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Government Fund Distribution and Tracking System using Blockchain

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Abstract:
The Government Fund Distribution and Tracking System is a novel application that leverages the power of blockchain technology to improve transparency, efficiency, and accountability in the allocation and monitoring of government funds. Traditional government fund management processes often face challenges such as corruption, fraud, lack of transparency, and inefficiency. By integrating blockchain technology into the existing system, these issues can be addressed effectively. The proposed system utilizes a decentralized blockchain network to create an immutable and transparent ledger of all financial transactions related to government funds. It offers several key features to enhance the fund management process:
1. Transparent and Immutable Ledger: Blockchain provides a distributed ledger where all transactions are recorded in a transparent and tamper-proof manner. This ensures that every transaction related to the distribution and utilization of government funds is verifiable and cannot be altered retrospectively.
2. Smart Contracts for Automated Execution: Smart contracts are self-executing contracts with predefined rules and conditions. In the context of the Government Fund Distribution and Tracking System, smart contracts can be utilized to automate the allocation of funds based on predefined criteria. This reduces manual intervention, eliminates human error, and ensures the fair and efficient distribution of funds.
3. Enhanced Accountability and Auditability: Blockchain technology enables real-time tracking of fund utilization. Every transaction recorded on the blockchain can be traced back to its source, providing a transparent trail of fund flow. This feature promotes accountability among government agencies and reduces the risk of mismanagement or misuse of funds.

Keywords: Government fund distribution, tracking system, blockchain technology, transparency, accountability, efficiency, smart contracts, auditability, security, data privacy.

I.INTRODUCTION

Blockchain is one of the technologies that have created a disruptive change in several industries. Currently, Blockchain is getting used in numerous places and there are more applications of Blockchain yet to be discovered and implemented. Blockchain is characterized by its decentralized nature, the integrity of the information stored within the chain, and its openness. Due to these characteristics, another area in which Blockchain can be used is to release funds for government projects. Governments have to cater to an enormous number of responsibilities of a state. The working of state governments in- volves numerous transactions towards various operations that require to be applied throughout the state. This includes new projects, repair, and maintenance work, awarding contracts, paying off government employees, farmer schemes, and so on. A serious hurdle that the highest government faces is the low-level corruption that's sometimes impossible to trace, which deprives the state of progress. Tracking it's a really difficult task because of the present system. Blockchain is touted for its capability to reinforce the trust and ease of information-based exchanges among people and associations. The innovation offers a guarantee when deliberately applied within the proper settings. Customarily, associations working their own, singular IT frameworks trying to group must pander to difficulties including compromise of data, recognizing a solitary wellspring of truth, and provoking establishment. Blockchain innovation tends to those difficulties by giving a specialized establishment that underpins the execution of shared business forms, such that no single substance controls the complete framework. Government incorporates a characteristic need to assemble, support, and ensure open trust in data and frameworks. In such kinds of situations, blockchain may help to boost this trust.

II.OBJECTIVES

1. Transparency and Accountability: Implementing a blockchain-based system can enhance transparency and accountability in the distribution of government funds. Each transaction and allocation can be recorded on the blockchain, providing an immutable and auditable record of how funds are distributed.

2. Secure and Immutable Records: Blockchain technology ensures that all transactions and data recorded on the blockchain are tamper-proof and cannot be altered retroactively. This feature helps to maintain the integrity of government fund distribution records, reducing the potential for fraud or corruption.

3. Efficient and Cost-effective Processes: By leveraging blockchain technology, the system can streamline the processes involved in fund distribution, eliminating the need for intermediaries and reducing administrative overheads. Smart contracts can be utilized to automate certain tasks, such as verification and approval processes, leading to increased efficiency and cost savings.

4. Real-time Tracking and Monitoring: The use of blockchain technology enables real-time tracking and monitoring of fund allocation and utilization. This provides government agencies and stakeholders with up-to-date information on the status of funds, ensuring better oversight and decision-making.

5. Improved Accessibility and Inclusivity: Blockchain-based systems can promote financial inclusion by providing a secure and transparent platform for distributing funds. It can enable easier access for individuals and organizations, including those in remote or underserved areas, who may face challenges in traditional financial systems.

III.METHODOLOGY

How does blockchain work?

There are three basic components of a blockchain: blocks, miners, and nodes.

Block: Every blockchain is made up of several blocks, and each block includes data, which is a record of transactions. The crucial point is that the chain is not owned by a single individual or organization.

