Handbook of Green Computing and Blockchain Technologies

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Blockchain in Administration

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Advances and Implications of Decentralized Applications for Sharing Information

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CONTENTS

4.1 INTRODUCTION

The broad determination of blockchain technology (BCT) is observed as the main furthermost significant technology drifts that will affect commerce and culture in the coming years. BCT has materialized as a possibly disorderly, general-purpose technology for organizations and administration to support transactions and information that needs trust and authentication.

Vos et al. (2017) discussed BCT which carries the equivalent data at various nodes and the data will only be put in as per consent to have the nodes among the nodes. A fresh dealing can be appended; however, data cannot be detached. Stowing information comes via transaction in distributed nodes which is named as a distributed ledger. This lessens the need for a principal performer and the danger of operation or arrangement letdown all nodes have the complete information.

Dimitrov (2019), found that blockchain (BC) can be consumed for any alteration of tenure and the stowage of significant information and leaflets like "licenses,"

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"certificates," "government-related decisions and legislation.". Classically, data kept in a BC are transactional data like the tenure of land admin, birth and wedding certificates, lorry registries, commercial licenses, didactic certificates, scholar loans, communal welfares and ballots. BCT has the likelihood to deliver improvements to administration and civilization and can extant the following stage in "e-government" growth, as they allow abridged charges and intricacy, pooled right-hand courses, better discoverability of audit test and confirmed reliable record card. In this paper authors are intense on level technique, talking the technological complexity of using BC technology for peer-to-peer (P2P) manners.

There is need to offer chances for designing transaction and data altercation courses in the secluded context. In juxtapose, barely any study is attentive to BC technology and its aptitude to discourse communal requirement. In this paper, authors make an impression of vital welfare and recognize fresh characters for administration to achieve BC technology and safeguard their benefits. The author's main objective is to donate to a more proved conversation about BC in administration by sketching the care to facets that are understated and need further study.

4.2 LITERATURE REVIEW

Vos et al. (2017): the authors discuss the potential usage of blockchain technology in administration, with a summary of about latest advances in the arena of blockchain technology as an instance of methodical maturity, and administration. The association between Being Individual(s), Right(s) and Entity(s) in a government system is the foundation for the description of mandatory functionality, assumed the intricacy within these three fundamentals: uniqueness of an individual, lawful variety in objects. The paper investigates how certain principles of good administration, which include transparency, accountability, security, and regulation, are possible by blockchain technology. It is concluded that the method does not to be mature adequate for operation in administration in this instant.

Paik et al. (2019): the authors set out to upsurge the consideration of blockchain technology as a data store and to endorse a systematic method of overcoming its too bulky software systems. Jha et al. (2019): in this paper, the authors classify the mutual layers of a typical software system with data stores and conceptualize each layer in blockchain terms. Another, authors inspect the location and movement of information in "blockchain-based" operation. Finally, authors scrutinize the information administration complexity in blockchain with relationship assurance in terms of privacy and security.

Grover et al. (2019) describe the blockchain and its dispersion looks to be changeable for dissimilar industries. The objective of this study is to discover the blockchain technology dispersal in variety industries through a mixture of academic literature and social media.

Farouk et al. (2020), elaborate of a combination of data, network, and blockchain technology in healthcare. The healthcare data are come to be an imperative element in this sector. There is need to secure and safe transmission of medical data among the organization. The big challenge is to collect the information about patient diseases which has become essential to restrict the pandemic in the world. There are numerous ways of doing this, although it is not possible to obtain complete and

temporal information at a given time. To bring the transparency between the organizations around the world, there is need to share the data directly across the world. This can be done only via technology which includes a combination of IoT network and blockchain which are decentralized in the system and have the capability to store the data in distributed manner.

Gökalp et al. (2018): the main objective of this paper is to suggest a blockchain framework in medical which include all shareholders in healthcare system to examine prospects and contests by giving a unified blockchain design.

Bell et al. (2018) discuss numerous sectors of healthcare system and safety that could be improved using blockchain technologies. These comprise of detecting phenomenon by distributed application, medical tests, pharmaceutical detecting, and health insurance. The detectable appliance is capable to trace their purpose within the infrastructure of blockchain. The information collected can be utilized advance security and safeguard of patient by getting the depth detail of market retail analysis to enhanced efficiency effectively. In this paper, author present latest sectors of pharmaceutical detectability, data sharing, clinical tests, and device tracing.

