



Government Fund Allocation and Tracking System using Blockchain and Machine Learning-based Fraud Detection

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Abstract—State government work includes numerous transactions regarding various projects throughout the state. This includes the grant of new measures, initiatives, projects, contracts, and farmer plans. One of the most difficult factors targeted at Top is low levels of corruption, difficult to follow, and can deny the state. Due to the current system, persecution is very problematic, which provides the poor people with services that are difficult to pursue. In this case, we use blockchains that allow encryption and transaction security at every stage, and at the same time, maintain transparency so that all transactions are supported in the detection of their credibility. Therefore, we present a framework for using blockchain innovation and full fund transmission systems. Blockchain contains a growing list of data records called blocks. Cryptographically hashed data, a timestamp, and recent transactions are included in each block. To further enhance the system's ability to detect misuse, we integrate machine learning techniques that analyze transaction patterns to identify and flag potentially fraudulent activities automatically, increasing accountability and reducing manual oversight.

Index Terms—Blockchain, Transactions, Security, Tracking, Transparency, Encryption, Machine Learning.

I. INTRODUCTION

Blockchain is one of the technologies that has brought about disruptive changes to several industries. Blockchain is currently used in many places, with more blockchain applications that still need to be discovered and implemented. Blockchains are characterized by their decentralized nature, the integrity of the information stored in the chain, and their openness. Due to these characteristics, another area where blockchain can be used is releasing funds for government projects. Governments must meet the vast number of state responsibilities. State government work involves numerous transactions in the direction of various operations that must be applied across the state. This includes new projects, repair and maintenance work, awarding contracts, paying government officials, and planning for farmers. The critical hurdle facing the best government is low corruption, making it impossible to pursue a state of progress. Persecution Because of the current system, it is a really difficult task. Because of its capabilities, blockchain is promoted to strengthen the trust and simple information base between humans and associations. Innovation provides guarantees if intentionally applied within the correct settings. Usually, their own unique IT frameworks are associations that recognize difficulties including data compromises and seek to recognize lonely waves of truth, provocative facilities. Blockchain innovation tends to create specialized companies that support the execution of common business forms, so individual substances control the complete framework. The government includes the property to gather, support and ensure open trust in the terms of the data and framework. In these types of situations, blockchain can help to strengthen this trust. To make this better, we've added a machine learning model that can detect suspicious transactions.

II. LITERATURE SURVEY

A literature survey (or literature review) in a project report examines existing research and published findings related to your topic. It helps identify what's already been studied while considering your project's specific parameters and scope. This step is absolutely essential before beginning any serious research. Before starting our development, we carefully reviewed previous work in our field to understand what we might expect and identify potential challenges, using these papers as references. In this section, we analyze relevant studies about Government Fund Allocation & Tracking Systems using Blockchain Technology.

[1] This study investigated how blockchain technology could reduce embezzlement in government fund transfers. The researchers identified eight crucial characteristics for effective digital fund transfer systems, organized in multiple layers. To ensure fairness, they proposed implementing blockchain technology with mathematical models that verify transaction validity at every level. Their system also allows public auditing, enabling ordinary citizens to track fund flows, creating complete transparency and fairness.

[2] This paper examined blockchain systems that maintain perfectly transparent records while controlling access to transaction data. The system uses encryption and hashing to secure transaction data in blocks that form an unbreakable chain. Every participating node verifies transactions before permanent recording, ensuring complete transparency in government operations. The researchers demonstrated how this could create a completely corruption-proof process for allocating and tracking funds.

[3] This research explored blockchain applications for tracking government funds. The paper noted that significant portions of allocated funds often go unused or misused, primarily due to corruption. Implementing blockchain would allow complete tracking of all funds - showing exactly when, where, and how money gets spent. The authors concluded this technology could substantially benefit government operations and national economic growth.

[4] This system employs encryption and hashing to create secure transaction blocks in an unalterable chain. Each transaction gets verified by multiple nodes before permanent recording. This approach establishes a fully transparent process that prevents tampering with fund allocation records, creating a trustworthy system for financial management.