Miners: Miners are assigned with adding new blocks to the chain via a process known as mining. Miners must solve complicated mathematical problems in order to add data to the block. When a block is efficiently mined, the miner is financially rewarded.

Nodes: A node connects each block to another block, forming the chain. A node is basically that keeps the copies of the ledger and keeps the network operational.

How does blockchain provides security?

Most blockchains arrange data into blocks, with each block containing a transaction or set of transactions. Each new block in a cryptographic chain connects to all the blocks before it in such a way that it is very hard to tamper with. Consensus processes ensure that each transaction within the block is truthful and accurate by validating and agreeing on all transactions within the block. Blockchain technology provides decentralization by allowing members of a distributed network to participate. There seems to be no single point of failure, and an individual user cannot manipulate the transaction record.

How is immutability achieved by blockchain?

A hash value is a unique value that identifies a single block. As hash values are determined by the content of each block, each block is uniquely identifiable by its own hash value. As a result, each block can refer to or point to the one before it, such that the fourth block refers to the third, which refers to the second, and so on. As a result, the hash value serves as a reference.
For example, in our system, Admin (Government) sends the funds requested by the user. After that, the Government determines whether the transaction being conducted is legal. As the iterations continue, a chain builds, demonstrating transaction transparency. Lastly, the fund is transferred from Admin to the User, and the transaction gets completed. The immutable feature of blockchain is seen in the previous example, making it immaculate. It is immutable due to the combination of validations given by the blockchain hashing procedure and cryptography.

How will a transaction enter into the blockchain?

It is necessary to approve and validate a transaction before it can be added to the blockchain. Before a transaction can be added to the blockchain, it must go through several important phases. Now, we'll take a look at cryptographic key authentication, and proof of work authorization protocols in subsequent blockchain networks.

Authentication

Although the original blockchain was supposed to function without a central authority, transactions must still be validated. Accessing a person's "account" or "wallet" of value requires the identification of cryptographic keys. A string of data (similar to a password) serves as a cryptographic key. Using a secured digital identity created by these two keys - a private one that is visible only to a user, and a public one that everyone can see - users can authenticate themselves via signatures and 'unlock' transactions.

Authorization

After the users have agreed on the transaction, it must be authorized, before it can be added to a chain of blocks. The decision to bring a transaction to the chain on a public blockchain is decided by consensus. The majority of "nodes" (or computers) must accept the transaction for it to be valid. The people who own machines in the network are rewarded for confirming transactions. This method is referred to as 'proof of work'.

Understanding Libra

Learn how Facebook used certain parts of blockchain technology to establish Libra, a new cryptocurrency that has the potential to impact the banking and finance industries.

Proof of Work

To add a block to the chain, Proof of Work asks the individuals who own the machines in the network to solve a difficult mathematical problem. Mining is the process of resolving an issue, and 'miners' are generally rewarded in bitcoin. However, mining is a difficult task. The mathematical problem could only be resolved via trial and error, with a 1 in 5.9 trillion chance of succeeding. The process requires significant amounts of computational power, and this consumes considerable amounts of energy. This means that the benefits of mining must surpass the expense of the computers and the electricity used to power them because a single computer would take years to solve a mathematical problem.

IV.PROPOSED SYSTEM ARCHITECTURE

The project's major objective is to develop a platform that tracks government fund allocation using blockchain technology. The platform aims to accomplish the following goals:

• Making the work of government fund allocation with reporting documentation is more convenient. Due to the fact that the data on donations will be aggregated in one place, it will allow us to prepare reports automatically.
• By developing a blockchain-based system, charitable foundations can become more transparent.
• To maintain transparency and security at every stage.
• In order to create a government procedure that is incorruptible.
• To provide an immutable environment for funds tracking.
• Utilization of funds. The proposed system is used to track the funds granted to the state government as they go through the government process. It uses blockchain technology to safeguard transactions at each level while retaining transparency in every transaction and sealing every transaction with proof as the money goes forward. The system secures data using hashes to keep a block of transactions in a chain. It enables a complete proof, secure, and authentic financial distribution and tracking mechanism, which contributes to the formation of an incorruptible government. In our system, there are 2 modules i.e., Admin (Government) and User. Admin (Government) Module: Government provides the requested funds to the user. User Module: In this system, the user will request the funds according to their needs and also, they can check their transaction history and wallet balance as well.

