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Effective Information Retrival Using Query Search Algorithm for Block Chain Based Systems

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ABSTRACT: Blockchain technology is a network of peer-to-peer nodes that keeps transactional records, also known as blocks, of the public in various databases, also known as the chain. This type of storage is commonly referred to as a digital ledger. Blockchain technology has significant implications in wireless routing technologies. The purpose of this article is to provide an overview of the use of blockchain technology in the wireless routing advertisement. Although the technology is most commonly connected with crypto currencies, it also offers potential in non-financial applications like as supply chain, energy, and the food industry. This project makes use of blockchain technology to exchange routing information messages in wireless Adhoc networks securely and quickly. Here the shortest path between two nodes is identified and the route information is exchanged among nodes using blockchain.

KEYWORDS: Blockchain, ARP, DRP, Logistics Information, Time Delay, Reduce Agent.

I. INTRODUCTION

A blockchain is a globally distributed, open, shared ledger or database that runs on millions of devices and records all transactions between two parties. It does it quickly and reliably, effectively serving as a safe storage facility for not only information but everything of worth. A Blockchain is a decentralized network for value exchange, similar to the Internet of the 1990s, which served as a decentralized network for information exchange. The blockchain is a basic technology that is owned and controlled by no single organization.

Routing is the process of determining the most efficient route to a destination by minimising the distance or travel time required[21]. Nodes engage in the wireless network by routing data to other nodes, which is done dynamically based on network connectivity and routing algorithm.

Blockchain can be used for secure data sharing in a wireless network[22]. The mobility and resource limitations of nodes are significant elements that influence blockchain performance. Designing a routing system that exchanges routing information quickly in blockchain is extremely difficult.

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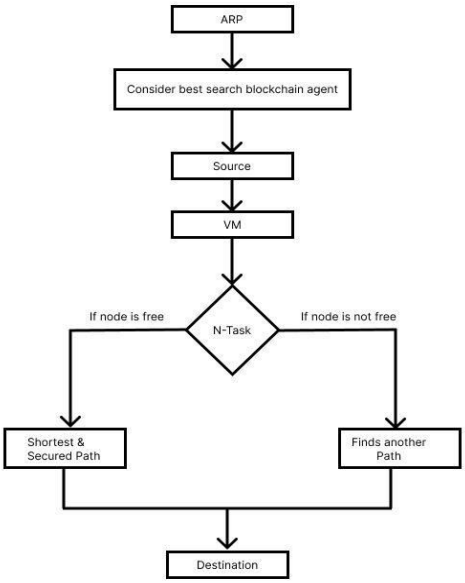

Fig 1: Workflow

A wireless network is that connects wireless client devices quickly and easily without the use of access points [5]. MANET stands for Mobile Ad-hoc Network, also known as a wireless Ad-hoc network or Ad-hoc wireless network, which is often built on top of a Link Layer ad hoc network and provides a routable networking environment[25]. Wireless mobile ad-hoc networks are dynamic, self-configuring networks with nodes that are free to move[6][24]. Each node acts as a router, forwarding traffic to other nodes in the network that have been designated [7].

Wireless networks are more vulnerable to cyber-attacks. Due to the distributed nature of the operation for security, routing, and host setup, a centralised firewall is not present [8]. As a result, there are concerns about the data's accuracy. Blockchain is being used to overcome these problems and provides an extra layer of security.The shortest path between two points is determined using DRP (Dynamic Routing Protocol). It is less secure because it does not show alternate nodes for the route. The ARP (Adaptive routing protocol), on the other hand, provides us with the shortest and most secure route, as well as alternate nodes for the path between source and destination. In these two strategies, path selection is dependent on factors such as time.The time process, which identifies multiple ways to compress and minimise the non-value added time of route design in order to maximise the time value of the routing algorithm. [9]. Because there are many nodes utilised to determine the route, each node will have a certain amount of energy that will be used to select the way while routing occurs through the nodes.
Ad-hoc networks have its security problems due to its hash neighbour relaying packets. Because of data transmission faults, wireless ad-hoc networks are equally unreliable [10]. To address these challenges, blockchain has been implemented to protect the routing path and data transfer [11].
A new algorithm has been implemented to the DRP and ARP protocols. In which the time reduction approach and energy consumption are considered, and the time compression and energy consumption are demonstrated effectively.

