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CHARITY WITH CLARITY: CROWD FUNDING USING SMART CONTRACTS

[1]Ch. Niranjan Kumar
Professor
Department of CSE, Sreenidhi Institute of Science and Technology, Hyderabad,
Telangana, India
niranjan609@gmail.com

[2] Manish Krishna Kandrakota
UG Student
Department of CSE, Sreenidhi Institute of Science and Technology, Hyderabad,
Telangana, India
22311a05d2@sreenidhi.edu.in

[3]YLN Swamy Pallerla
UG Student
Department of CSE, Sreenidhi Institute of Science and Technology, Hyderabad,
Telangana, India
22311a05g0@sreenidhi.edu.in

[4]Anjan Saketh Saripalli
UG Student
Department of CSE, Sreenidhi Institute of Science and Technology, Hyderabad,
Telangana, India
22311a05f9@sreenidhi.edu.in

[5]Vishwa Teja Kancharakuntla
UG Student
Department of CSE, Sreenidhi Institute of Science and Technology, Hyderabad,
Telangana, India
22311a05c8@sreenidhi.edu.in

Abstract— **Crowdfunding is an online fundraising method originally designed for the public to donate money to support the work of creative people. Crowdfunding uses blockchain technology to provide smart contracts to users. This enables us to deliver public services in a safe, transparent and secure way. The mission of this project is to provide an interactive model for performing arts and donations. Both campaign sponsors and donors can create and support campaigns by viewing or submitting approval requests and completing requests through the system. Donors can also see the progress of the money they donate. All transactions will be recorded on the blockchain and stored in blocks. The use of smart contracts in blockchain is very interesting. Without the help of a trusted third party, blockchain-based agreements must be negotiated, executed, and implemented between untrusted participants. It is important to create all the code that will run on the blockchain. Blockchain was first used as the basis for cryptocurrencies but has spread to many other industries in recent years. Blockchain is expected to become the most widely used technology as a green way of doing business online. The biggest problem in today's global economy is that competition is not tightly controlled and some financial reports turn out to be lies. Leveraging the Ethereum smart contract in the field of crowdfunding, this project aims to reduce these concerns, eliminate fraud and allow contracts to be executed completely mechanically by ensuring that the initiative continues within a certain period of time.**

Keywords— Crowdfunding, Smart contracts, Blockchain-based, Cryptocurrencies, Safe, Transparent and Secure, Request, Contributors.

I. INTRODUCTION

Blockchain technology is a new method in computer science and technology, it can increase the use of cryptocurrencies as a decentralized and secure exchange. Bitcoin was one of the earliest applications of blockchain technology and has been gaining attention from around the world ever since. Along with Ethereum, they form the basis of modern cryptocurrency development focused on smart contracts using blockchain. The project is built on technologies such as Solidity, Ethereum and ReactJS. Cryptocurrency transactions can be made quickly, cheaply and securely through this application. People are still worried about change, lack of control, and the possibility of corruption. Despite these concerns, cryptocurrencies continue to evolve as new technologies emerge. The goal of the blockchain application project is to create a safe and secure Bitcoin exchange coin using smart contracts, React JS, Solidity and MetaMask. This plan aims to reduce dependence on real and controlled benefits and increase the payment rate. We strive to make transactions secure and transparent using blockchain technology, thereby increasing overall efficiency and ease of payment. Payment. The hash value and names of devices and outputs are always recorded in every transaction on the blockchain network (just like transactions used by Bitcoin). The Bitcoin ledger is a system that keeps track of who owns each Bitcoin. It has two parts: “Statuses,” which show current ownership of all available Bitcoins, and “Transitions,” which is a process that describes how Bitcoin ownership changes over time. Cryptocurrency is a business phenomenon that facilitates activities such as buying, selling and trading. However, many countries have not yet integrated the benefits into their economic activities. This article examines cryptocurrencies, their current status and the implications of the next generation of these currencies. The article also analyzes the investment risk of Bitcoin and gold countries. Bitcoin is a cryptocurrency. Fortunately, there is no central bank, no governor. Transactions are cryptographically verified by network nodes and recorded and distributed using ledger blockchain technology. Research Purpose Blockchain can be thought of as a block of digital data files created in public records. Blocks contain information about each transaction. It also contains information about a specific buyer or seller. One of the main tasks performed by blockchain technology is storing cryptocurrency transaction data. It has a decentralized structure. (Blockchain). Blockchain is an important part of cryptocurrency security and privacy. Crowdfunding refers to the situation where a project or company is financed by the "crowd" rather than one or two main investors. For the campaign to be successful, you need to get support from many sponsors and convince them that your project is worth their money. There are four different types of funding, but they all rely on donations from like-minded people. Here's a

