Assurance of Transparency In Charity Using Blockchain

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Abstract: Charity is the key in assisting folks. But sometimes money handling issues arise. We've created a novel technology in trend known as blockchain for improvement. This technology ensures that all monetary transactions are ultra-secure and transparent which boost people's trust.

Our unique web application employs the blockchain to optimize charity operations. Imagine it as a quick and secure cash highway connecting willing donors to needy recipients. This boosts confidence and addresses concerns like added fees and sluggish procedures common on conventional donation platforms. Consequently, charities become more efficient and benefit everyone. The key concepts in the project include Consensus algorithm, Hashing algorithm, Key Cryptography. Consensus algorithm gives you the assurance that all the nodes in a blockchain agree on a single, valid transaction history. Hashing algorithm provides a mechanism to convert a given data into fixed size, it has unique hash code for data integrity verification. SHA-256(Secure Hash Algorithm 256-bit) is the most widely used in blockchain technology.

Blockchain era guarantees that each one of the transactions are recorded and cannot be altered which results in decreasing the hazard of fraud or misuse of funds. This builds trust among donors in understanding that their contributions are getting used for their meant purpose. By putting off intermediaries and streamlining the donation system. Blockchain reduces administrative expenses for charities. In this manner, more of the donated cash will directly go to the needy once. This will make charitable efforts more impactful.

Keywords: Blockchain, Cryptography, Consensus algorithm, Hashing algorithm, Transparency.

I.   INTRODUCTION

In the world of helping others, making sure everything is clear and open is really important. When we give to charities, it's common to wonder if our donations are truly making a difference or if they're being used the way we hope. This uncertainty often comes from the old-fashioned ways of handling donations, where there are middlemen and unclear processes. But now, there's an exciting solution to this problem: blockchain technology.

This paper is regarding exploring how blockchain can make the charity process more explicit & reliable. Consider this as a newly discovered and a better way of keeping an eye on where your donations go, Block chain is an assured digital ledger that helps in keeping track of all transaction. Storing them in such a way that everyone included in the process can see it. It is like an open book to all involved in the charity connection / charitable community.

So, what makes blockchain so special? Well, it's decentralized, meaning there's no one central authority controlling everything. Instead, the information is spread out across a network of people involved in the charity process. Once data is added to this blockchain, it can't be changed or tampered with. This ensures that the information about donations remains true and trustworthy.

In the former times, when we used to donate to the charities often there were mediators involved, due to which there wasn't a transparent knowledge of where our donation went. Sometime they took a part of the donation for themselves & there were always transaction charges applied .This typical old fashioned setup had its own thre including money being misused or theft.

Now, with the help of block chain, we can αvoid the middleman & those extra fees. It's a secure and clear way to handle donations. Blockchain has already made an impact in various fields like production, education, financial affairs, health Services.
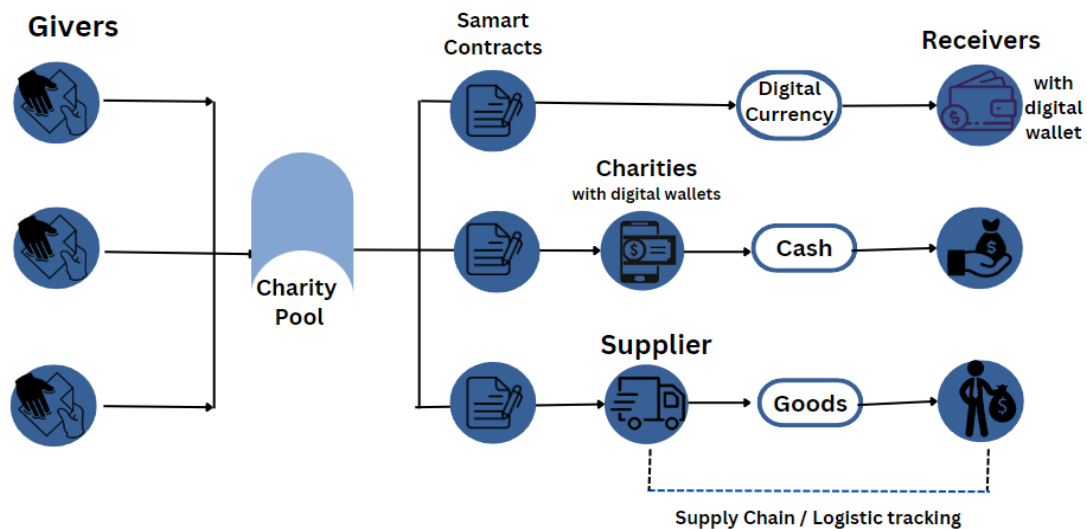

