate gives us an idea of how successful the protocol is in delivering packets. A high value of Packet Delivery Fraction indicates that most of the packets are being delivered to the higher layers and is a good indicator of the algorithm performance.

Average End-to-End Delay (AED):
This is defined as the average time taken by the data packets to reach the intended destinations. This include delay occurred due to different reasons like queuing delay, propagation delay, processing delay etc.

$$AED = \frac{\Sigma\ (\text{time received} - \text{time sent})}{\text{Total data packets received}}$$

C. Result

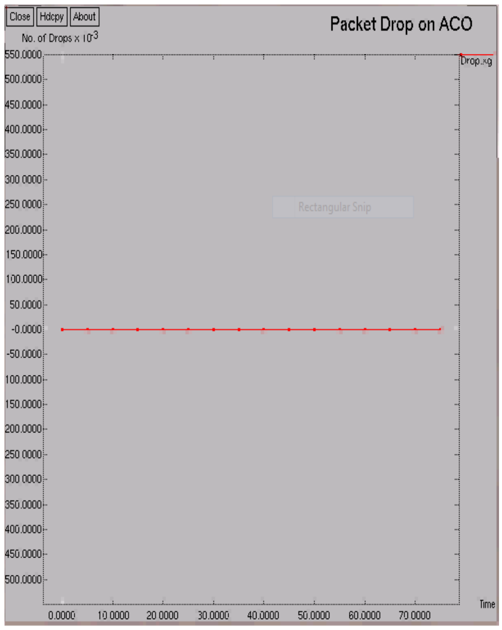


Fig 1.1. This shows about the packet drop. Since the packet has to find the shortest path there is no disturbance we had got a straight line. This shows that there is no drop of packet.

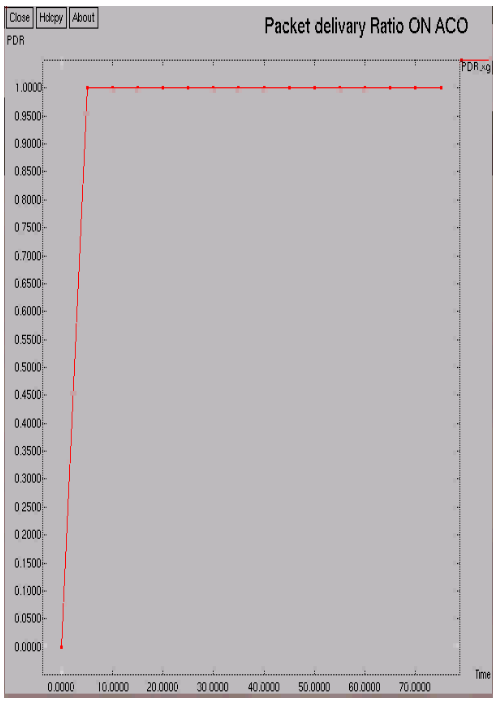


Fig 1.2.This shows about the Packet Delivery Ratio. According Fig 1.1 no packet drop all packet has been delivered. Thus this graph shows about the packet delivery ratio.

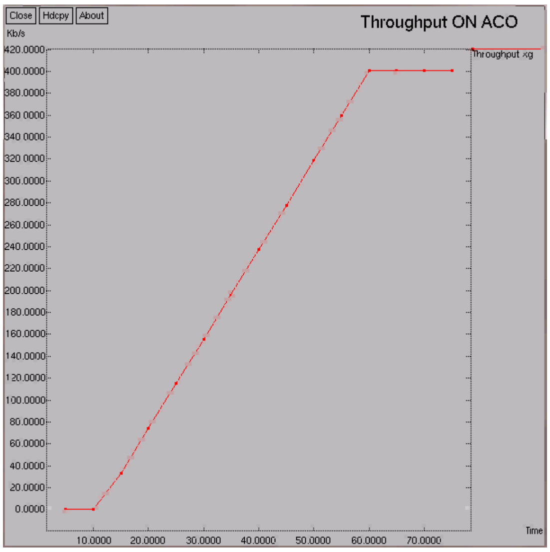


Fig 1.3. This show Throughput how the packet are been delivered. This graph shows how the packet are been delivered

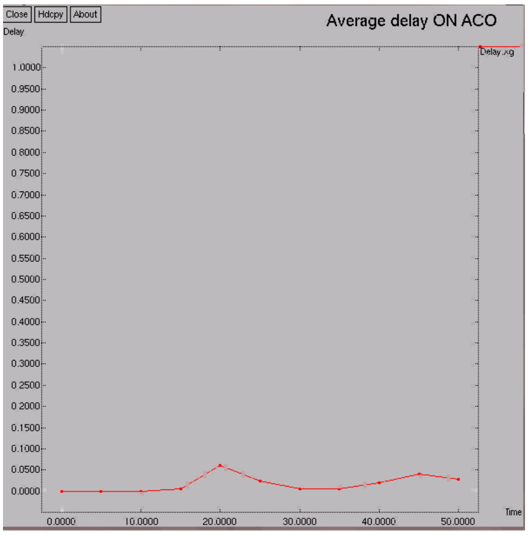


Fig 1.4.This shows about the average delay.

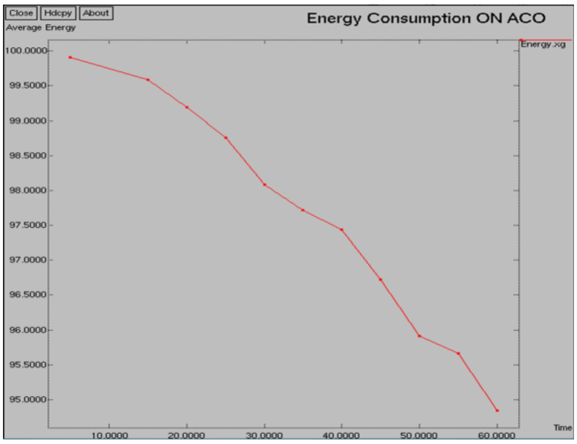


Fig 1.5. This graph shows the rate of energy consumption occurs.

CONCLUSION

Thus a new "Antro" algorithm for the UWSN. We have we have been simulated in NS-2 and generated graphs for the proposed algorithm.

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