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breakdown of each: Crowdfunding – Back when people donate to a cause, business, or individual without asking for anything. Global as a Service - Peer-to-peer (P2P) lending is a form of crowdfunding that involves free lending. The money obtained from the free loan is borrowed by the sponsor and must be repaid with interest from the specified date. Crowd-Based Crowdfunding - This is the reward donors receive for their donations. Rewards are based on donations, which encourages more donations. Equity-based crowdfunding – Allows small businesses and startups to build out part of their company in exchange for money, unlike some crowdfunding campaigns that do not involve backers from the company members they bring back. These donations represent a type of investment because participants receive participation in the company based on the resources they provide. Most financial aid programs are available on online platforms and there is a fixed deadline for when funds will be available.

II. RELEVANT WORKS

Crowdfunding using blockchain is a method of raising funds for projects or ventures by collecting small contributions from a large number of individuals through a decentralized, transparent, and secure blockchain-based platform. Forget dusty meetings and endless documents. Crowdfunding using smart contracts is revolutionizing fundraising. Imagine creators around the world presenting their dreams to a global audience powered by the secure, transparent magic of blockchain. Smart contracts act as automatic custodians, depositing money only when critical moments are reached and creating trust without the need for an intermediary. Cryptocurrencies have also joined the ranks, enabling new models such as peer-to-peer finance and social assets. This powerful trio—the impact of crowdsourcing, the accountability of smart contracts, and the distribution of cryptocurrencies—is reshaping the financial landscape, one project at a time. Blockchain technology is essentially distributed ledger that securely stores data in a chain of digital blocks. Imagine it as a digital record book that everyone on the network can access and verify, but no one can edit or tamper with. This document dives into the multifaceted world of blockchain technology, showcasing its potential applications and challenges across various industries. From resilient cultural features for smart contracts in Iraqi oil companies to quantum-powered voting and decentralized e-roaming for electric vehicles, the research presented explores diverse use cases. Education, finance, supply chains, and agriculture are touched upon, highlighting the potential of blockchain to revolutionize how we manage information and interact within these sectors. However, the document also acknowledges the importance of understanding cultural, regulatory, and technological hurdles that need to be addressed for successful implementation. Ultimately, this collection of research paints a comprehensive picture of blockchain's exciting potential while reminding us of the challenges that lie ahead in harnessing its power to reshape our world.

Blockchain technology has evolved and has the potential to improve crowdfunding by providing a distributed, tamper-proof system. Blockchain-based crowdfunding has advantages such as speed, efficiency, automation, elimination of intermediaries, flexibility and immutability. The crowdfunding deal value is expected to reach $5.2 million by 2027. Problems in crowdfunding can be solved using Ethereum smart contracts. Blockchain systems are designed to prevent interference and ensure trust and transparency among all network participants. Smart contracts can provide clarity, security and transparency in financial aid projects by eliminating the need for intermediaries.[1]

This article presents a blockchain-centric crowdfunding service that provides privacy, security, and distribution to the crowd. The goal is to create smart contracts that allow donors to allocate funds to projects and successfully collect donations. Blockchain technology technology solves the problem of spending money and provides a safe and stable platform to the masses. The system includes the application process, voting system and platform creation phase. Users can easily initiate new projects, contribute to projects and request funds through the blockchain platform.[2]

Nonprofit organizations play an important role in fundraising, especially during the Covid-19 pandemic. Trust and technology are key to attracting donors and increasing donations. Blockchain technology can bring trust to fundraising organizations and promote transparency.