Fig. 1 Implementation of Blockchain Technology

II.   LITERATURE SURVEY

I.   In 2019 a student named N. Sai Sirisha published a Paper called "Proposed Solution for Trackable Donations using Blockchain". The main purpose is to help communal organisations to manage transactions with transparency by executing Smart contract-based inducements.
Transparency in the contribution process is the primary aim of practicing the propositioned solution. By using smart contracts the solution ensures that the donation trackable & efficiently used for the charitable intention. The paper aims to fully change the way these charitable organisation work.

II.   The author's association with the prestigious National Research University Higher School of Economics demonstrates their expertise in software engineering. In 2019, Hadi Saleh, an accomplished software engineer from the same institution, authored the seminal paper titled "Platform for Monitoring Charitable Foundation Donations using Blockchain Technology". This work introduces a novel approach to donation tracking leveraging blockchain technology and highlights its potential to enhance transparency and efficiency in the charitable sector. The author's academic credentials further underscore their credibility and deep understanding of software engineering principles.

III.   As an alumnus of the renowned National Research University Higher School of Economics, the author possesses a solid foundation in software engineering. Notably, in 2019, Hadi Saleh, an accomplished software engineer from the same university, authored an influential paper on "Platform for Monitoring Charitable Foundation Donations using Blockchain Technology" This paper proposed a novel approach for utilizing blockchain to track donations, highlighting its potential for enhancing transparency and efficiency within charitable organizations. The author's academic credentials further corroborate their proficiency in software engineering concepts.

IV.   "Aid, Charity, and Donation Tracking System Using Blockchain", a paper published by Aashutosh Singh who is a member of the Information Technology department at St. Francis Institute of Technology in Mumbai, India in the year 2020.This paper emphasizes on a decentralized donation tracking system, particularly by utilizing the Ethereum blockchain. In this system, the intended receivers of donations have direct accessibility and complete transparency, which makes them more accountable. This innovative procedure of using the concept of Ethereum blockchain, guarantees a high level of transparency and social responsibility. This methodology gives donors a detailed understanding of how their shares are being used. The main goal of this concept is to build the relation of trust between the donors and recipient and motivate them to do more charity.

V.   In the year 2020, Professor Hanyang Wu from Nanjing University of Science & Technology's School of Economics and Management in China authored a paper entitled "Creating a Dependable Service System for Charity Donations Amidst the COVID-19 Outbreak". This paper enlightens on the restyling of charitable processes during the pandemic period by focusing primarily on blockchain technology. The main goal of this paper is to focus on building a trustable service system which is devoted towards facilitating charitable contribution along with addressing the problems due to the COVID crisis.

VI.   In 2021, Muhammad Shoaib Farooq of the University of Management and Technology in Lahore, Pakistan's Department of Computer Science published a paper titled "A Framework for Enhancing Transparency and Auditability in Charity Collection Using Blockchain Technology". Currently there is less transparency in the process of gathering donations for charitable cause which leads to several difficulties in gaining confidence of the donors. In an attempt to find solution to this problem above paper put forth the concept of blockchain. This technique highlights the importance of transparency during the transition for developing trust in donors. By making use of build in characteristics of blockchain like system's performance, time efficiency and the effects of various block sizes and numbers within the blockchain the blockchain architecture enhance the charity collection process by increasing accountability, transparency and donor's confidence.