[5] This study presented a system that monitors funds at every stage until they reach intended recipients. Using advanced hashing techniques, the framework aims to eliminate all types of fraud in government transactions. It removes middlemen while enhancing security and transparency throughout the process. The system also significantly reduces human errors and processing delays in fund distribution.

[6] The final paper proposed a decentralized application using Quark Chain technology. It establishes transparent transactions through smart contracts, enabling direct agreements between suppliers and recipients without intermediaries. Any irregularities in transaction records become immediately apparent, effectively preventing supply chain fraud.

This review demonstrates blockchain technology's potential for revolutionizing government fund management. The examined systems show how blockchain can prevent corruption, enable public oversight, and streamline financial processes. Our project builds upon these findings to develop an enhanced tracking system with additional fraud detection capabilities.

III. METHODOLOGY

How Does Blockchain Work?

A blockchain consists of three core components: blocks, miners, and nodes.

Blocks: A blockchain is a series of interconnected blocks, each containing transaction data. The key feature is that the chain is decentralized—no single entity owns or controls it.

Miners: Miners create new blocks through a process called mining. They solve complex mathematical problems to validate and add transactions to a block. Successful miners receive financial rewards.

Nodes: Nodes link blocks together, forming the chain. They maintain copies of the ledger, ensuring the network remains operational and secure.

How Does Blockchain Ensure Security? Blockchains organize data into blocks, with each block storing one or multiple transactions. Every new block cryptographically connects to previous ones, making tampering extremely difficult. **Consensus Mechanisms:** Transactions are verified and agreed upon by network participants, ensuring accuracy and trust. **Decentralization:** Since control is distributed across the network, there's no single point of failure, and no individual can alter transaction records.

How Does Blockchain Achieve Immutability?

Each block has a unique hash value, generated based on its contents. This hash acts like a digital fingerprint, linking each block to the one before it (e.g., Block 4 references Block 3, which references Block 2, etc.). Example:

In a government fund allocation system:

- The Admin (Government) sends funds to a user.
- The system verifies the transaction's legality.
- The transaction is recorded transparently in the blockchain.
- Funds are transferred securely, and the transaction is finalized.

This process ensures immutability—once recorded, transactions cannot be altered due to cryptographic hashing and validation.

How Is a Transaction Added to the Blockchain?

Before a transaction joins the blockchain, it undergoes authentication and authorization:

1. Authentication:

Users authenticate transactions using cryptographic keys (a public key visible to all and a private key known only to the user). Digital signatures verify ownership and unlock transactions.

2. Authorization (Consensus):

On public blockchains, transactions require majority approval from nodes (computers in the network). Miners validate transactions via Proof of Work (PoW), earning rewards for their efforts.

Understanding Proof of Work (PoW) PoW requires miners to solve a complex mathematical puzzle to add a block. **Mining Difficulty:** The puzzle has astronomically low odds of being solved (e.g., 1 in 5.9 trillion). **Energy Intensive:** Solving it demands massive computational power, making mining costly. **Rewards:** Miners earn cryptocurrency (e.g., Bitcoin) to offset their expenses.

Project Overview: Blockchain for Government Fund Allocation This system leverages blockchain to ensure transparency, security, and accountability in state fund distribution.

Key Objectives:

Simplify tracking of government fund allocations and donations.

Automate report generation for transparency.

Prevent corruption by creating an immutable audit trail.

Secure transactions at every stage using cryptographic hashing.

System Modules:

1. Admin (Government):

Approves and disburses funds to users.

2. User:

Requests funds as needed.

- Views transaction history and wallet balances.

By integrating blockchain, the system ensures tamper-proof records, real-time tracking, and trustworthy financial distribution.



Fig. 3.1: Flowchart of the proposed system

In Figure 1, we see that a user requests funds from the administrator (the government) and that request is sent to the government for approval. The government can then look into the request and approve or reject the request.