Fundraising requires a strict audit process and multi-institutional collaboration. Smart contracts and blockchain technology can improve the fundraising process and make it safer and more transparent. Blockchain technology can also facilitate the fundraising operation as well as the transfer and distribution of funds.[3]

The current problem with crowdfunding sites is the lack of recognition of donor rights and management donation Blockchain technology can provide a reliable application for fundraising. The core structure of the crowdfunding app includes smart contracts and user-friendly interfaces. Future The scope of proposed work includes the successful implementation of contracts and the safe way to use all techniques of crowdfunding. This chapter also discusses the regulatory framework and development for blockchain-based crowdfunding and its potential for future development.[4]

Crowdfunding is a way for a group of people to raise money for a project. Crowdfunding platforms include kickstarter.com, Indiegogo.com and mystartr.com. Advantages of crowdfunding include better matching between developers and funds and more information for investors.

Contains information on the flaws of crowdfunding platforms, fraud and information asymmetry. Blockchain can solve problems such as fraud, money laundering and information asymmetry in crowdfunding. Companies using blockchain in consumer finance include WeiFund, Acorn, Cybit, etc. takes place. The system uses smart contracts and the Ethereum network for public services. Participants review and vote on the asking price and the transaction is recorded on the blockchain. Blockchain-based crowdfunding platform aims to provide a more transparent business in its distribution model.[5]

Traditional crowdfunding platforms face issues such as trust, transparency, and high transaction costs. Blockchain-based charity crowdfunding platforms have been created to solve these issues. Blockchain technology technology provides transparency, security, and automation through smart solutions provides contracts. Now crowdfunding platforms such as Ketto, Milaap and GoFundMe are also discussed. Examples of charity platforms using blockchain technology are given Platforms.[6]

Crowdfunding in India: Review of Online Crowdfunding Platforms in India. Crowdfunding is a collaborative process where people collaborate and come together for a common goal or idea. Business. Although crowdfunding in India is still in its infancy, the potential is very high. This article covers selected Indian online crowdfunding platforms (CFPs), their focus areas, financial strategies and examines revenue models. CFPs support not only the business but also the social environment. Ketto, Wishberry, Catapooolt, Ignite Intent, Start51 are some of the crowdfunding services in India. Ketto is socially oriented and has a great understanding of news and service. The main criteria for the platforms include operational life, usability and verification, supporters' passion and project strength. They provide advice on legal and company registration issues, Consulting and training events. Future plans include supporting charity work taking, investing with good results, building a global audience and creating awareness among the masses.[7]

The authors analyze the process by which fundraising organizations use blockchain technology for more reliable and secure financing. Blockchain is a decentralized database technology that will increase trust in long-term collaboration. There are 3 crowdfunding programs: All or Nothing, Keep Everything, and Keep the Target Away. The crowdfunding process involves fundraising, fundraising organizations, and banks acting as custodians and fundraising agents. The crowdfunding process involves fundraising, fundraising organizations, and banks acting as custodians and fundraising agents. Blockchain technology can be used to track fundraising activities and store transaction history.

Provide direction to other research related to blockchain technology.[8]

Smart contracts and blockchain technology have potential applications but also face issues such as vulnerability to hackers. This study focuses on the use of smart contracts and the efficiency of smart contracts in Iraqi oil and gas companies. cultural group. This study uses the consideration of adoption, recognition, and integration of technology and resource use to analyze the impact of smart contract technology on the individual, the environment, and the organization even if the relationship isn't there. Research provides commercial benefits to oil and gas companies and helps them achieve desired results using information technology.[9]

This paper discusses the concept of quantum blockchain and its application in electronic voting. Quantum blockchain is an economic system that combines qubit contract protocol and quantum secure communication for transparency, security and decentralization. The article explains the components of the qubit promise and their role in reaching consensus on the data block. It also touches on the development of quantum voting protocols to address security risks posed by quantum computers. The paper also describes a quantum blockchain-based multi-candidate voting protocol that uses the concept of Condorcet winners to improve the voting process. Overall, the paper demonstrates the advantages of quantum blockchain for electronic voting and whether it is ready for practical use.[10]

This article explores the challenges and solutions of e-Roaming, a strategy to increase the accessibility of electric vehicle charging. Current centralized electronic circulation systems raise concerns about business efficiency and privacy risks. To solve these problems, the article examines the integration of blockchain technology with self-sovereign identity (SSI). The model consists of three entities: costing officers (CPOs), electronic service providers (e-MSPs), and users. It leverages blockchain as a public ledger and SSI for self-regulation, powered by legacy systems and secure communications. The architecture is designed to help disintermediation, accountability, efficiency, data protection, availability and scalability of the e-Roaming system.[11]