II. LITERATURE SURVEY

"Decentralized Attestation and Distribution of Information Using Blockchains and Multi-Protocol Storage":
Felix Härer and Hans-Georg Fill [16] describe the distribution of information using decentralized attestation from blockchain. This paper also uses multiprotocol storage for compatibility. This enhanced approach intends to offer innovative ideas to the conversation of blockchain scalability rather than specific protocols or blockchain.It extends the

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capabilities of current protocols for applications like digital asset certification and timestamping. From this paper the decentralization of distributed information is used in this system for the distribution of messages between nodes.

"Linear Elliptical Curve Digital Signature (LECDS) With Blockchain Approach for Enhanced Security on Cloud Server" :
B. SOWMIYA Et al[17] describes a method adapted called linear elliptical curve digital signature (LECDS) with Hyperledger blockchain to prevent private data loss. To maintain privacy the sensitive data are hidden using cryptographic technique even for authorized users. A method called linear regression is used to classify the information of the users into two sections namely sensitive and non-sensitive data. From this paper the Merkle hash tree has been used for validation process in our project for the generation of the encrypted hash value of the message.

"Research on Logistics Information Blockchain Data Query Algorithm Based on Searchable Encryption" :
YIBO SUN Et al[18] describes a searchable and encrypted logistical information blockchain data query method is presented to ensure the security of logistics information and to query information quickly and efficiently using searchable encryption algorithms paired with the properties of the blockchain. The logistical data is first separated into different data files, then encrypted using an asymmetric searchable encryption technique and saved in the cloud server. This makes the information feasible and analyse the correctness and completeness, for which this paper has been referred for our project.

"Blockchain Based Secure Routing and Trust Management in Wireless Sensor Networks":
Saba Awan Et al[19] describesan encryption and trust evaluation model based on a blockchain that stores the identities of Aggregator Nodes (ANs) and Sensor Nodes (SNs). The SNs are vulnerable to malicious nodes and have limited energy, transmission range, and processing capability. Following then, the malicious nodes communicate incorrect route information and increase the number of retransmissions, consuming the SNs' energy quickly. To remove malicious nodes from the network, the trust values of SNs are computed. The network's secure routing taken into account the SNs' residual energy and trust values. The trustworthiness of different are taken into consideration by referring this paper.

"Reputation Based Routing in MANET using Blockchain":
Maqsood Ahamed Abdul Careem and AveekDutta[20] describesone of the most significant challenges in routing packets in Mobile Ad hoc Networks (MANETs) is the lack of trust and reputation among the participating nodes, which frequently results in packet delivery that is unreliable. They have used a small number of nodes to validate routing activities done by other nodes, and they used Blockchain networks distributed consensus method to build each node's reputation. Scoring system is used to isolate malicious nodes via distributed consensus and use heterogeneous difficulty for Proof of Work to indicate the reliability of validation. The difficulty level and score are then combined to determine a node's reputation. This reputation is used to calculate the quickest, most reputable path between a source and destination node using a novel routing metric. To find the shortest and reliable path from source to destination in our project is referred from this paper.

Detection of Wireless Traffic Bandwidth for Automatic Communication Protocol Selection in Wireless Network-on-Chip Systems
For each application, Vimuth Fernando et al[6]describes a novel method capable of dynamically modifying the MAC protocol to the characteristics and demands of the WNoC.. From this paper the adaptation of routing protocol to wireless networks is referred to this paper.

"Impact of Mobility Models on Multi-Path Routing in Mobile Ad-Hoc Networks":
Nicholas Cooper and Natarajan Meghanathan[7]describes a detailed simulation-based investigation of the effect of mobility models on the performance of node and link disjoint multipath routing algorithms in Mobile Ad Hoc Networks. From this paper multipath routing in MANET is referred to this paper.

"Security Challenges of Wireless Communications Networks: A Survey"
Gerald K. Ijemaru et al[8] discuss the security weaknesses and threats posed by wireless networks' fundamental open nature, as well as potential solutions.From this paper security challenges in wireless networks is referred to this paper.

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"An Improved ARP Protocol for Enhanced Lifetime in Wireless AD Hoc Networks"
The E-ARP protocol, developed by Qian Zhao et al [15], adds a new way to the existing ARP protocol that allows it to carry on extra energy exchange messages between neighbours. From this paper adaptive routing protocol for wireless networks is referred to this paper.

