Babylonian Journal of Networking
Vol.2024, **pp**. 69–77
DOI: https://doi.org/10.58496/BJN/2024/008; ISSN: 3006-5372
https://mesopotamian.press/journals/index.php/BJN

Research Article

Underwater Wireless Sensors Increase Routing Performance using Impact Efficient localization-based Routing protocols

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ARTICLE INFO

Article History

Received 08 Mar 2024
Accepted 11 May 2024
Published 03 Jun 2024

Keywords

Impact High Efficient Localization-Based Routing Protocols (IHELBRP)
UWSNs
Underwater Routing Protocols
Reinforcement Learning-based Opportunistic Routing Protocol (RLORP)

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ABSTRACT

The Underwater Wireless Sensor Network (UWSN) is an organization used to perform observing of errands over a particular region; it is furnished with shrewd sensors and vehicles that are adjusted to convey helpfully through wireless connections. Remote sensor networks are enormous scope networks comprised of modest, reduced sensors with immense scope energy and settling limit that might be utilized in different unpredictable circumstances under factor conditions. The use of UWSNs is growing daily due to their significant contribution to several applications, including underwater surveillance and search. Wireless sensor networks submerged in water confront unique challenges. Therefore, particular routing protocols are needed from source to destination; security concerns that should be taken into consideration by routing protocols must be addressed by many UWSN applications. The proposed routing protocols influencing IHELBRP (Impact High Efficient Localization-Based Routing Protocols) and the UWSN architectural perspective. Reviewing and examining steering conventions concerning energy consumption, packet delivery rate, and packet delivery rate is finished. The advantages and disadvantages of each steering convention are recorded. To shield the correspondence medium here, a rundown of safety needs is incorporated alongside an investigation of safety worries in UWSN.

1. INTRODUCTION

In UWSNs, efficient routing systems are fundamental for information movement. The free space issue in UWSNs is tended to by RLORP, which was introduced in this review. In the setting of restricted energy and submerged conditions, RLORP is a beneficiary-based steering framework that joins sharp directing and supports figuring out how to ensure energy effectiveness and continuous execution of information transmission. To accomplish transmission, the free recovery strategy hopes to avoid free nodes and advances when it tracks down open space [1].

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In contrast with customary submerged wire-based gear, UWSNs have been demonstrated to be a functional choice for marine checking and investigation. In any case, information gathering in UWSNs is seriously restricted due to the hear-able channel's transmission highlights. One method for improving information gathering in UWSNs is configuring steering calculations considering submerged sound transmission properties and potent organization engineering. [2].
Routing algorithms and other aspects of underwater wireless networking and communication have been the subject of much research for many years. A collaborative routing protocol is developed based on these preparations using Q-learning techniques. Transfer actions in this protocol are decided based on empirical information and rewards obtained. To be more precise, a sending node assesses the network's impact and routing performance of every potential forwarding action before choosing a receiving node [3].