Hoy (2017): the authors discuss blockchain technology that is a comparatively a new technology and used to prove and supply the transaction records for virtual cryptocurrencies like Bitcoin. The system used in this process is distributed and redundant in nature, which makes difficult for the transactions to be revoked or faked.

Dimitrov (2019) gives theoretical consideration to the practical basics of the budding of blockchain technology in healthcare system, which is required to comprehend precise blockchain application, estimate commercial cases including blockchain startups, or trail the argument regarding its anticipated economic effects.

Casino et al. (2019) presents a systematic literature review of the blockchain technology used in the multiple domains. This paper demonstrates the ongoing state of blockchain technology and also present the sorting of blockchain focused applications in the various sectors such as supply chain, healthcare, business, IoT, privacy, and data management. This paper also helps in the emerging areas of research in the blockchain technology.

Myeong and Jung (2019): the authors discuss the increasing interest in the blockchain technology in the administration which can increase the economic efficiency, security, and decentralization in administration. Authors also tells use this technology in the upcoming future in the public sector such as e-government which can enhance the administrative process in the government in the various countries to enhance the administrative process, security, and also in the data management in the governance sector.

4.3 LITERATURE GAP

In the literature review discussed in this paper there are the various limitations or gaps in the literature which are as follows:

1. **Scalability Problem**: In the existing research of blockchain in various management systems there is the limited number of transactions are processed in which the number of blocks used in the blockchain are limited in frequency and size.

2. **Lack of Transparency**: There is a lack of transparency or we can say lack of centralized transaction process in the existing blockchain of management system which makes the lack of trust in the management systems by the people.
3. **Absence of Trust in Network**: In the various management systems, there is a lack of trust in the network which is used in the organization, institutions, etc. which makes the management system more vulnerable to cyber-attack.
4. **Security**: To run blockchain technology in the existing management system there is the need of advanced security features such as encryption to encrypt every transaction process and hashing method to link the encrypted transaction process to the old transaction process.
5. **False Traceability**: There is the high false traceability rate in the supply chain of existing or traditional management system which can make the several problems such as theft, counterfeit, and loss of goods etc.
6. **Cost**: Organizations spend a lot of money to manage the existing management system and the organization needs to reduce the cost and use the money for development of the organization such as improvement in the existing system, improvement in infrastructure, develop new techniques, etc.

4.4 PROPOSED FRAMEWORK

Blockchain technology is the well-versed broad technology which is used to handle data and digital assets in distributed mesh networks, and the use of this technology in administration management systems can solve various problems in administration which we discussed in the previous section and enhance the administrative process in states, countries, or in the world. In the proposed framework of blockchain in administration which is given below in the Figure 4.1 we are going to solve the corruption level in the revenue department which is part of any administrative management system.

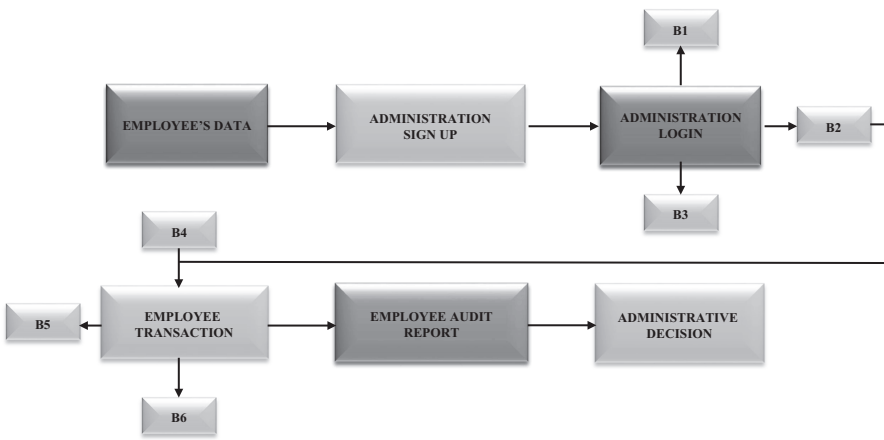

FIGURE 4.1 Proposed framework.