III.   PROPOSED SYSTEM

The system architecture contains four key actors: donors, beneficiaries, charity organizations and cooperative stores. The charity organization develop charity projects. The organizations who wish to raise donations will request the donors for their contribution. The interested donors will give their share to the charitable organization and the beneficiaries will get the needed help through cooperative stores. Beneficiaries can utilize the tokens at cooperative stores for goods/services. Charity organizations can transform tokens to actual money, assuring transparency, stopping misuse, and protecting transactions within the blockchain framework.
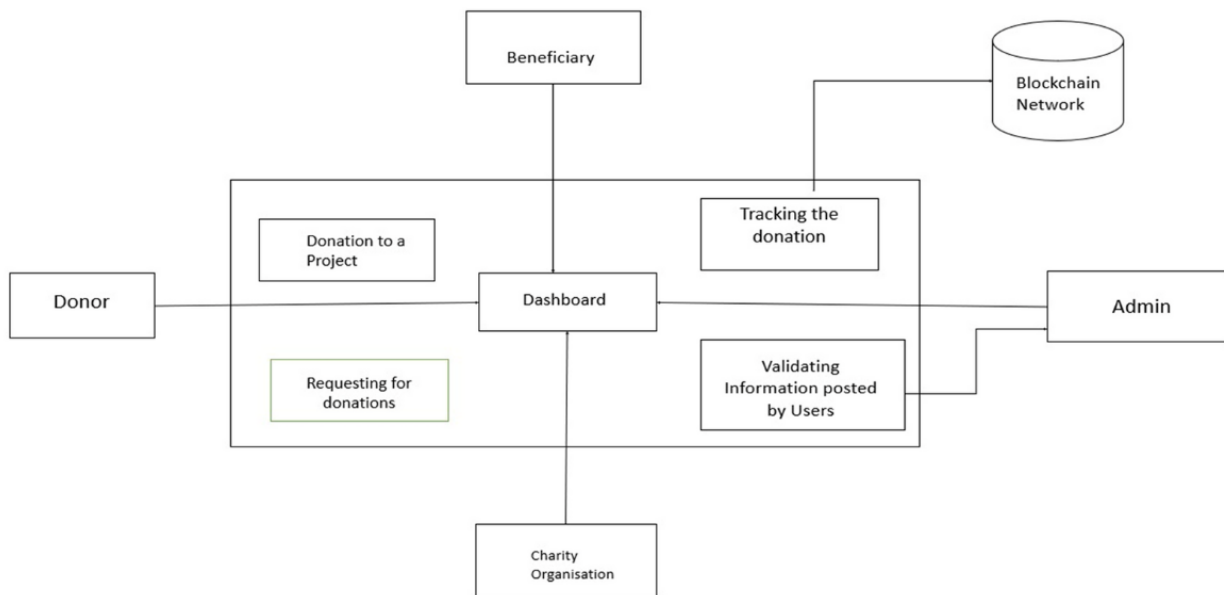

Fig. 2 System Architecture

A.   Structure of Blockchain:

Block Header:

Block Header typically contains three sets of block meta data. The process of linking block header to previous block in blockchain by referring to its hash is done by first set. Important information related to mining top competition, like difficulty target, timestamp and nonce forms a part of second set. The last part that is the third. Set of block metadata contain the Merkle tree root, effectively that sums up all transactions carried with the help of blockchain.

B. Versions:

Version 1.0:
Hall finney in the year 2005 proposed the Blockchain Version 1.0. In this version he almost emphasis was on cryptocurrency and it also illustrated the initial working by of blockchain by making use of DTE(Distributed ledger Technology) It laid the foundation of financial transactions within the blockchain domain, particularly exemplified by Bitcoin.

Version 2.0:
Version 2.0 was developed to solve the problems faced by the previous version, version 1.0. The evaluated version focus on the complex process of bitcoin mining and network's limited scalability. In this version, smart contracts were the remarkable development.