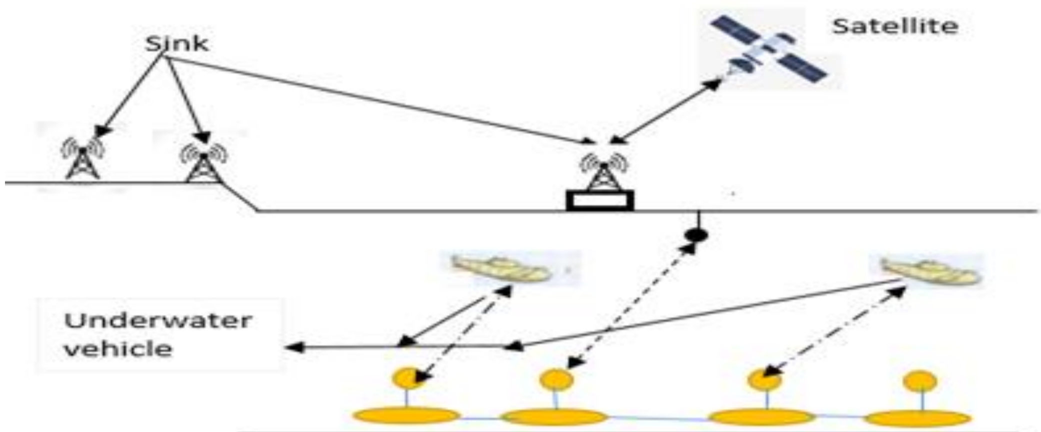

Fig. 1. General Architecture Underwater vehicles

The plan of underwater vehicles employed in underwater sensor networks (UWSNs) is characterized by the acoustic transmission in Fig. 1, which is intrinsic to amphibian conditions. It presents exceptional issues regarding energy utilization, long engendering dormancy, and accessible transfer speed. It is trying to quickly embrace ideas previously demonstrated to be trustworthy in open organizations because of these UWSN issues. One of the main components for the idleness of delicate UWSN applications is start-to-finish dormancy. For delay-delicate UWSN applications, utilize artful directing to upgrade brilliant puts while fulfilling the start-to-finish idleness prerequisites. The source effectively gets a parcel; utilize a nonlinear streamlining model to address this UWSN or steering issue [4].

1.1 Contribution of the Work

- A network that is utilized for monitoring activities in a particular area is known as an underwater wireless sensor network (UWSN).
- These cars have wireless connections and sophisticated sensors that allow them to work together in communication.
- A handset that deals with the acoustic signs from submerged is situated toward the sink's finish.
- The handset might send and get long-range radio recurrence signals when speaking with the coast station.
- The gathered information is utilized inside or associated with another network for a predefined reason.

2. RELATED WORKS

UWSNs use broadcasting, which is intrinsic to aquatic environments and has issues related to energy consumption, significant propagation delays, and available bandwidth. It is challenging to immediately adopt techniques that have demonstrated their reliability in open networks due to the challenges presented by UWSN [5].
First, by successively choosing nearby nodes with greater values as possible forwarding nodes. Second, to enhance the routing protocol's performance, two reward functions—one for successful packet transmission and the other for unsuccessful packet transmission—are built in conjunction with cross-layer data in the MARL reward function [6].

Void nodes employ the void operation method to establish a temporary CH to re-establish network operations. NS3 verifies the scheme through comprehensive simulations. The simulation outcomes demonstrate that, in comparison to the baseline scheme, the two suggested designs enhance network performance [7].
This technique is innovative in using normal progression to choose a possible candidate sender during the data transmission phase. Additionally, there are two modes of operation for the proposed routing protocol: void avoidance mode (VA with NA-TORA) and regular operating mode (NA-TORA) [8].
UWSNs, or submerged remote sensor organizations, are another innovation that can be utilized to investigate submerged assets. Security is vital since UWSN conditions are defenseless against many kinds of safety attacks. This exploration proposes a solid, energy-productive, and helpful directing convention for UWSNs [9].
These two strategies use individual sequence learning and stochastic game theory to increment parcel sending, energy proficiency, and organization execution. Every hub alters its transmission power and conveys bundles in a versatile and dispersive manner. Please take advantage of your association by making it viable [10].
Extend and personalize the pool of candidates. Based on this, a forwarding that combines opportunistic forwarding and interflow network coding in CORS is constructed utilizing an opportunistic coding technique. Furthermore, a sliding window-based coding technique that offers low overhead and efficient coding gain should be developed. Second, a sliding window-based decoding algorithm aims to reduce the overhead associated with decoding. According to the simulation results, CORS dramatically enhances the network performance of current protocols in various circumstances [11].
Achieving high data rates in a MANET requires optimizing efficient packet access. Degradation results from identifying the rogue node; therefore, it can be difficult to lessen the intensity in a critical location when trusting nodes have identical qualities [12].
The transmission burden can be partitioned uniformly across the sensor hubs, assuming the sensors tweak their correspondence power while sending or transferring intermittently produced information. In particular, recommend decent directing engineering and matching organization methods that carefully work out the heap weight for each practical ensuing bounce, bringing about an energy-proficient use across all submerged sensors [13].
Low communication bandwidth, significant propagation delays, ocean currents, and other distinctive features set USNs apart from wireless sensor networks. In 3-D USNs, a new mob cast routing protocol was created with the peculiarities of USNs in mind. Creating a power-saving mob cast protocol in 3-D USNs to address the issue of 3-D unpredictability is a significant architectural challenge. [14].
This also enables the forwarder to modify its transmission power in response to the distant nodes in its neighbor list. Third, duplicate packets are minimized by comparing the PFN, depth, and residual energy between neighboring packets. Additionally, it lowers network latency in high-traffic sections of the network by utilizing two sinks. [15].
For wireless networks comprised of thousands of versatile, free hubs that need to be removed from a prior network foundation, portable impromptu organizations, or MANETs, are an essential idea. Since independent hubs can access the organization freely, they can make fleeting, unique organizations inclined to fast topological changes [16].
The RN to DN model is utilized most briefly from a multipath climate to move parcels from the source hub to the objective hub as fast as possible. The new directing worldview boosts the quantity of DNs related to RNs. A network interaction is likewise presented to work with information moving from the parent AUV to the kid and eventually to the sink node [17].
These models are utilized in the briefest manner from a multipath climate to move bundles as fast as possible from the source hub to the objective node. The new steering worldview augments the quantity of DNS related to RNs. A league interaction is likewise presented to work with information moving from the parent AUV to the kid and eventually to the sink hub [18].