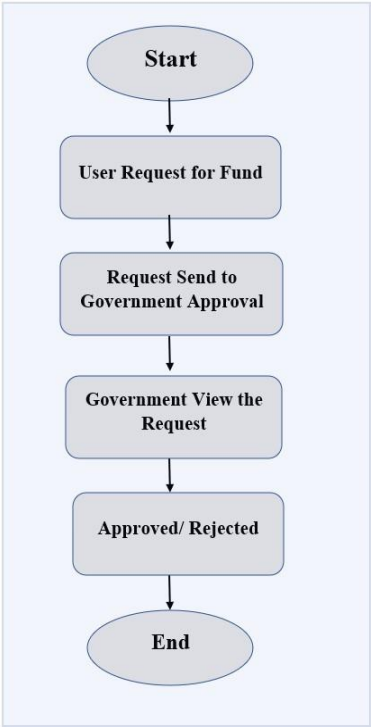


Figure 1

In the Figure 1 we can see that the user requests the funds from the admin (Government) then the request gets sent to the Government for approval. After that, the government views the request and then can approve or reject the request.

In Figure 2 and Figure 3 we can see that a block having the stated information is propagated into the network. The transaction is validated by the network's nodes (people in real life). Following this confirmation, the block is put on the blockchain along with a timestamp. After that, the transaction could be enforced. All transactions submitted in this manner will be noted and made publicly available to everyone.