By using reliable language these smart contracts are created which gives structured layout for actors in the blockchain operation.

In blockchain operation, smart contracts convert transactions into digital records which makes it easier to track them. Another notable enhancement in the version 2.0 was the switch from bitcoin to ethereum as the commanding platform. The shift from bitcoin to ethereum brought about a significant uprise in the blockchain technology

Version 3.0:
Version 3.0 enhances the blockchain technology even further than the previous version by introducing the concept of decentralization or dapps. These operation are far more developed than the traditional ones because there is no language barrier for the frontend. Programmers can use any programming language to build the frontend. The backend works on the decentralization principle which provides peer-to peer network. The concept of decentralization eliminates the need of a centralized authority to validate the entire process. Through dapps, a new era of technology emerges where frontend and backend work hand in hand by taking advantage of the decentralization conception. This concept makes the application more adaptable as well as supports distributed system, which helps to expand blockchain technology.

Version 4.0:
Blockchain version 4.0 takes a huge leap in blockchain technology by proposing some new advancements like Web3, the metaverse, and the industry 4.0. The main goal of this version is to use the concepts of blockchain in the applications of industry 4.0. This version works in the direction of establishing a cost effective blockchain network, to encourage more people to use the blockchain architecture.

C. The Consensus Algorithm:

The last and the most important layer in the blockchain architecture is the consensus layer, which strives for achieving complete agreement among all the peers in the condition of shared ledger. The main focus in this concept is to boost the understanding among the nodes in blockchain technology. It also addresses serious safety and security issues. In this layer, several other consensus algorithm work, proving as the building blocks of well-known crypto currencies like bitcoin ethereum.

PoW	The PoW algorithm plays a crucial role in the consensus mechanisms of blockchain technology. To add new block in blockchain it takes the help of computation logic. To update the ledger the peer needs to solve a crucial mathematical problem. Dedicated miners undertake the responsibility of validating the transactions in blockchain. This miners are enticed with some rewards to appreciate their work.
PoS	Like Proof of Work (PoW), Proof of Stake (PoS) in the new technique introduced in order to validate transaction in blockchain. In PoW computational logic is used to validate the transaction whereas in Proof of Stake (PoS), the algorithm ask the validators to invest some amount as a stake in order to add a transaction in blockchain. To appreciate their involvement in this process, the validators are given a token of participation which is a combination of their initial stake along with some amount. If the validators do not verify the block correctly they might loose their stake a suffer a great loss.

PoA	The Proof of Authority (PoA) algorithm is used in conditions where all peers of the blockchain network have a relationship of trust among them. PoA relies on establishes identities instead of computational logic and stakes.
PBFT	The Practical Byzantine Fault Tolerance (PBFT) algorithm is a consensus algorithm designed specifically to improve network's ability to deal with Byzantine Fault Tolerance. i.e. to ensure that the system in working correctly without any disturbance even if some part of it fails. Implementing PBFT makes the blockchain more reliable and secure.
RTP	In traditional systems the cross-border transaction a bit slow and less reliable. This is where Ripple Consensus Algorithm (RTP) comes into action. RTP helps in making cross border transaction more secure and faster. This technique uses a group of computers to validate the transactions.

D. The SHA-256 Algorithm:

SHA-256 is the fundamental hashing algorithm in blockchain like Bitcoin, Bitcoin Cash, and Bitcoin SV.

It is a hashing function that produced a fixed length output alphanumeric string. It ensures security by creating a digital fingerprint for each block and linking it with its forerunner block in the blockchain.

IV. CONCLUSION

This paper throws light on the web application developed with the intension of helping the needy by collection donations by using blockchain technology.

The entire focus of this application is to ensure transparency by eliminating the intermediaries, displaying the genuine need of the beneficiaries and motivating the donors by informing them about their transactions. The Proof of Work (PoW) ensures security.

The primary motive behind this is to build trust amongst the people and inspire them to come forward and do good deeds by donating. While taking into consideration the existing limitations in blockchain technology, we strive to provide more efficiency

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