3. PROPOSED METHODOLOGY

Data must be altered before transferring with the most minor loss possible to create wireless communication networks between nodes. Intensity modulation techniques like on-off keying and pulse position modulation, or BPM, form the foundation of most underwater optical systems. It shows how various communication ranges can be covered using adaptive modulation technology. To assist the recipient in fixing any problems in the message they have received, these strategies append extraneous bits to the message sent. These codes decrease bandwidth efficiency while simultaneously increasing the system's power efficiency.

Optical signs crumble in basically the same manner as hear-able ones. This lessens the framework's piece error rate. While plans cannot accomplish much centimeter precision, different methodologies utilized in UWSN-based plots just do not give many meters of exactness, sporadic sign proliferation examples, and impedance from foundation aggravations. It improved with a directing framework in light of IHELBRP to expand flagging connection points and multipath steering.

3.1 Acoustic Signal Attenuation

The attenuation of the signal under the channel's conditions determines how well a wireless communication system works. Equations that simulate the attenuation related to subsonic underwater communications are produced.

$$A(d,f) = A_0 d^k a(f)^k \tag{1}$$

Where A0 is the normalization constant, k (the diffusion factor) is 1.5, and A (d, f) is the attenuation across distance d at frequency f.

3.2. Optical Signal Attenuation

Longer distances cause increased attenuation of optical signals. The following formula models the power of optical signals received at the target node.

$$p = \frac{2P_0 A_r cos\beta}{\pi L^2(1 - cos\theta) + 22A_r} e^{-et} \tag{2}$$

Distance from the emitter (d), emitter luminous flux spread angle (θ), emitter area, attenuation coefficient (α), and receiver area are all related to the emitter. Optical communications require a restricted field of view and a direct line of sight to maximize received power.

3.3 Impact High Efficient Localization-Based Routing Protocols (IHELBRP)

Additionally, impact high-efficiency localization-based routing protocols (IHELBRP) perform better in underwater wireless sensor networks (WSNs); nonetheless, the former is mainly utilized in dense networks with little traffic, while the latter is employed in networks with regular traffic and significant traffic. The model of exponential damping used is essential. IHELBRP routing protocol I (z) is one example.

$$I(z) = I_0 \exp(-c(\lambda)\cdot z) \tag{3}$$

The Lambert-Beer law is represented by equation 3. In the channel, this expresses the light received at a distance z from the transmitter. In this case, the attenuation coefficient is c (λ), and the transmitted light is I0.

The research above concluded that OLSR's high energy consumption makes it viable for use, while DSR's low throughput makes it unsuitable.