"Efficient time reducing and energy saving routing algorithm for wireless sensor network"
To address the demand of the current research trend, S Venkataramana et al describe[9] an innovative energy-saving routing algorithm for wireless sensor networks (WSNs). A novel idea of dominating node has been presented, in contrast to traditional methodologies.
When using DRP and ARP in MANET for the route determination there is a concern in security which may lead to tampering data. Furthermore, they have merely described the time consumptionof the nodes.The performance of the DRP and ARP algorithms with respect to time taken for route generation and route advertisement and energy spent by a node for the same are measured. The experimental results show that they cannot be used in real time environment. In order to improve the performance and use a routing protocol in real time environment, a novel SRAP (Secure Routing Adaptive Protocol) is proposed in this project. Before getting into the details of SRAP protocol, DRP and ARP were examined in the following sections.

Methods
DRP (Dynamic Routing Protocol)

In DRP protocol the parameter time is mainly considered. In this the blockchain concept is introduced to level up its security and making the information trustworthy that is selected for path selection. In this the number of nodes is selected by running the secure routing program. In ad hoc networks, secure routing protocols are those that are designed to resist routing threats that interrupt route finding.A wireless ad hoc network that permits quick connection establishment between wireless compute nodes in the same actual space without the usage of infrastructure devices like access points or base stations[14][23]. A type of blockchain called Ethereum is created as it aims to create a system that provides people more control over their data and the capacity to create and run blockchain-based services.

Pseudo code
Start the procedure
Initialize the search blockchain agent $(sa)$with $'c'$ clusters (block)

$\text{BLOCK}(sa) \leq c$

Start searching process with iteration (itr)
While $n < itr$
For each BLOCK (sa) i do
For each vector $x(p)$ do
Evaluate Euclidian distance (Ed) to all search agents
Make $x(p)$ to search agent (sa)

$$X(p) <= sa$$

Evaluate fitness function

$$f\{BLOCKsa(i)\} = p1/x(BLOCKsa(i)/+p2Res\ BLOCKsa(i).(P)$$

end while

III. RESULTS AND DISCUSSION

Time and Energy are the factors that are taken into considerations. With the 45 blocks and approximately 180 nodes that are taken for implementation.There are 45 ethereum blocks created to have the nodes to make the information passed more secure. We have to provide the number of nodes per block as an input. Next, the initialization should be done. The number of nodes chosen is evenly distributed and present inside each block. In each block, a head node called Virtual machine will be assigned to control and store the information of the other nodes. There will also be a node named n-node that stores information about other nodes and assigns work to each node. Other VM nodes are those that are idle yet capable of working. Now the source and destination should be selected from the working nodes inside the blocks. DRP implies here and find the shortest path between the source and destination with the help of VM nodes.

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2 Scenarios has been taken ,

Scenario 1 - When time is considered,

In iteration 1, source node and destination node is taken as 7 and 174 , the time taken in seconds are 5.43(DRP). 5.55(ARP), 5.39(SRAP). In iteration 2 , source and destination node is taken as 9 and 165, the time taken in seconds are 5.35(DRP), 5.41(ARP), 5.21(SRAP).In iteration 3 , source and destination node is taken as 5 and 135, the time taken in seconds are 5.21(DRP), 5.35(ARP), 5.17(SRAP) , likewise for 10 iterations time taken is calculated and shown in the graph.

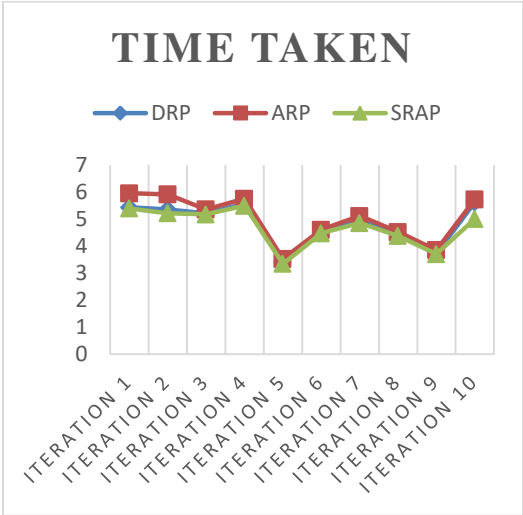

FIGURE 2: Time

.**Scenario 1**–Energy is considered,

In iteration 1, source node and destination node is taken as 7 and 174 , the energy consumed in Joules(J) are 3.43(DRP). 3.60(ARP), 3.39(SRAP). In iteration 2 , source and destination node is taken as 9 and 165, the energy consumed in Joules(J) are 3.38(DRP), 3.48(ARP), 3.35(SRAP).In iteration 3 , source and destination node is taken as 5 and 135, the energy consumed in Joules(J) are 3.27(DRP), 3.41(ARP), 3.23(SRAP) , likewise for 10 iterations the energy consumed in Joules(J) is calculated and shown in the graph.