The above proposed framework in the Figure 4.1 illustrates the use of blockchain in the administrative process of revenue department in which we use the employee data and analyze the corruption level in the employee transaction with the help of the audit report and takes the administrative decision by the revenue administrator. This proposed framework can also be used in the various administration management system, healthcare, businesses, and in e-government etc. which makes the enhancement in the administrative process.

The proposed framework discussed about the methods of developing the administration systems is based on the machine learning approaches which include signature-based administration system and profile-based administration system. The authors analyze that the signature-based approaches are based on the current and previously stored information that uses the known pattern of data to identify the corruption in the revenue department. The drawback of the signature-based approach is that it is limited to find only known pattern-based corruption. The second is the anomaly-based approach which is used to predict the corruption based on the samples which are unknown patterns and not decided previously. For finding the unknown pattern the anomaly-based deep learning approaches are needed that is convolution neural network, recurrent neural network, and artificial neural network. There is a need for advanced research in the field of tracking systems that could be beneficial for many people and can generate employee audit report for the employee within a fixed period. Figure 4.1 shows an administration system which allows integrating data from the multiple data center in multiple formats. The user sends the request to the administrative officer with an administrative problem statement where the administration has some criteria that need to follow by an employee in the department to generate the identity with sign up and log in, and to proceed the request to an intelligent system of the administrative system for generating the report with the history of the employee transaction. The above figure represents the administration system that is connected with employees in the revenue department of administrative system through the IoT network. Employee that connects with the IoT network and communicate with the administration intelligent system by the mutual relationship between the existing employee transaction and recent problems related to administration system.

4.5 DATA FLOW ANALYSIS IN BLOCKCHAIN

In which the data flow in architecture of blockchain is shown via the administration management system in an associated network of administration worldwide is shown which consist of events that are linked among them and functioned, which usually shows the flow of the data in the in a network of administration through the blockchain for transparency and enhancing the administrative process.

Figure 4.2 shows the diagram of blockchain in the administration. The flow of the procedures through the system in an organization is shown, which consists of procedures that are interconnected among them and worked and linked in the organization, which generally shows the flow of the data in the organization through the various processes. As the data stored in the blockchain is immutable, the path taken by the blockchain for data flow from generation to the end is negligible. For a better flow

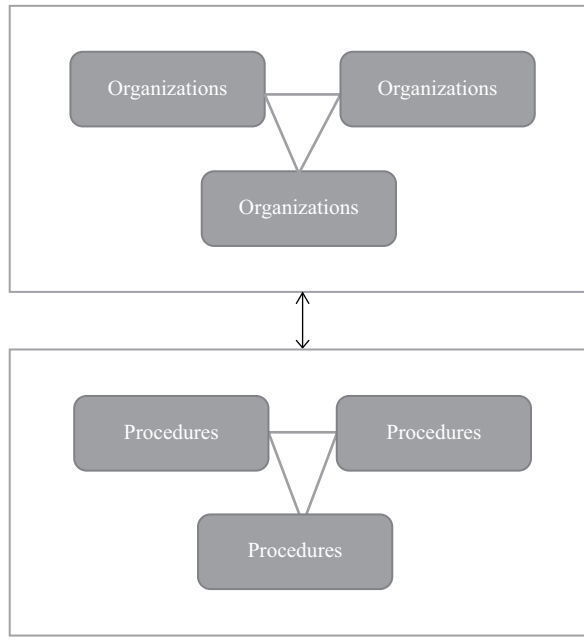

FIGURE 4.2 Data flow analysis.

diagram, the necessary features of blockchain are present. This refers to flow of the digital data acquisition in the internal and external databases for the production data transfer (Khari et al. 2019). The actual databases after preprocessing and the feedback database is not that much necessary, because the infrastructure in each scenario is same so, it can be assumed or neglected (Le et al. 2019). These production technologies are useful and helpful in the blockchain technical production. While looking at the production in the digitization, the chain of a procedural approach is to be followed as:

(1) System
(2) Sensor
(3) Gateway
(4) Internet

A government that is based on the blockchain can safeguard data, lessen fraud, and streamline processes, waste, and the misuse while concurrently increasing confidence and responsibility. A government that is based on the blockchain model government and independent organization businesses divide assets on top of a disperse ledger safeguard by using the cryptography technique. For protecting the sensitive citizen information and the government data the structure given above is used that will also eliminate the single point failures. A government that is based on the blockchain has the capability to resolve provision main points and allow the following advantages:

(1) Safeguard storage of sensitive citizen, government, and the business data
(2) Depletion of labor concerted processes
(3) Depletion of immoderate costs related with managing liability and accountability
(4) Reduced prospective for abuse and corruption
(5) Improve faith in the online civil systems and government
(6) Building up the faith with the citizens
(7) Enhancing efficiency
(8) Shield the sensitive and important data

The administrator-dispersed ledger style can be grasped to assist a cluster of government and public sector processes, which includes the digital payments, identification management, healthcare, voting, supply chain management, and land registration. There are number of governments join the race to process statutory legislation and begin pilot projects that is centered on the blockchain technology. It can leverage the blockchain technology to supply process optimization, cyber security. Government and enterprises have a complex and ever evolving issue of identity and security. For solving the issues related to the digital system and identity, blockchain is used because it has exceptional utility to provide the solutions. There are number of advantages of using blockchain technologies by the enterprises and organizations.

(1) The business will be better protected with the high level of security
(2) The transactions are transparent so they can easily track
(3) Transactions done by the organizations are faster by using the blockchain
(4) The chances of hacking threats are also getting reduced to a larger extent.
(5) There is no need to pay the centralized services because blockchain has the decentralized platforms
(6) Different levels of accessibility are also offered by the organization's blockchain technology
(7) Automatic account reconciliation

4.6 RESEARCH IMPLICATION

In the authors discussed in this paper there are various limitations or gaps in the literature which are as follows. In the existing research of blockchain in various management systems there is a limited number of transactions that are processed in which the number of blocks in the blockchain are restricted in size and frequency. There is a lack of transparency or we can say a lack of centralized transaction processes in the existing blockchain of the management system which leads to a lack of trust in the management systems by people. In the various management system, there is the lack of trust in the network which is used in the organizations, institutions etc. which makes the management systems more vulnerable to cyber-attack. In this paper, authors present a significant appraisal of repeatedly welfare of blockchain technology created in related works and talk over with their suggestion for administrative process. There is a need of move from a "technology-driven" to "need-driven approach"

where blockchain utilization is made to order to safeguard fit with necessities of managerial methods and in which the managerial method is improved to get advantage from the technology. The framework for governance is created to be a state for getting advancement. On the basis of significant appraisal, authors offer indication for additional research into the considerable advantages of blockchain applications in the digitization of government and participation of blockchain structure and its utilizations to fulfill community needs of public value. The future work includes the integration of multiple hospital data for early diagnosis of the disease. To work on a combination of a decentralized system and a resilient distributed data approach with cloud computing to invent a health tracking system in broadways.

4.7 RESEARCH LIMITATIONS

The dodges of research met by researchers for putting of suggested and improved administration system in blockchain are labeled as:

(1) The rising, and vast study approved in this context with similar approaches retain out researcher's new approach.
(2) The absence of convenience of credential makes it feasible for explores that definite investigates are inattentive from the research paper as there present some articulators that cannot be openly attainable.
(3) The growing and massive demand of studies in the information security arena generate it probability for researchers to absent off some of the primary seeks from a consistent study directed by investigators

4.8 CONCLUSION AND FUTURE SCOPE

The primary demand focused in the study how blockchain technology is helping in invention and renovation of government process such as application in reducing of corruption, and in health care etc. In this paper, authors present a significant appraisal of repeatedly welfare of blockchain technology established in related works and considered their suggestion for administrative process. There is a need for a move from a "technology-driven" to a "need-driven approach" where blockchain utilization is made to order to safeguard fit with necessities of managerial methods and in which the managerial method is improved to get advantage from the technology. The framework for governance is created to be a state for getting advancement. On the basis of significant appraisal, authors offer indication for additional search into hefty advantages of blockchain application in digitization of government and participation of blockchain structure and its utilizations to fulfill community needs of public value.

- The future work includes the integration of multiple hospital data for early diagnosis of the disease.
- To work on a combination of a decentralized system and a resilient distributed data approach with cloud computing to invent a health tracking system in broadways.

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