E-learning has changed a lot due to COVID-19. Schools are working hard to find alternative ways of learning and education. E-learning is cost-effective and can increase data reliability by 60%. Digital learning technologies facilitate self-learning and tracking of new skills and knowledge. Blockchain technology can benefit education by providing a global network of trust, credit transfer and alumni to students and higher education. A blueprint for credit training and grading. The concept of smart technology has many teaching methods. Blockchain technology can provide transparency of training programs and access to advanced information for employers.[12]

This article highlights the importance of compliance with regulatory requirements and the need for investment in infrastructure and R&D. The document also highlights the potential impact of blockchain technology on enterprise payments and settlement, risk prevention and management, and IT architecture. The benefits of blockchain technology in improving the collaboration and connection of smart financial instruments are mentioned. The document acknowledges the issues and challenges companies face in the use of blockchain technology, but also acknowledges its potential to reform the financial ecosystem. The need to establish and improve policies and standards regarding the use of blockchain in business. The article discusses the benefits and challenges of blockchain technology in the banking sector in general and highlights the need for collaboration, investment and innovation.[13]

This article presents research that aims to integrate existing research on the relationship between blockchain technology and the factors that determine its adoption and identify customers and barriers to adoption. This study focuses on the adoption of blockchain in the supply chain, specifically in the fishing industry. The article identifies three primary

organizational environments that influence the adoption and use of new technologies: the technological environment, the organizational environment, and the environmental environment. It also discusses potential applications of blockchain in supply chain management, such as collecting and sharing information, reducing information and costs, transparency and traceability, and promoting competition. This study uses data analytics techniques to collect and analyze a variety of blockchain data related to supply chains, fishing, and adoption. Research studies show that resources are the key enablers and integration is a major barrier to blockchain adoption. [14]

This paper discusses the use of blockchain technology in a variety of industries, including finance, forecasting, insurance, healthcare, law, technology energy management, real estate, digital identity, governance, supply chain management, rental cars, and education. It pays special attention to the integration of blockchain technology in supply chain management and emphasizes the importance of managing the integrity and safety of food products. The document also mentions the potential use of blockchain in agriculture, Industry 4.0 and Industry 5.0. Overall, the article explores the current state, potential applications and future directions of blockchain in supply chain management and highlights the importance of connecting new technologies such as blockchain and artificial intelligence to improve the delivery process and improve customer experience.[15]

Blockchain is emerging as a disruptive technology with the potential to increase transparency and public trust in public administration and services. But incorporating blockchain into public administration could transform all aspects of public officials' work, including their daily duties and responsibilities. While some public officials may view blockchain as a way to improve current governance, others may view it negatively and oppose it. An experimental example was carried out to investigate public opinion on the use of Blockchain in the delivery of public services in the Council. The results show that more public regulation of certain aspects of blockchain increases the risk of blockchain acceptance by public officials and is also associated with trust in public administration and services. Public administration around the world faces new social, economic and political challenges, such as managing risk and uncertainty, building trust and legitimacy of public institutions, being strong and effective, working for diversity, improving social participation and service.[16]

III. Proposed work & Algorithm

One of the most common problems of today's donation process is the lack of transparency and trust issues with the third-party managers such as NGOs. The NGOs act as middle men where contributions are made to and stored at. The major drawback of this funding system is that the funds are in complete control of the NGO and the process of further utilization of funds is unknown to the contributors. Due to this, potential contributors hesitate to donate money and hence the problem statement.