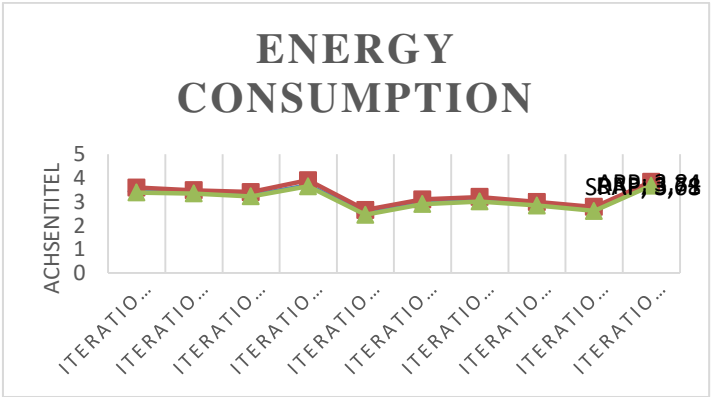

FIGURE 3: Energy

Scenario 2 - When time is considered,

In iteration 1, source node and destination node is taken as 25 and 179 , the time taken in seconds are 5.43(DRP). 5.51(ARP), 5.40(SRAP). In iteration 2 , source and destination node is taken as 35 and 95, the time taken in seconds are 3.47(DRP), 3.51(ARP), 3.42(SRAP).In iteration 3 , source and destination node is taken as 8 and 148, the time taken in seconds are 4.91(DRP), 5.10(ARP), 4.87(SRAP) , likewise for 10 iterations time taken is calculated and shown in the graph.

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IV. CONCLUSION

The core of the wireless routing advertisement is time compression strategy and energy saving technique. Here various sources has been used to reduce time and energy consumption in wireless routing advertisement. Various techniques like DRP, ARP and SRAP has been analyzed to reduce non value added time and energy consumption. The DRP protocol selects a routing path based on time, while the ARP protocol selects a routing path based on time and security, as well as showing alternate nodes for the path that can be used if the current routing path is blocked. Then, in addition to the existing factors like time and security, a proposed protocol called SRAP is shown, which considers factors like node energy for routing. It also allows us to determine the current energy of the nodes, allowing us to plan an alternate path if the current working nodes' energy is insufficient. Finally SRAP(Secure Routing Adaptive Protocol) performs better that DRP and ARP with respect to Time and Energy by 6% and 4 % in scenario 1 and 5% and 9% in scenario 2 respectively. In the future, this technique can be used in VANET (Vehicular Ad Hoc Network) for Supply Chain Management and also in other wireless network services to get benefited in time and energy consumption. And also the information gathered about the routes saved in the nodes can be safely stored in the cloud utilising blockchain technologies that can be deployed physically in IoT devices or in VANET software.