In Figures 2 and 3, we can see that the blocks spread across the network along with the information provided. Transactions are verified by the nodes (who are real life people) of that network network.

After this confirmation, the block is placed on the blockchain along with the timestamp.

According to this, you can carry out a transaction. All transactions submitted in this way will be determined and made available to everyone.

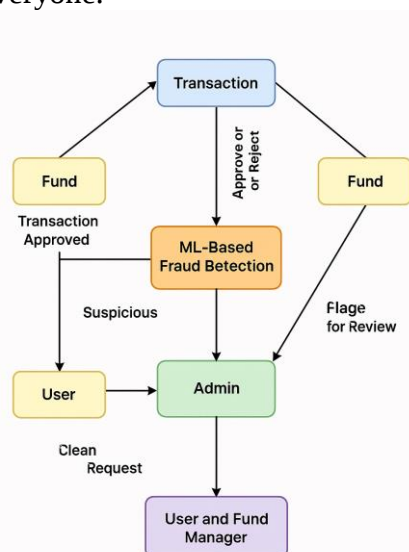


Fig. 3.2: System Architecture

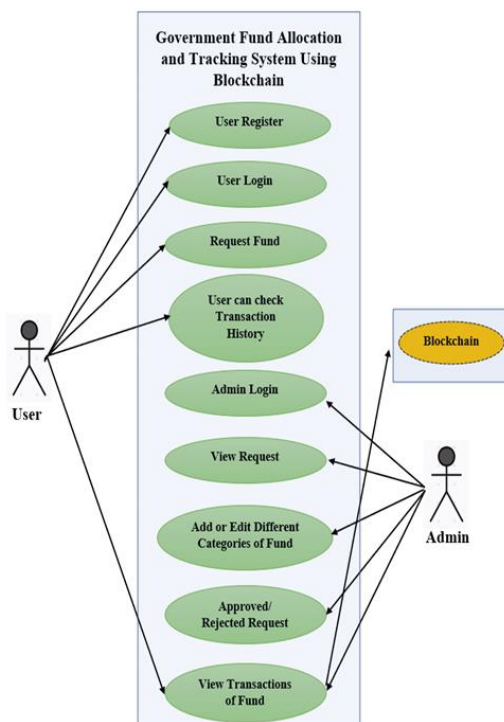


Fig. 3.3: Use Case Diagram

IV. RESULTS

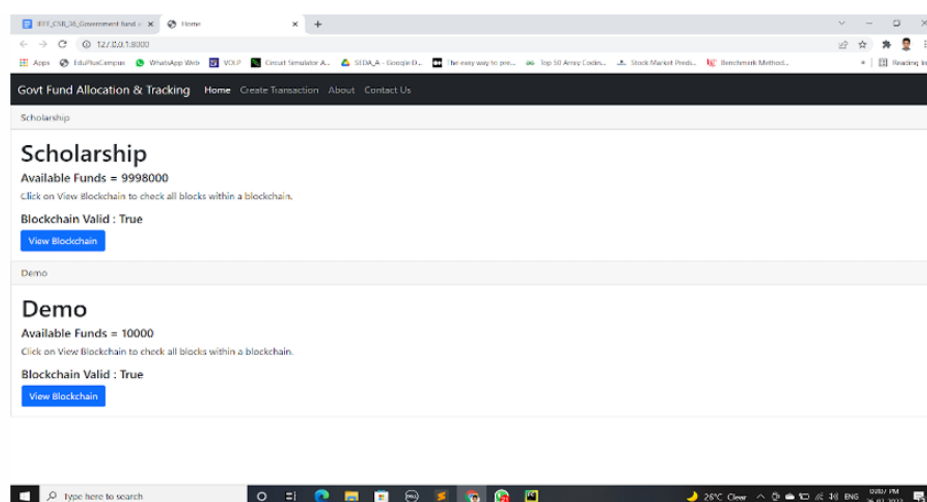


Fig. 4.1: Home Page

The home page will have all the available schemes listed. A normal user can visit the site and check for schemes and available and allocated funds.