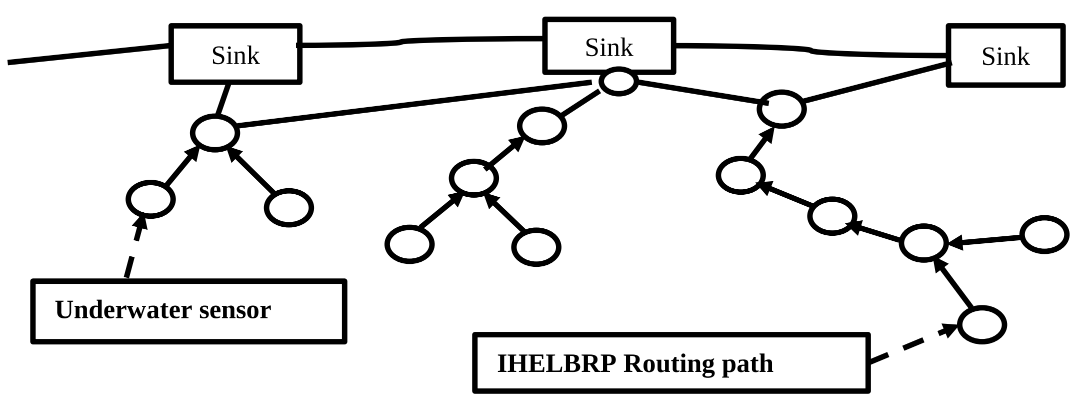

Fig. 2. Proposed Architecture

IHELBRP performs better in underwater WSNs, according to Fig. 2. However, it is mainly utilized for dense networks with little traffic. In contrast, the latter is used for networks with frequent high traffic. To achieve optimal results in energy consumption, routing efficiency, packet delay, and underwater wireless packet delivery rate. Chap. And the subjects above are discussed.

4. RESULT AND DISCUSSION

The routing optimization of underwater wireless sensor networks is covered in the proposed system. The suggested system, which uses the IHELBRP routing protocol to optimize routing for underwater wireless sensor networks, may address the issue of routing optimization. Packet delivery ratio, packet end-to-end delay, and energy consumption are further issues with underwater wireless sensor networks. Using the tools below, determine the simulation parameter.

TABLE I. SIMULATION PARAMETERS

Parameters	**Values**
Number of nodes	100
Simulation Runs	200 Joules
Energy Resource	30
Minimum Energy Threshold	512 bytes
Data Packet size	32.2 kbps
Data rate	258 m
Carrier Frequency	28khz
Simulator tools	NS2
Routing protocol	IHELBRP

The Impact High Efficient Localization-Based Routing Protocols (IHELBRP) system is utilized to optimize routing in underwater wireless sensor networks. The proposed system simulation parameter is shown in Table 1. Reduced energy levels, increased packet delivery ratios, and shorter packet delay times are all achieved with the help of the suggested method. To conduct the packet delivery ratio as the number of nodes rises, utilize Table 2.

TABLE II. UNDERWATER WSN PACKET DELIVERY RATIO (%)

No of Packets	DSR	AODV	DSDV	OLDER	IHELBRP (proposed)
25	60	65	70	75	80
50	65	75	85	88	89
75	68	79	89	90	91
100	75	78	87	88	93

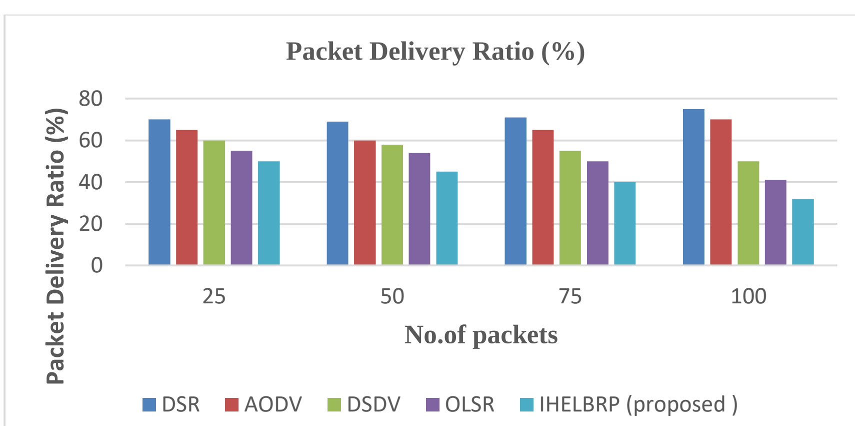

Fig. 3. Packet Delivery ratio

Figure 3. And Table 2. Compare the packet delivery ratio to different routing techniques. The DSR routing protocol achieves a 75% delivery ratio for 100 packets. With 100 packets, the AODV routing protocol has a 78% delivery ratio.

With 100 packets, the DSDV routing protocol yields an 87% delivery ratio. With 100 packets, the OLSR routing technique has an 88% delivery ratio. With 100 packets, the suggested IHELBRP routing protocol system yields a 93% delivery ratio.