Proposed Solution **---** A better way of managing and utilizing funds is through a SMART CONTRACT. The basic idea is to design a smart contract using Blockchain Technology that replaces the role of NGO in the funding process that uses cryptocurrency as the mode of transaction. The smart contract is designed in SOLIDITY [17] programming language (top recommended language for Ethereum and Smart contracts) and all the captured test cases have been run on REMIX IDE [18] which is an integrated development environment used to deploy blockchain-based smart contracts. The other tools and technologies that have been used backend are Web3[19], Ethereum [20], Hardhat [21], Truffle [22], Remix [23] (Development & Testing framework), MetaMask [24] (Network), React.js [25], Sandbox blockchain, etc. They can be briefed as follows. Solidity is a programming language designed for writing smart contracts on blockchain platforms, notably Ethereum. It enables developers to create decentralized applications (*DApps) by defining the rules and logic of smart contracts. Solidity supports object-oriented programming principles and is crucial for building secure and transparent blockchain applications. Web3 refers to the next generation of the internet, emphasizing decentralized protocols and technologies. It envisions a web where users have more control over their data and transactions through blockchain and decentralized technologies. Web3 is associated with DApps, blockchain interoperability, and the shift towards user-centric, trustless systems. It aims to redefine the way information and value are exchanged online. Ethereum is a decentralized blockchain platform that enables the creation of smart contracts and DApps. It introduced the concept of Ether (ETH) as its native cryptocurrency and played a pivotal role in popularizing blockchain beyond digital currency. Ethereum's programmable and versatile nature has made it a cornerstone for decentralized finance (DeFi) and various blockchain innovations. Hardhat is a site for developing and testing Ethereum smart contracts. It offers flexibility, customization, and seamless integration with other tools. Consider this your go-to platform for processing and fine-tuning smart contracts. Truffle simplifies the development process by handling tasks such as compilation, deployment, and testing. It provides templates, automation, and even a built-in debugger to make smart contract developers' lives easier. Consider this your complete solution for a smooth and efficient development process. Remix is an online IDE that allows you to write, export and interact with smart contracts directly in the browser. It's great for learning strings, experimenting with code, and even debugging contracts on the fly. Think of it as your virtual space to explore and explore the world of smart contracts. MetaMask is a browser extension and mobile application that acts as a wallet for cryptocurrencies and tokens, as well as a bridge to interact with DApps on various blockchains. It is the most popular way to access the decentralized web, with over 20 million users. React.js is a popular JavaScript library for creating efficient, interactive and easy-to-use user interfaces. It breaks web pages into reusable components, making them more scalable and flexible. React.js underpins many popular dApps, including MetaMask, Uniswap, and OpenSea. Sandbox Blockchain is an integrated gaming platform that allows users to create, own and profit from gaming

experiences and digital assets using blockchain technology. It combines the power of NFTs with a user-generated gaming experience. Overall, an efficient code has been designed which acts as the heart of this idea.

Algorithm **---** The Smart contract's unique algorithm makes it a digital ledger that stores a log of each and every transaction, both authorized and failed due to which it can be considered tamper-safe and reliable. The Smart contract consists of independent function blocks for every task of which the major are the following:

1) **sendEth** --- This function enables the contributor to transact funds in Ethers. The funds are received and managed by the smart contract. Once a transaction is made, the ether balance is increased accordingly.
2) **createRequest** --- This function is called by the manager when an appeal is made by an organization.
3) **voteRequest** --- This function enables the interested contributors to vote for the request.
4) **makePayment** **---** This function is called by the manager in order to process the appeal of the organization. It is designed in such a way that transaction is authorized only if majority of the contributors vote for the request and is denied in case voting majority is against the appeal. Once a fund transaction is processed successfully, the ether balance is deducted accordingly.

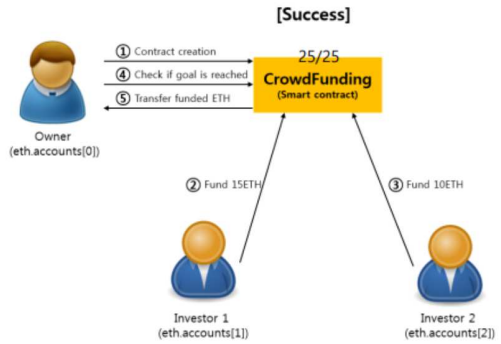

Fig. 1. Successful Transaction

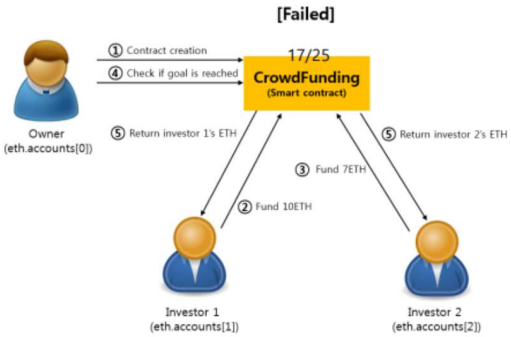

Fig. 2. Failed Transaction

Features **---** The smart contract, being subject to the following rules, ensures Safety, Trust, Distributed control and Transparency.

