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AN ENERGY EFFICIENT DESTINATION SEQUENCE DISTANCE VECTOR ROUTING PROTOCOL FOR UNDERWATER WIRELESS SENSOR NETWORKS

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ABSTRACT: Underwater wireless sensor network attracted massive attention from researchers. In underwater wireless sensor network, many sensor nodes are distributed at different depths in the sea. Due to its complex nature, updating their location or adding new devices is pretty challenging. Due to the constraints on energy storage of underwater wireless sensor network end devices and the complexity of repairing or recharging the device underwater, this is highly significant to strengthen the energy performance of underwater wireless sensor network. An imbalance in power consumption can cause poor performance and a limited network lifetime. To overcome these issues, we propose a depth controlled with energy-balanced routing protocol, which will be able to adjust the depth of lower energy nodes and be able to swap the lower energy nodes with higher energy nodes to ensure consistent energy utilization. The proposed energy-efficient routing protocol is based on an enhanced genetic algorithm and data fusion technique. In the proposed energy-efficient routing protocol, an existing genetic algorithm is enhanced by adding an encoding strategy, a crossover procedure, and an improved mutation operation that helps determine the nodes. The proposed model also utilized an enhanced back propagation neural network for data fusion operation, which is based on multi-hop system and also operates a highly optimized momentum technique, which helps to choose only optimum energy nodes and avoid duplicate selections that help to improve the overall energy and further reduce the quantity of data transmission. In the proposed energy-efficient routing protocol, an enhanced cluster head node is used to select a strategy that can analyze the remaining energy and directions of each participating node. In the simulation, the proposed model achieves 86.7% packet delivery ratio, 12.6% energy consumption, and 10.5% packet drop ratio over existing depth-based routing and energy-efficient depth-based routing methods for underwater wireless sensor network.

Keywords

Improved depth controlled energy-efficient routing protocol, underwater wireless sensor networks, improved genetic algorithm.

I. INTRODUCTION

Underwater wireless sensor networks (UWSNs) are growing in popularity in academics and industries due to their wide range of application domains, including ecosystem monitoring, disaster risk reduction, secondary navigation, energy exploration, and monitoring. Due to powerful unique technologies in underwater monitoring, ocean surveillance, marine surveillance, and custom development for sensing underwater benchmarks, the domain UWSNs has received considerable attention recently. Collecting sensor nodes, base stations, and sink nodes creates a UWSN.1 In UWSN, all the sensor nodes are strewn across the water, mainly from the exterior to the base. The main problem is trying to save energy by using the DSDV routing protocol in the presence of malicio us nodes, using parameters of packet loss, throughput and power.

II. OBJCTIVE

Improve performance by comparing throughput, packet loss, or packet loss. Monitor the performance of the proposed algorithm DSDV

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Different type of activities is done in the sensor node which consumes lots of power due to which there is a need to protect the power of node. The battery of the hub is hard to energize in remote situations, because of this issue the vitality productive directing is utilized to take care of these issues. To accomplish the point, we need not exclusively to limit all out-vitality utilization alongside this equalization the routing stacking WSN.

III. LITERATURE SURVEY

Battery substitution is not an efficient resolution in an underwater environment. Once the detector nodes begin controlling their battery life, vitality openings (lifeless habitats) begin generating. That interrupts the transport of information packets and, in turn, starts the degradation of this system operation. This limit requires beneficial and productive usage of the detector node's capacity. Vector-based forwarding (VBF) addresses the difficulty of sensor nodes. For the sensor nodes, it predefines a pipe for info storage. Each packet comprises information regarding the place of the forwarder, the foundation, and the location. If a node gets a packet, then it computes its location. Then the exact location information is added to the package in the event. In concentrated beam routing (FBR) protocol, an origin node sends a command package to share location advice about itself and this vacation location with them. However, maybe not all neighbour nodes react to this package. Neighbors who lie inside a cone formed with the destination's angle and the origin node respond to this package. Each Single node computes its location line linking the destination and the origin node to determine whether it is positioned inside the cone.

III. EXISTING SYSTEM

- A low-cost, modular, and Long-Range Wide-Area Network (LoRaWAN)-based IoT platform, denoted as "LoRaWAN-based Smart Farming Modular IoT Architecture" (LoRaFarM), and aimed at improving the management of generic farms in a highly customizable way, is presented.
- To enhance different aspects of harbour activities. We analyse the data collection service from underwater sensor nodes. Specifically, we assess the End-To-End (E2E) communication, from sensor nodes deployed in the harbor to the gateway placed on the shore.
- UWSN software is gaining fame for overburdened resources , observation of elements of this environment, and empowering progress within the subject of sea checking and observatory programs ocean surveillance.