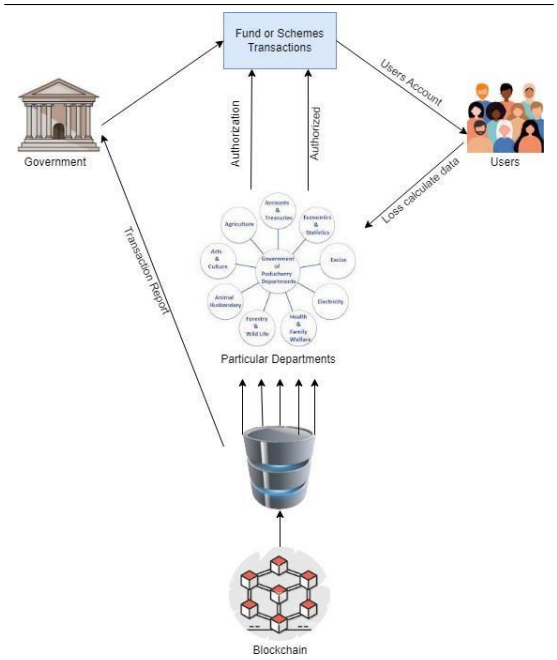


Figure 2. System Architecture

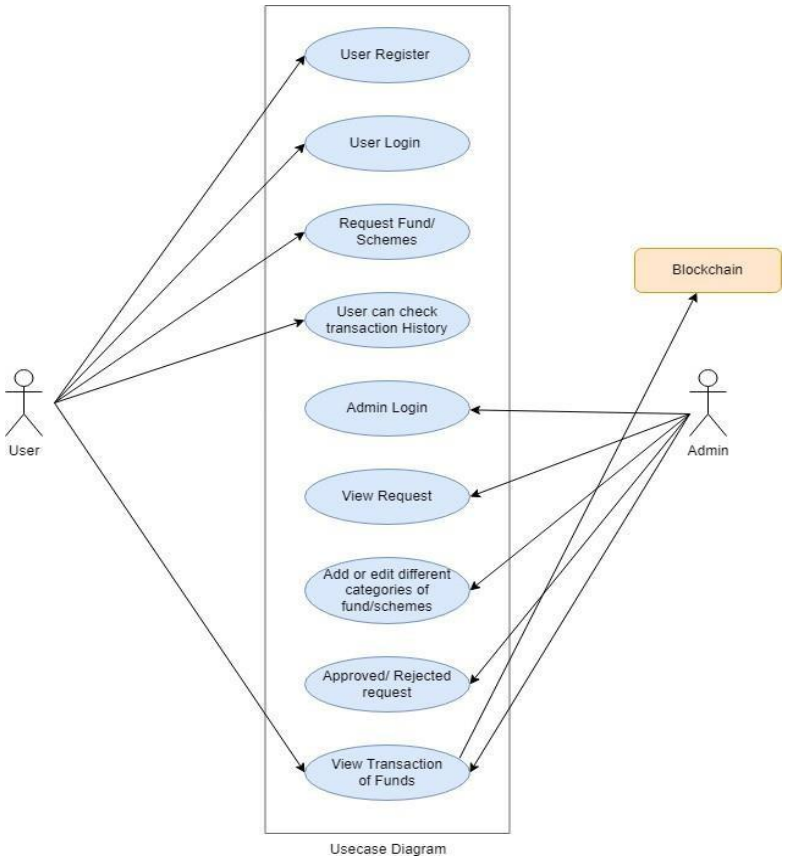