1)There exists a middle man account termed Manager.
2)createRequest and makePayment can only be performed by the Manager.
3) There exist multiple accounts termed contributors who can donate money in the form of cryptocurrencyEthers.
4) Contributors can transfer funds greater than minimum contribution, before deadline, which are stored and handled by the smart contract.
5) There exist certain accounts termed organizations who can appeal to the manager for funds.
6) Once the request is created by the manager, only contributors can vote for or against.
7) Every contributor gets one and only one vote.
8) The appealed funds can be transferred by the manager and the payment is processed subject to the condition that the voting majority is for rather than against which and when, the transaction is disabled and funds refunded.
9) Duplicate payment to completed request is prohibited.

IV. RESULTS

The following test cases have been verified based on the output whether the transaction is processed or if it is shown as an error depending on the inputs given. The green tick on the output screen indicates a successful transaction subject to the condition that all the rules of the algorithm are true and the voting majority is for the appeal. However, a red cross is shown on the output screen along with an error message whenever the algorithm detects unauthorized input and also if majority contributors do not support the appeal.

TEST CASE: Total contributors – 3, Voters – 2, Transaction authorized and successful, Ether balance deducted in Fig. 3.

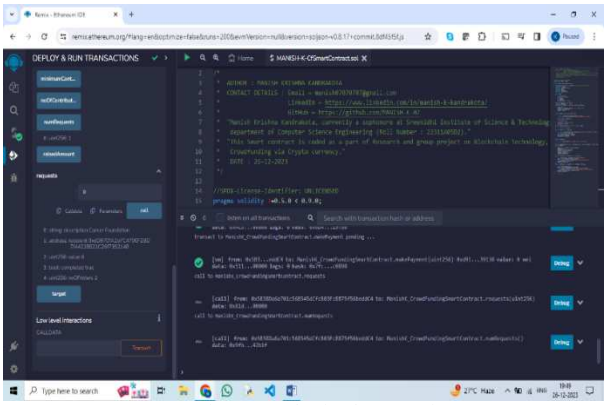

Fig. 3. Authorized transaction

TEST CASE: Total contributors – 5, Voters – 2, Transaction denied and failed, displays "majority does not support" in Fig. 4.

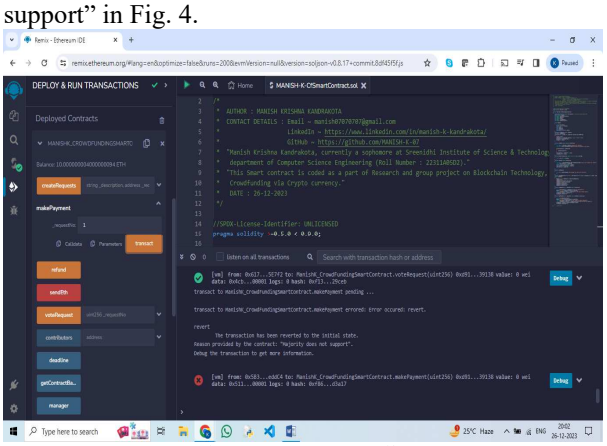

Fig. 4. Voters < Contributors

TEST CASE: Total contributors – 8, Voters – 5, Transaction authorized and successful, Ether balance deducted in Fig. 5.

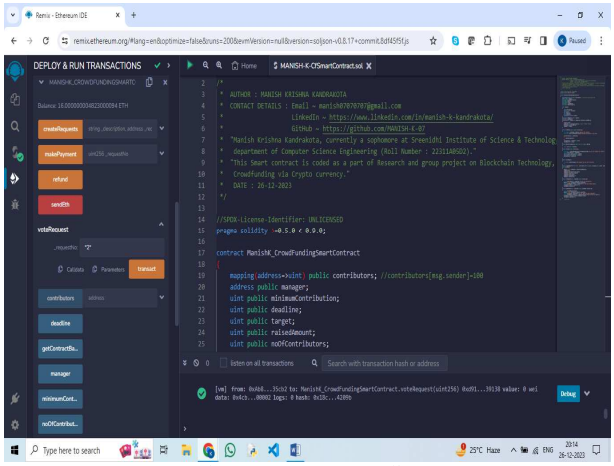

Fig. 5. Voters > Contributors

Standard Test Cases: The Smart Contract follows a certain set of rules to attain the highlighted features. These test cases show the output when either one of them is not followed.