IV. PROPOSED SYSTEM

- In this paper am using proactive destination sequenced distance vector routing protocol along with UWSN.
- Each mobile nodes keeps a routing table, this table contains the list of all available destination and the number of hops.
- Each table entry is tagged with a sequence number which is originated by the destination nodes.
- It requires each mobile nodes in the network to advertise its own routing table to its current neighbors.
- The advertisements, is done either by broadcasting or multicasting.by the advertisements the neighboring nodes can know about any change that occurred in the network due to the movements of nodes.
- Sequence number is used to denote that an update is new or old.

A. ADVANTAGES:

- This process is making use of normal time caching process only.
- Due this, delay is minimized as compared to previous malicious node attack detection mechanisms.

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V. ARCHITECTURE DESIGN

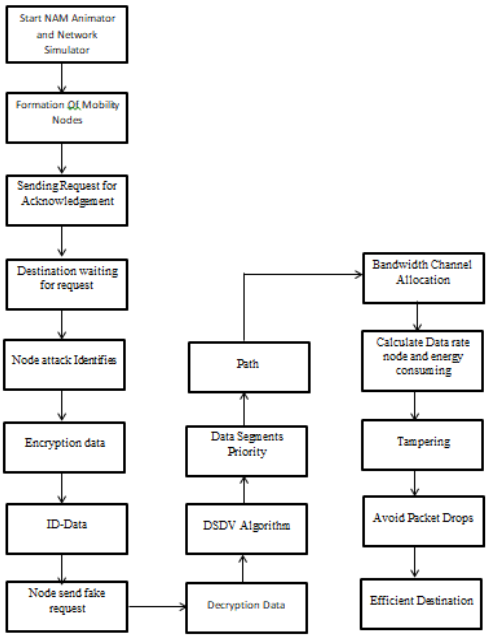

Fig. 1 Proposed for block diagram

VI. MODULE

There are six Modules in this system

- NS object and node creation module
- Detection of malicious nodes module
- DSDV routing protocol algorithm
- Check node condition and data transmission module
- Encrypted data module
- Network animation module and X-graph

VII. SIMULATION PLATFORM

1. NS2

NS2 is short for Network Simulator Version 2. In Computer Communications, NS2 is a free-to-access real- time simulator designed for research projects.

2. SECURITY GOALS

All security systems should provide security mechanisms that can guarantee the confidentiality of the system. These functions are often referred to as the purpose of the security system. In this document, these objectives can bedivided into the following three main groups: Privacy B. Trust C. Availability Data encryption in this document uses symmetric cryptography algorithms to encrypt data transmission security between nodes. The system must encrypt the data or "systematically scramble the data so that it cannot be read without knowing the encoding key". This function is determined by a level of security system. The harder it is to crack an encrypted message, the safer it is. I recommend using, and symmetric ciphers

3. DSDV ALGORITHM

DSDV is based on the Bellman-Ford algorithm. With DSDV, each routing table will contain all available destinations, with the associated next hop, the associated metric (numbers of hops), and a sequence number originated by the destination node. Tables are updated in the topology per exchange between nodes. Each node will broadcast to its neighbors entries in its table. This exchange of entries can be made by dumping the whole routing table, or by performing an incremental update, that means exchanging just recently updated routes. Nodes who receive this data can then update their tables if they received a better route, or a new one. Updates are performed on a regular basis, and are instantly scheduled if a new event is detected in the topology. If there are frequent changes in topology, full table exchange will be preferred whereas in a stable topology, incremental updates will cause less traffic.

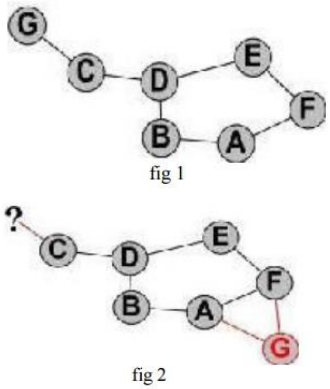

Fig. 2 DSDV Algorithms

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Advantages

- DSDV was one of the early algorithms available. It is quite suitable for creating ad hoc
- Networks with small number of nodes. Since no formal specification of this algorithm is present there is no commercial implementation of this algorithm.
- DSDV guarantees for loop free path.

4. NUM GRAPH

A graph is a non-linear document consisting of vertices and edges. Vertices are sometimes called nodes, and edges are lines or arcs that connect two nodes in a graph. Traditionally, a graph consists of a series of vertices (V) and a series of edges (E). Graph data models are powerful tools for representing and analyzing relationships between objects or entities. They are particularly useful in areas such as social analysis, consensus processes, and computer networks. In sports data science, graphs can be used to analyze and understand the effectiveness of teamwork and player interactions on the field. Think of a football game as a network where the players are the nodes and their interactions on the field are the edge. This network of connections is what image data represents and is key to understanding team performance and players' strength in the game.