TABLE III. UNDERWATER ESN PACKET END TO END DELAYDELAY (M/SEC)

No of Packets	DSR	AODV	DSDV	OLDER	IHELBRP (proposed)
25	0.9	0.7	0.6	0.4	0.5
50	0.8	0.6	0.4	0.3	0.4
75	0.7	0.6	0.5	0.4	0.3
100	0.8	0.7	0.6	0.5	0.2

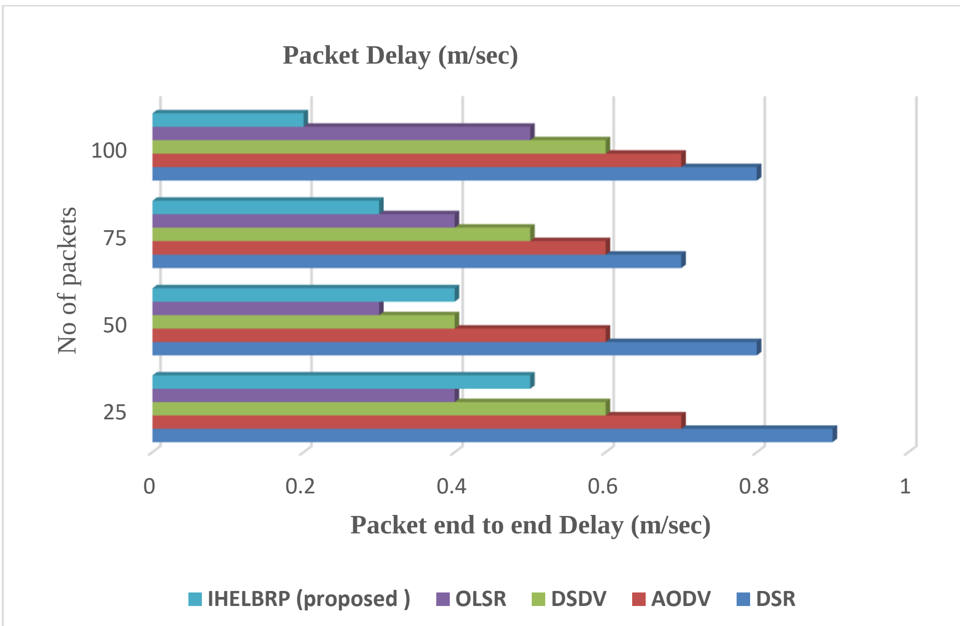

Fig. 4. Delay performance

Table 3 and figure.4 discuss the delay performance compared to various routing protocols. The DSR routing protocol is used for 100 packets and gives an End-to-end delay performance of 0.8 m/sec. The AODV routing protocol is used for 100 packets and provides a delay with performance of 0.7 m/sec. The DSDV routing protocol is used for 100 packets and gives a delay performance of 0.6 m/sec. The OLSR routing protocol is used for 100 packets and causes a delay with a performance of 0.5 m/sec. The proposed system of IHELBRP routing protocol is used for 100 packets and gives a delay performance of 0.2 m/sec.

TABLE IV. UNDERWATER WSN ENERGY CONSUMPTION

No of Packets	DSR	AODV	DSDV	OLDER	IHELBRP (proposed)
25	70	65	60	55	50
50	69	60	58	54	45
75	71	65	55	50	40
100	75	70	50	41	32

Table 4 and Figure 5 discuss the Energy Consumption performance compared to various routing protocols. The DSR routing protocol is used for 100 packets and gives an Energy Consumption performance of 75%. The AODV routing protocol is used for 100 packets and provides an Energy with Consumption performance of 70%. The DSDV routing protocol is used for 100 packets and gives an Energy Consumption performance of 50%. The OLSR routing protocol is used for 100 packets and provides an Energy with Consumption performance of 41%. The proposed system of the IHELBRP routing protocol is used for 100 packets and gives an Energy Consumption performance of 32%.