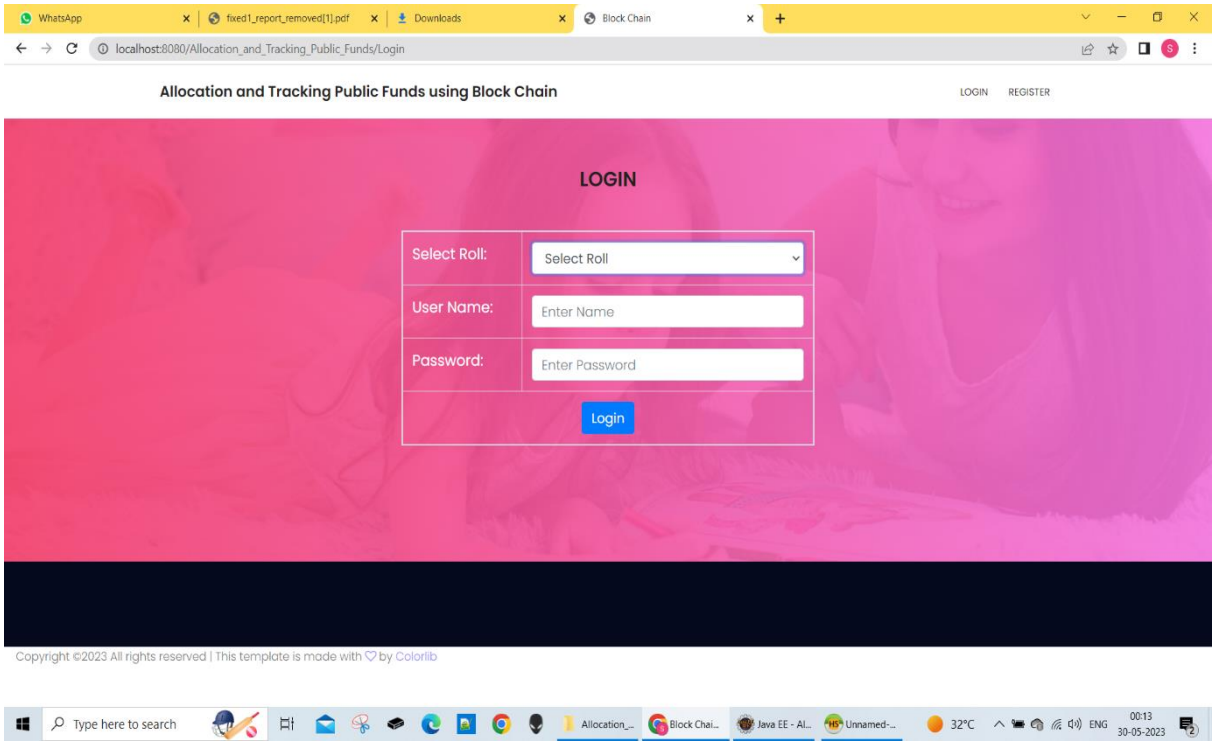
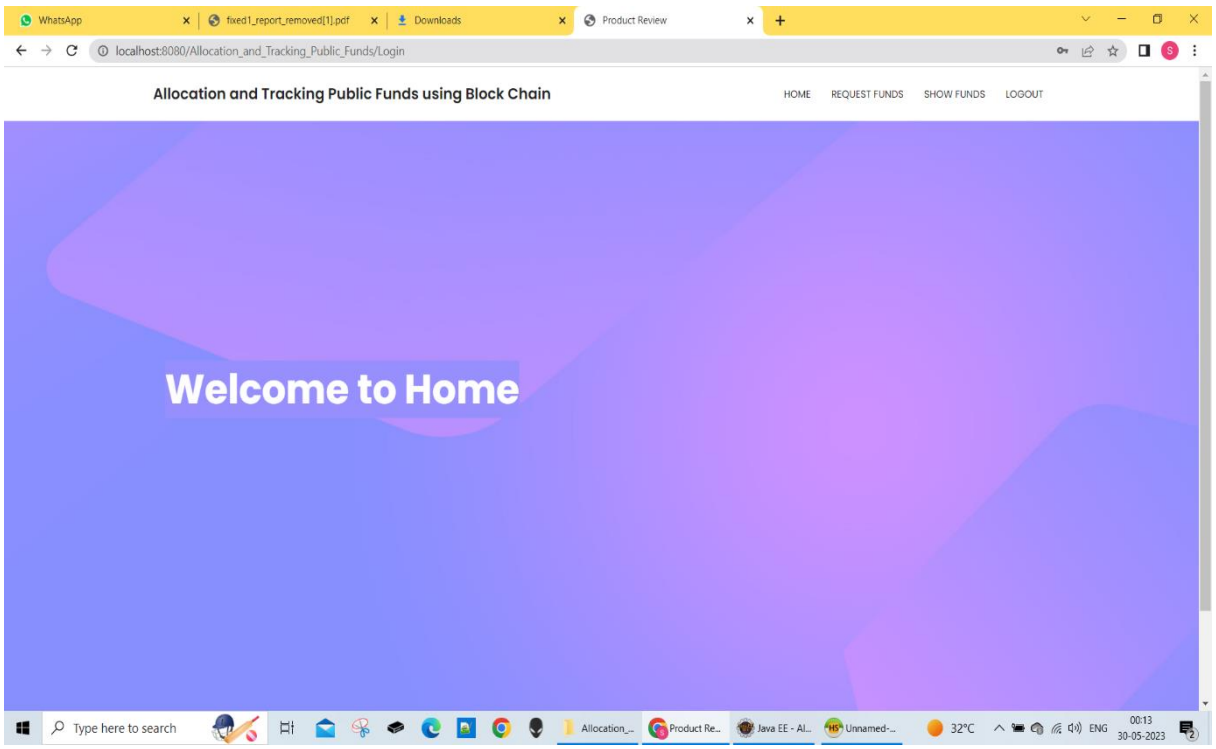
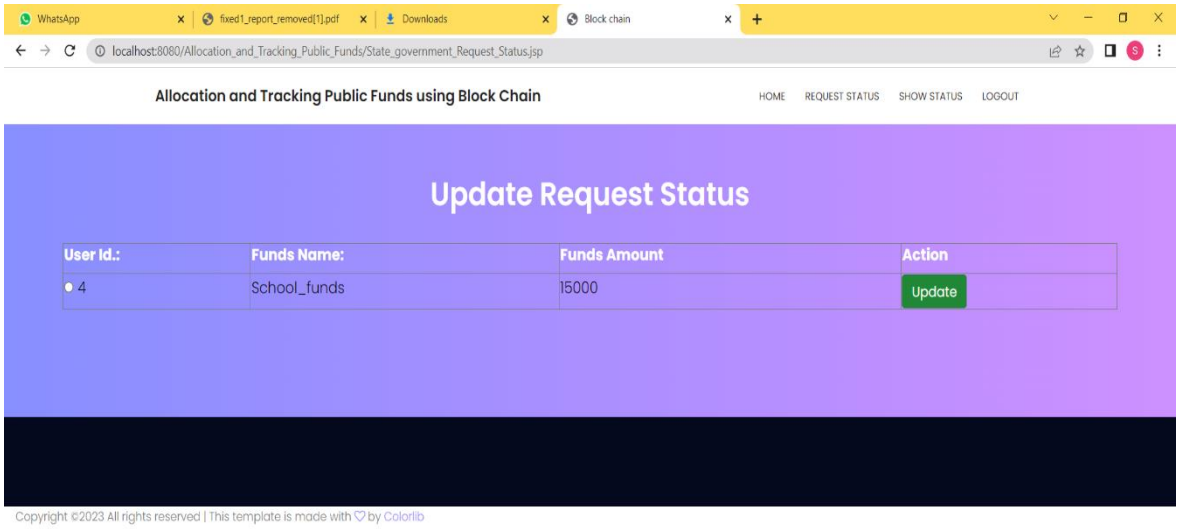