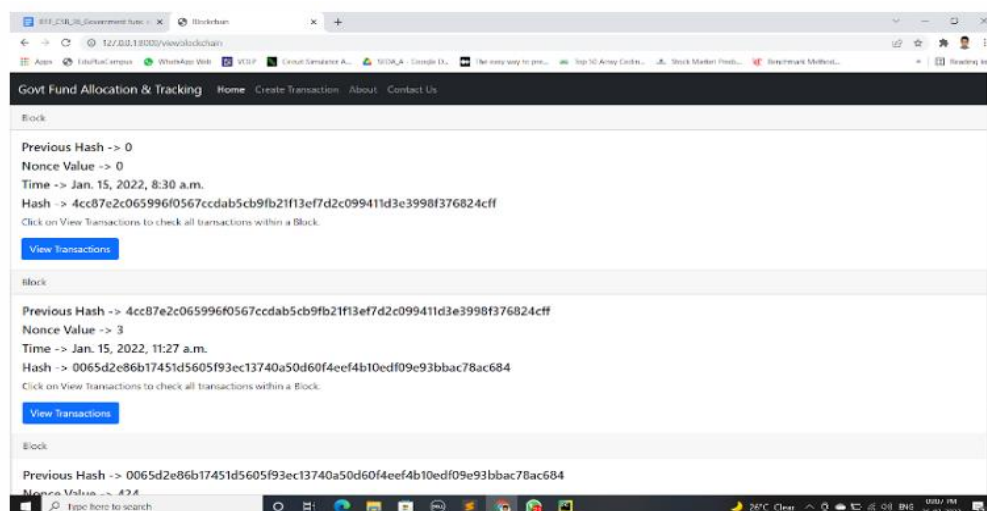


Fig. 4.2: Blockchain

A separate blockchain is available for each fund which can check for all the transactions Which transactions are publicly available now.

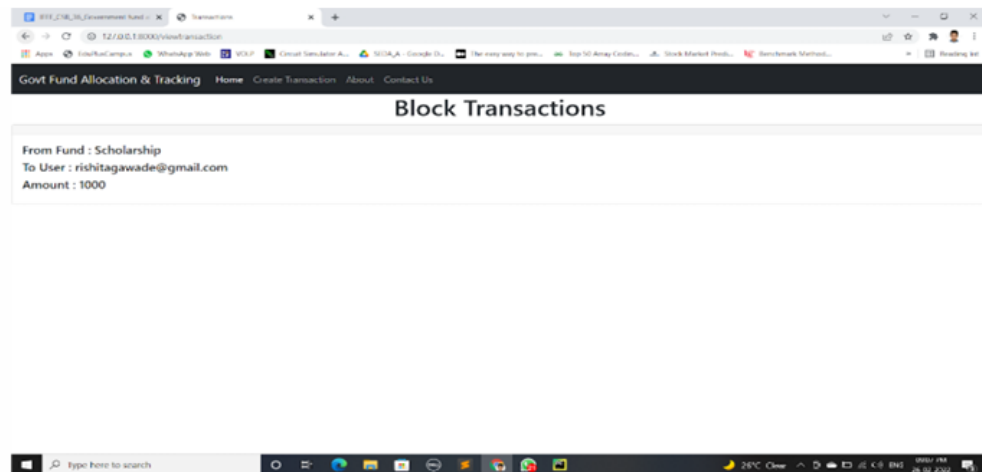


Fig. 4.3: Transactions

Users can check all the transactions within a particular block where all the information about that transaction is available here like username, amount, date, and time of transaction.