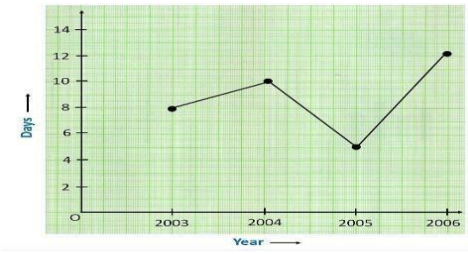

Fig. 3 Num Graph

PARAMETERS/ VALUES

Area of Simulation	(1000 X 1000)m
Nodes number	40
Types of Routing protocol	DSR
Internet protocol type	TCP
Antenna Model	Omnidirectional
Max package	50
Type of the MAC	802.11
Transmission speed	1.2 Mbps
Bandwidth	20MHz

VIII. RESULTS

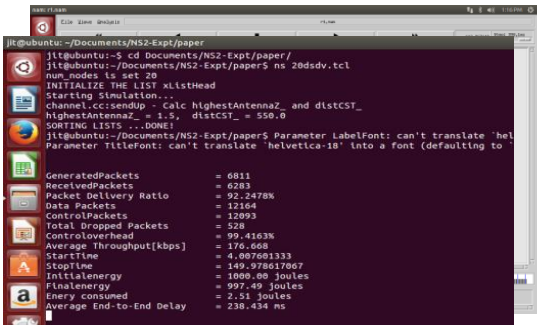

Fig. 4 Nodes in the source

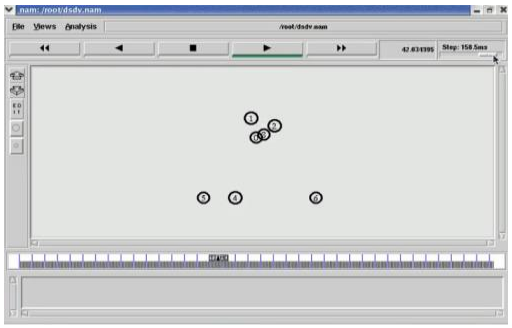

Fig. 5 Source node send ack request

Fig. 6 Performance Parameters of DSDV Network

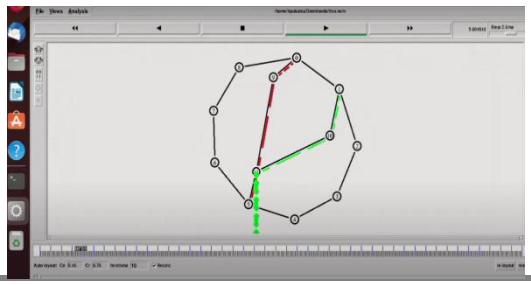

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Fig. 7 Routing performance Parameters of DSDV

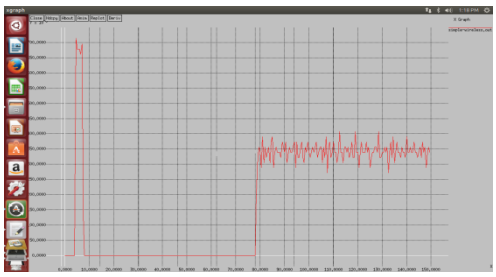

Fig. 8 Gnu plot of Packet Transmission in DSDV Network with 20 nodes in NS2

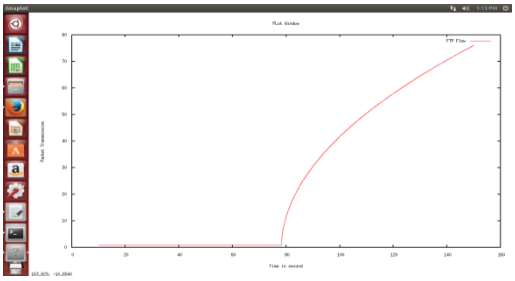

Fig. 9 Time vs. Packet transmission with 20 nodes

IX. CONCLUSION

In UWSN, the replacement of batteries is complex due to the wide size and typical structure of water, so energy-efficient routing in UWSN is always required. This research presented an energy-efficient protocol our proposed system implements the DSDV protocol as a routing protocol. It does not require additional hardware, node placement or sending any information to the base station. No further communication is used for node detection and isolation purposes. DSDV is generally a more efficient routing protocol because it creates ideal paths that can be improved for communication purposes. This methodology further ensures security in the data transfer process and energy efficiency. The proposed technique is also applicable when nodes advertise good connection, strong transmitted power, etc. Even in such cases, our system can detect and isolate such attacks in wireless networks.

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