Figure 3. Use Case Diagram

V.PROJECT IMPLEMENTATION



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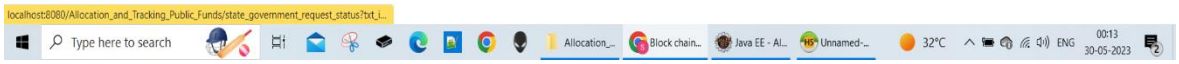
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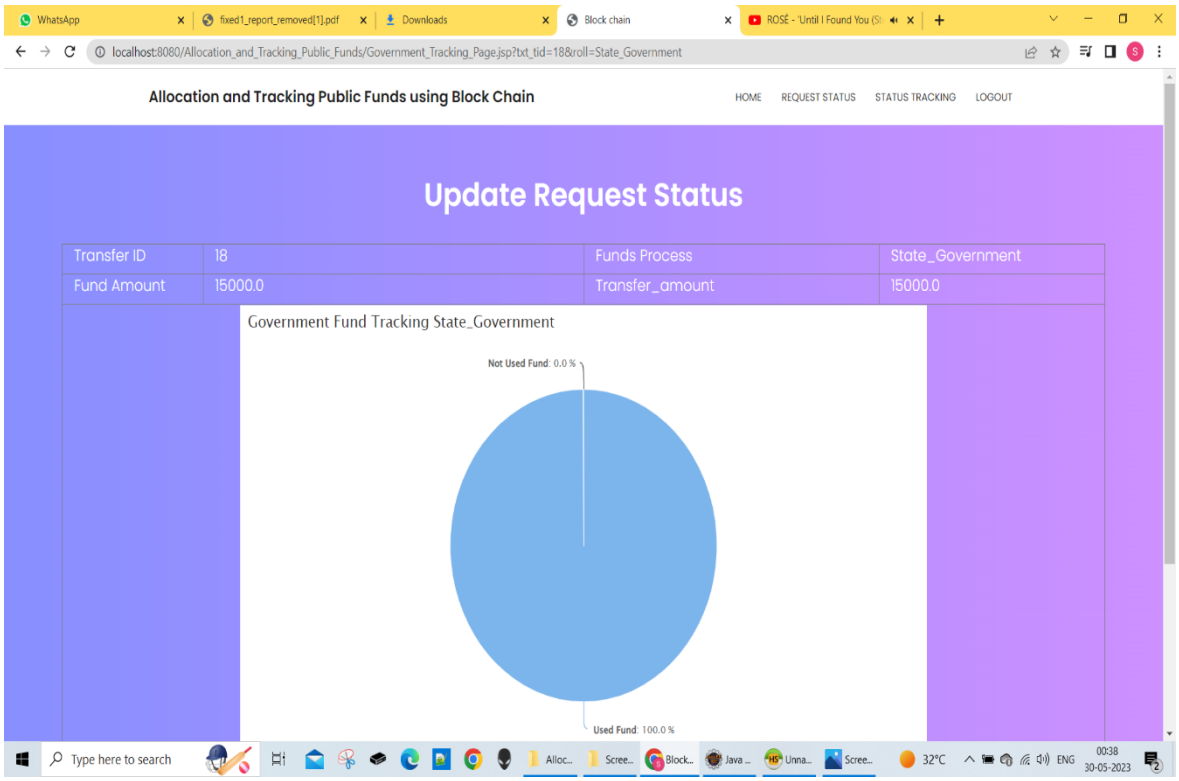
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VI.CONCLUSION

The implementation of a government fund distribution and tracking system using blockchain technology offers several significant advantages. Blockchain technology provides a decentralized and transparent platform that enhances accountability, efficiency, and security in the management of government funds.

By utilizing blockchain, the distribution of funds can be carried out in a tamper-proof and auditable manner. Each transaction recorded on the blockchain is permanent and cannot be altered, ensuring a transparent and immutable ledger. This feature helps to prevent fraud, corruption, and misappropriation of funds, as every transaction can be traced and verified by multiple participants.

The decentralized nature of blockchain technology eliminates the need for intermediaries and reduces bureaucratic processes, thereby streamlining the fund distribution system. Smart contracts, which are self-executing agreements written on the blockchain, can automate the verification and release of funds based on predefined conditions. This automation reduces administrative overhead and ensures that funds are disbursed efficiently and promptly.

Furthermore, the use of blockchain technology in fund tracking enables real-time monitoring of fund usage. Government officials, auditors, and citizens can access the blockchain network and view the movement of funds, ensuring transparency and accountability. Any discrepancies or suspicious activities can be quickly identified and investigated, promoting integrity and trust in the government's financial operations.

However, it is important to note that implementing a blockchain-based system requires careful planning, technical expertise, and collaboration with relevant stakeholders. Governments need to establish appropriate regulations and standards to ensure the secure and efficient operation of the system. Additionally, user education and training programs may be necessary to familiarize participants with the blockchain technology and its benefits.

In summary, a government fund distribution and tracking system based on blockchain technology offers numerous advantages such as transparency, efficiency, accountability, and security. By leveraging blockchain's decentralized and immutable nature, governments can enhance their financial management processes, ultimately leading to more effective and trustworthy governance.

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