TEST CASE	OUTPUT MESSAGE
createRequest by other than manager.	"Only manager can call this function".
makePayment by other than manager.	"Only manager can call this function".
Not a contributor but trying to vote.	"YOU must be contributor".
Make payment to closed request.	"The request has been completed".
Already voted but trying to vote again.	"YOU have already voted".
Minimum/late contribution.	"Deadline has passed".

Fig. 6. Standard Test Case Table

In all the above-mentioned test cases, the function blocks from the source code of the smart contract return certain messages on the output screen which indicate that some unauthorized action is being performed.

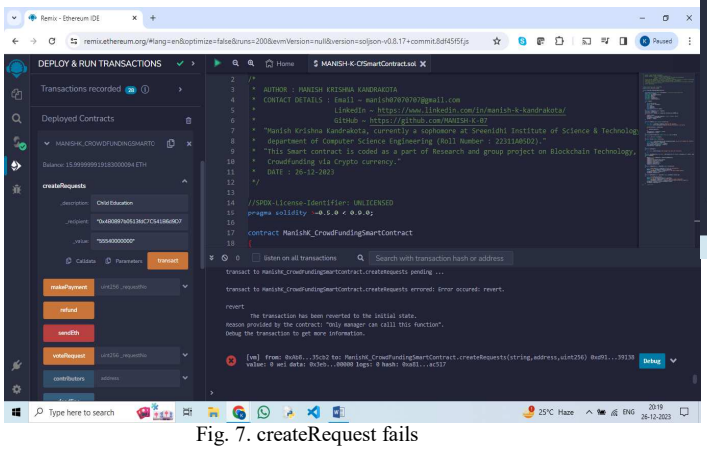

Fig. 7. createRequest fails

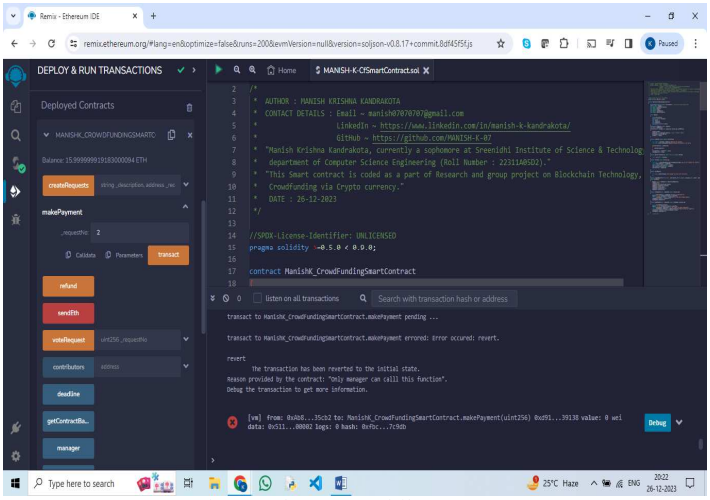

Fig. 8. makePayment fails

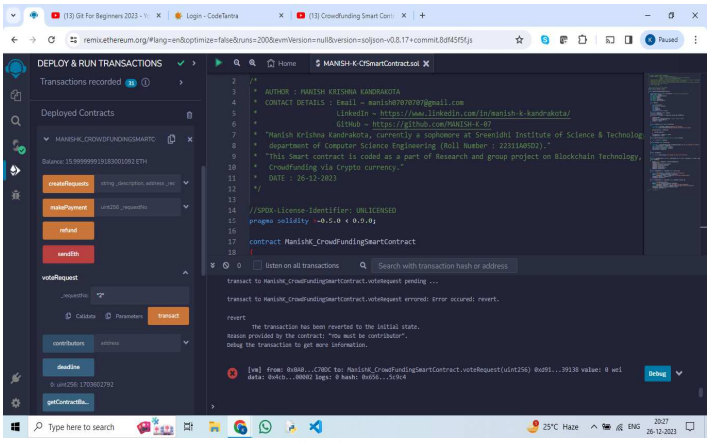

Fig. 9. Illegal voting

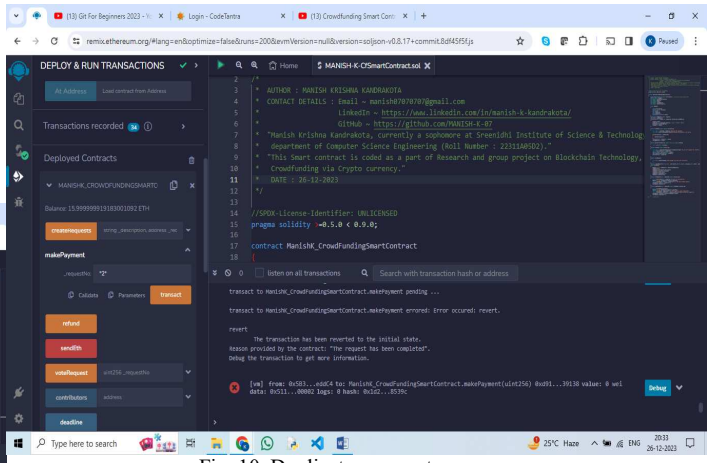

Fig. 10. Duplicate payment

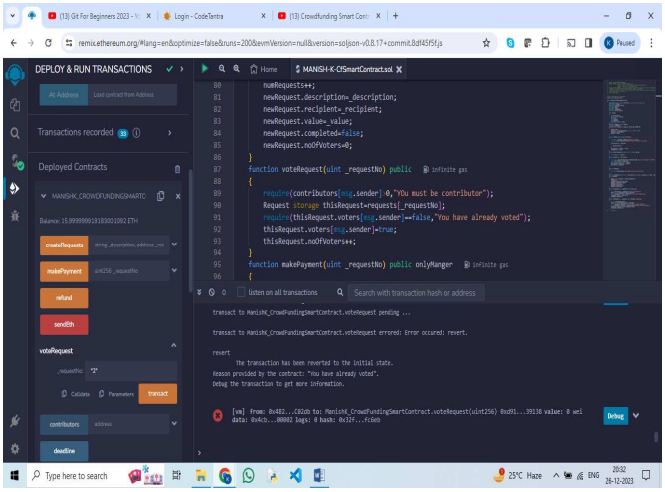

Fig. 11. Duplicate voting

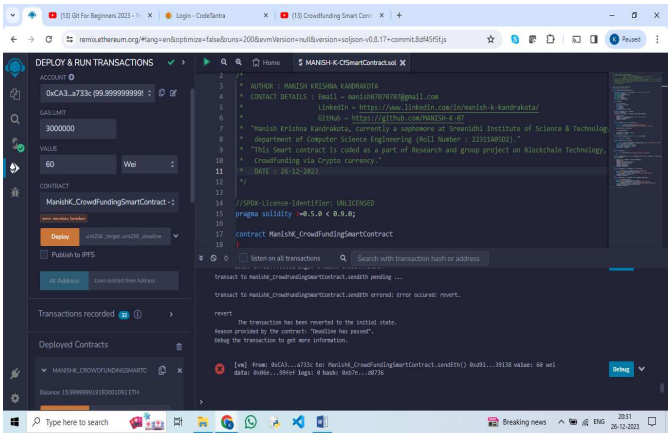

Fig. 12. Minimum requirements failed

V. CONCLUSION AND FUTURE SCOPE

Artificial intelligence and machine learning models could be applied to these platforms. This would enable users to review the application before continuing with the campaign if they became suspicious. Crowdfunding is in its nascent stages in India. It will take time to increase awareness. We bring people from different backgrounds together through crowdfunding. Crowdfunding has aimed to bridge the gap between those in need and those wishing to lend a hand. It facilitates promotion of new enterprises as entrepreneurs with feasible ideas get inexpensive funding without any inconvenience, Strict cyber restrictions should be implemented before adopting Blockchain. The managers of the campaign should use social media to advertise it to a general audience. It is crucial to identify the real campaign, and different strategies must be established to do so. Artificial intelligence and machine learning can be used to do that.

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