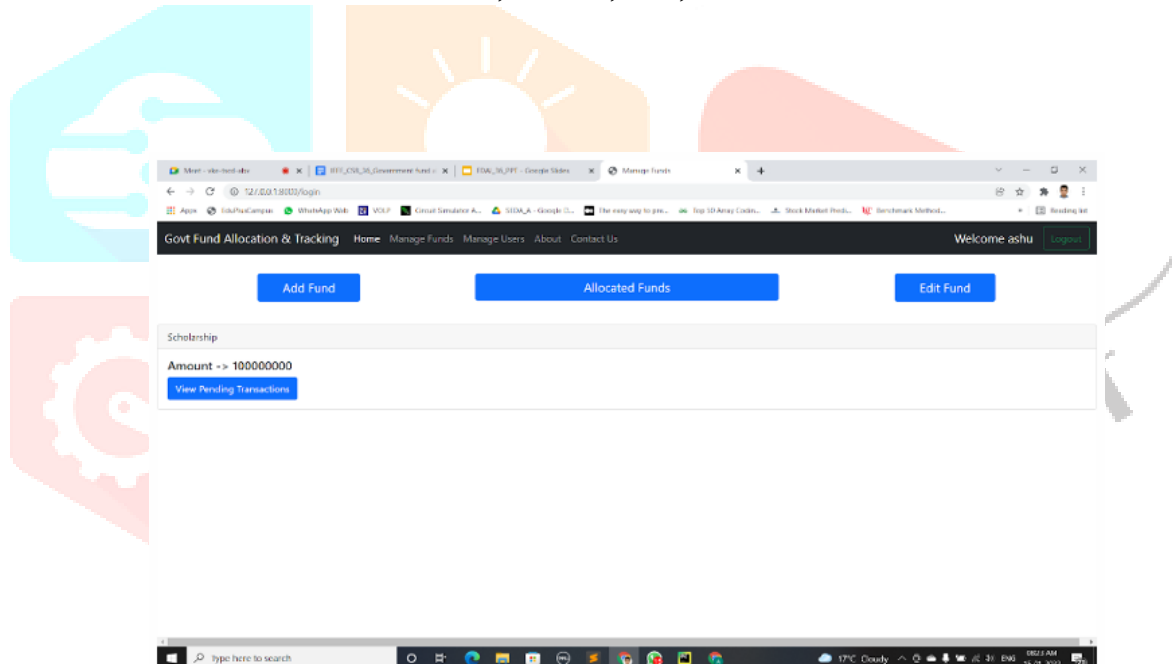


Fig. 4.5: Add/Edit and View Pending Transaction

Once logged as admin there are options to add or edit any fund. Also, the admin can view all the pending transactions in a fund and can accept or reject any of the requests.

Here, in the below fig we can see that the admin can add a new fund.

The user wallet option is also available so the user can keep track of all his transactions and check the status of the amount available in the account and the approval status of requests.