REFERENCES

1. Baiod, Wajde; Light, Janet; and Mahanti, Aniket (2021) "Blockchain Technology and its Applications Across Multiple Domains: A Survey," Journal of International Technology and Information Management: Vol. 29 :Iss. 4 , Article 4.
2. Heni KAANICHE, Fatma LOUATI, Mounir FRIKHA3 and Farouk KAMOUN1 "A QOS ROUTING PROTOCOL BASED ON AVAILABLE BANDWIDTH ESTIMATION FOR WIRELESS AD HOC NETWORKS",International Journal of Computer Networks & Communications (IJCNC), Vol.3, No.1, January 2011.
3. Nikhil Patearia,Vidisha, "PERFORMANCE ANALYSIS OF DYNAMIC ROUTING PROTOCOL IN MOBILE AD HOC NETWORK", Journal of Global Research in Computer Science,Volume 2, No. 10, October 2011.
4. DelfínRupérezCañas,Luis Javier García Villalba,Ana Lucila Sandoval Orozco, "Adaptive routing protocol for mobile ad hoc networks", published on ResearchGate,September 2014.
5. Henrik Lundgren, "Implementation and Real World evaluation of routing protocols for routing ad hoc networks", ITLicenciate Theses,2002-008.
6. Vimuth Fernando, Antonio Franques, Keyur Joshi, "Detection of Wireless Traffic Bandwidth for Automatic Communication Protocol Selection in Wireless Network-on-Chip Systems", University of Illinois at Urbana-Champaign, January 11, 2020.
7. Nicholas Cooper 1 and Natarajan Meghanathan ,"Impact of Mobility Models on Multi-Path Routing in Mobile Ad-Hoc Networks", International Journal Of Computer Networks & Communications (IJCNC), Vol. 2, No.1, January 2010.
8. Gerald K. Ijemaru, Ibrahim A. Adeyanju, Kehinde O. Olusuyi, Temidayo J. Ofusori,3Ericmoore T. Ngharamike and Adedayo A. Sobowale, "Security Challenges of Wireless Communications Networks: A Survey", International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 8 (2018) pp. 5680-5692.
9. S Venkataramana1, B V D S Sekhar, N Deshai, V V S SS Chakravarthy, S Krishna Rao, "Efficient time reducing and energy saving routing algorithm for wireless sensor network" ,International conference on computer vision and machine learning,IOPPublishing,IOP Conf. Series: Journal of Physics: Conf. Series 1228 (2019) 012002.
10. Sarika Sa*, Pravin Ab, Vijayakumar Ac, SelvamaniKd, "Security Issues In Mobile Ad Hoc Networks", 2016 Published by Elsevier B.V. doi:10.1016/j.procs.2016.07.363
11. David Cordova, Alexandre Laube, Thi-Mai-Trang Nguyen Sorbonne Universite, CNRS, LIP6, 7525 Paris, Franc Blockgraph: A blockchain for mobile ad hoc networks Guy Pujolle Green Communications, Paris, France
12. Fernando MagnoQuint˜ao Pereira, Marco Tulio de Oliveira Valente, Wagner Salazar Pires,Roberto da Silva Bigonha,Mariza Andrade da Silva Bigonha, "Tactics for Remote Method Invocation", Journal of Universal Computer Science, vol. 10, no. 7 (2004), 824-842,submitted: 16/2/04, accepted: 21/6/04, appeared: 28/7/04.
13. Mr. Vishal Rajput, "Authenticated Data Transmission in Decentralized Wireless Mobile Ad-Hoc Network (;MANET)", International Journal of Applied Engineering Research ISSN 0973-4562 Volume 9, Number 20 (2014) pp. 6707-6714.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.165

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| DOI: 10.15680/IJIRCCE.2022.1008022 |

14. Jidian Yang, Shiwen He, Yang Xu, Linweiya Chen and Ju Ren, "A Trusted Routing Scheme Using Blockchain and Reinforcement Learning for Wireless Sensor Networks", MDPI,Received: 24 January 2019; Accepted: 22 February 2019; Published: 25 February 2019.
15. Qian Zhao, Wen Hu and Guangsheng Feng, "An Improved ARP Protocol for Enhanced Lifetime in Wireless AD Hoc Networks", International Journal of Grid and Distributed Computing Vol.7, No.2 (2014), pp.173-184.
16. F. Härer and H. -G. Fill, "Decentralized Attestation and Distribution of Information Using Blockchains and Multi-Protocol Storage", in IEEE Access, vol. 10, pp. 18035-18054, 2022, doi: 10.1109/ACCESS.2022.3150356.
17. B. Sowmiya, E. Poovammal, K. Ramana, S. Singh and B. Yoon, "Linear Elliptical Curve Digital Signature (LECDS) With Blockchain Approach for Enhanced Security on Cloud Server", in IEEE Access, vol. 9, pp. 138245-138253, 2021, doi: 10.1109/ACCESS.2021.3115238.
18. Y. Sun, X. Li, F. Lv and B. Hu, "Research on Logistics Information Blockchain Data Query Algorithm Based on Searchable Encryption", in IEEE Access, vol. 9, pp. 20968-20976, 2021, doi: 10.1109/ACCESS.2021.3054557.
19. Saba Awan, Maimoona Bint E Sajid, Sana Amjad, Usman Aziz, Muhammad Usman Gurmani, Nadeem Javaid, "Blockchain based Authentication and Trust Evaluation Mechanism for Secure Routing in Wireless Sensor Networks".
20. M. A. A. Careem and A. Dutta, "Reputation based Routing in MANET using Blockchain", 2020 International Conference on comunication Systems &NETworkS (COMSNETS), 2020, pp. 1-6, doi:10.1109/COMSNETS48256.2020.9027450.

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