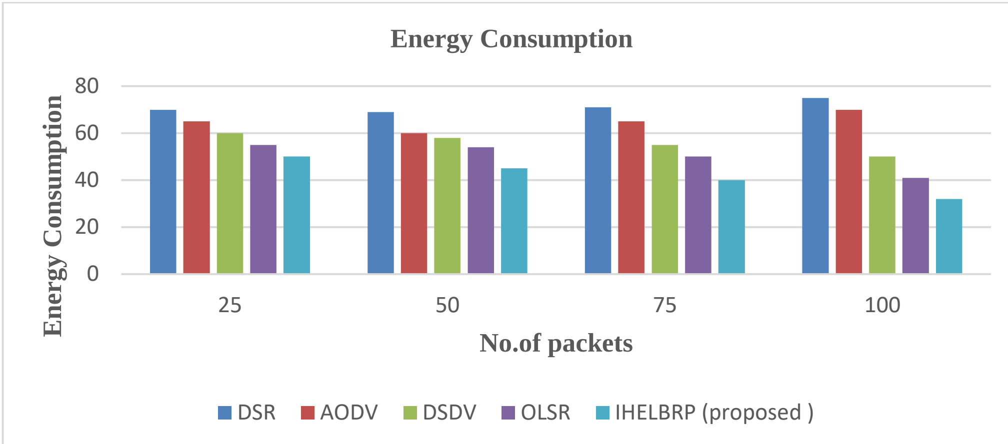

Fig. 5. Energy Consumption

TABLE V. UNDERWATER WSNs ROUTING PERFORMANCE

No of Packets	DSR	AODV	DSDV	OLDER	IHELBRP (proposed)
25	30	35	40	45	55
50	35	40	45	50	58
75	40	45	55	65	78
100	55	65	75	85	90

Table 5 and figure.6 discuss the Routing performance compared to various routing protocols. The DSR routing protocol is used for 100 packets and gives a Routing performance of 55%. The AODV routing protocol is used for 100 packets and provides a routing performance of 65%. The DSDV routing protocol is used for 100 packets and gives a Routing performance of 75%. The OLSR routing protocol is used for 100 packets and provides a routing with performance of 85 %. The proposed system of IHELBRP routing protocol is used for 100 packets and gives a Routing performance of 90%.

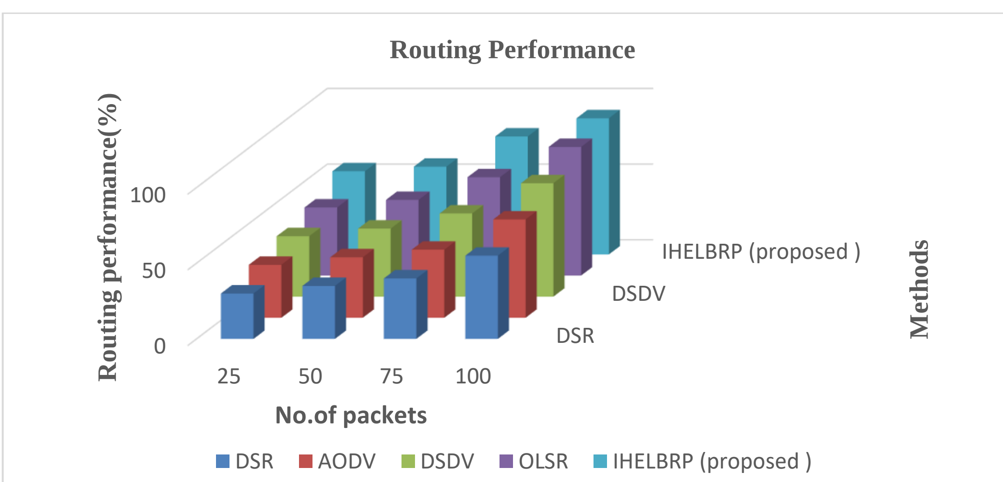

Fig. 6. Routing Performance

5. CONCLUSION

To solve issues with packet delivery ratio, routing performance, energy consumption, and end-to-end latency, UWSN nodes utilize more energy for each task and have limited battery life. It might be costly to recharge depleted batteries. A wireless sensor network's underwater systems are designed to use sensors and other devices to detect the ocean and then coordinate to function independently underwater. The IHELBRP routing protocol is being suggested. The 100-packet delivery ratio in this protocol is 93%, the 100-packet end-to-end latency performance is 0.2 m/sec, the 100-packet energy consumption is 32%, and the 100-packet network routing performance is 90%.

Conflicts Of Interest

The absence of any financial or personal connections that could create conflicts of interest is disclosed in the paper.

Funding

No financial grants or awards related to the research are disclosed in the paper, signifying a lack of external funding.

Acknowledgment

The author expresses gratitude to the institution for their provision of software tools and equipment that supported data analysis and visualization.

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