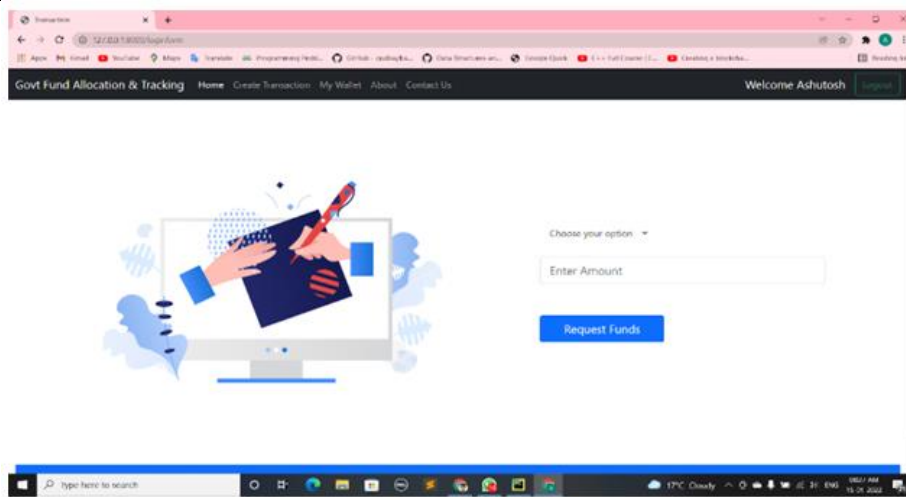


Fig. 4.6: Request Fund

ML enhances the Government Fund Allocation and Tracking System using Blockchain by detecting fraudulent transactions in real time. Using a Random Forest Classifier, the system analyzes transaction patterns based on amount and frequency, flagging anomalies. A Standard Scaler ensures data consistency, improving model accuracy. By combining ML with blockchain's transparency, the system prevents fund misallocation and fraud, ensuring secure and accountable government fund management.

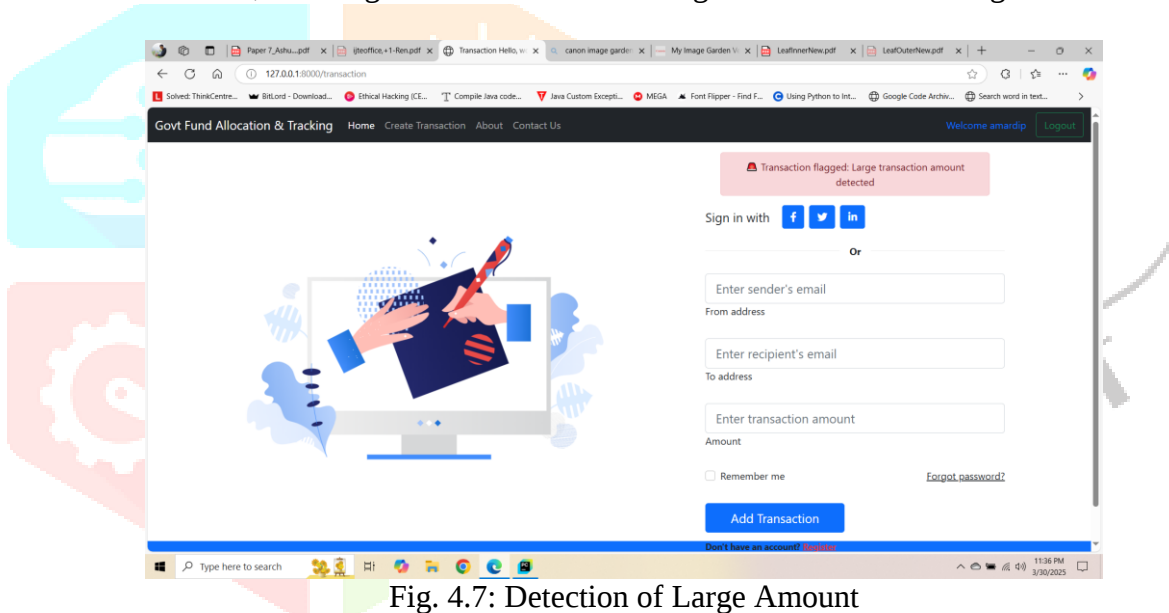


Fig. 4.7: Detection of Large Amount

V. CONCLUSIONS

In this fully secure government fund allocation and follow-up system, allocated funds are pursued at all levels until they reach the beneficiary. This proposed frame will be added to support the authorities, reduce corruption and provide transparency in all transactions. This is a blockchain-like non-coloring, working methods, and security feature. Provides correct governance and transparency. All transactions executed are noted. Blockchain Transactions cannot be changed as technology is used.

In addition, Machine Learning (ML) is integrated to detect fraudulent or suspicious fund requests before processing. The ML model analyzes request patterns, user behavior, and past transactions to flag high-risk requests. This adds an extra layer of intelligent security, reducing fraud attempts and improving the accuracy and speed of approvals.

In addition to preventing human mistakes and delays, it also helps to eliminate human mistakes. In this context, public institutional framework activities become confident, productive and stable and productive. You can upload your regular systems from anywhere in the world. People need to collect donations and take them to the next level for a large price range.

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