Smart Contracts using BlockChain as a means of self Regulated Open Source Crowdfunding

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Abstract

For a long time, Blockchain has been an exciting research topic, and many firms have benefited from its benefits. Likewise, Blockchain technology offers a lot of potential in the healthcare sector because of privacy, confidentiality, decentralization and security, Nonetheless, Electronic Health Record (EHR) systems are plagued by worries about data security, integrity, privacy and administration. We address how Blockchain technology may be utilized to improve EHR systems and how it could be a solution to these problems in this paper. We present a patient centric approach for integrating Blockchain technology for electronic health records in the healthcare sector. Also, to offer secure storage of electronic records for users of the proposed framework by specifying granular access controls. This framework gives the EHR system the advantages of a Scalable, secure, and integrated blockchain-based system.

Keywords – Blockchain, Decentralization, EHR, Patient Centric, Privacy, Security.

I. INTRODUCTION

Crowdfunding offers a lot of benefits for entrepreneurs and other start-ups who have a genuinely great project idea they want to work on but do not have access to funds for the resources they need to complete their project idea or fund their new startup. Traditionally these innovators turn to family,friends or small finance organizations. These small finance organizations charge exorbitant interest rates and for the most part charge very high interest charges in order to receive funding from them.

When we look at the existing crowdfunding platforms, we see that corporations charge both the donor and the user a large fee. Between the investors and the user implementing the project, there is also a lack of communication, trust, and transparency. Given the existing crowdfunding platforms' flaws and high rates, using blockchain technology is a logical commercial decision. Every transaction which is recorded on the blockchain, which is a decentralized digital ledger that cannot be tampered with. All of the records are kept in each of the decentralized network's nodes because it is a distributed system that works on

the shared consensus protocol. Ethereum virtual machines make it easier to create and run Smart Contracts, which are blockchain-based applications. All smart contracts are run on the traditionally used Ethereum Virtual Machine and Ether is used as the currency for our project. Crowdfunding is a straightforward method of raising funds for innovative project ideas. The problem with existing crowdfunding platforms is that they demand high fees and there have been many frauds committed either by the investors or the project managers. These problems may be avoided by using blockchain to develop a crowdfunding strategy. Traditional transaction expenses and platform fees commonly associated with other crowdfunding platforms, such as Kickstarter, are abolished when smart contracts are used for crowdfunding. [4]

The purpose of our project is to create a trustworthy application that will allow any new idea to become a reality. We're going to build a blockchain-based crowdfunding platform.It is presented in a very user-friendly interface for anybody who wants to implement and exchange ideas about the project or idea that they want to develop. These concepts are then approved by any investor who is interested in funding the project and then shared with the audience. Anyone who wants to financially support their principles and ideas are always welcome to do so. All these processes are carried out as a team effort.

By utilizing smart contracts for crowdfunding, traditional transaction and platform charges associated with existing crowdfunding platforms, such as Kickstarter, will be totally nullified. The purpose of our project is to create a trustworthy application that will allow any new idea to become reality. A blockchain-based crowdfunding platform will be developed by us. All of these steps are carried out in coordination with investors and company founders.

II. LITERATURE SURVEY

The scientific and scholarly articles which were searched on this topic were first identified google scholarly articles for the term ‘Crowdfunding’, the search was continued based on the citations which were given, after which led us to the terms such as P2P crowdfunding, social lending and person- person lending were stumbled upon and later investigated.

This is a very recent trend hence the papers which were referred to follow a “Phenomenon-Based-Approach” (Von Krough, Rossi Lamastra and Haefilger, 2012). Before crowdfunding was used [2]

Since crowdfunding is currently a relatively new field the amount of scholarly articles and papers are very limited.

The first publications addressing the issue of how to make crowdfunding more sustainable were published in 2011, then after a two-year hiatus, another study on the subject was released in 2013. As a result, while research in this topic is still in its early stages, the number of articles published has been steadily growing. In terms of the research methodologies employed, quantitative methods have recently gained popularity [3]. According to our investigation, no significant journal in this subject has published more than four articles on the long-term viability of crowdfunding, leading our team to the conclusion that any type of research in this sector is only seldom published. According to

our research, donation based crowdfunding received the highest amount of attention. Lending based crowdfunding approaches are the most relevant type of crowd funding practices when assessed by market based volume of 76%, but addressed only in 16% of the publications. The same contrast was also derived from in the crowd funding platforms examined, among what were examined, kickstarter which is a reward based crowdfunding platform is the favorite chosen source of data.

Crowdfunding is a relatively new trend which is slowly gaining popularity. According to one definition, "crowdfunding" is the ability to gather a generous amount of money from a large pool of potential investors and stakeholders. Thus far, crowdfunding has gained a lot of popularity driven mainly because of the international financial crisis of 2008 [7], which resulted in credit institutions tightening their financial strength and solvency criteria. In this new age which relies heavily on the internet for their day to day tasks and the unlimited access almost everyone has, it is possible to sustain large crowds of local and foreign investors in a cost-effective manner, playing major roles in the growth and spread of crowdfunding (IOSCO 2015). [5]

Crowdfunding is now considered as a great opportunity for individuals to get “entrepreneurial financing” which is serving as a great alternative to the existing financial mechanisms. examples include banks, credit institutions, small financial institutions and angel investors. Crowdfunding can provide a great alternative way for investors to access their funds and financial assets.

In the future, this will result in a diversification of the financial markets. Changes in financial institution laws, for example, might be viewed as a constraint on the successful functioning of financial markets for entrepreneurial firms. Globally, the financial health of developing businesses and SMEs, as well as their access to capital, has deteriorated to some extent. As a result, businesses have not always been able to meet their project funding needs through traditional sources of capital, resulting in financing gaps in some circumstances (European Commission 2018b).

Of course, not every firm is supported financially. As a result, funding alternatives to bank financing, such as risk and equity finance (i.e. bond markets, crowdsourcing, and venture capital), have become more important from the perspective of growth-oriented businesses. Equity crowdfunding is especially important for assisting the growth of technology-intensive and innovative enterprises in general. This is especially true when a company is trying to break into new markets or develop new products. Palmer discovered in his research that the cost of (crowd) fundraising (i.e. associated fees) isn't the key reason why some companies opt to use crowdsourcing.[3]

III. PROPOSED WORK

Traditional crowdfunding platforms have a number of disadvantages, including: operational fees, strict laws and regulations, startups acting in bad faith, and intellectual property risks.

Because of the drawbacks of traditional crowdfunding platforms, blockchain technology is a viable business choice.Crowdfunding systems based on blockchain technology have the potential to become a more acceptable source of funding for a variety of initiatives and causes.

For example, blockchain smart contract solutions automate the release of funds only when milestones demonstrate that the funds will be required in the future. Fundamentally, blockchain crowdfunding systems may give vital oversight into individual campaigns while lowering the amount of trust required for investment.

This project's goals would be: Improved Equity Accessibility Rather than relying on a crowdfunding site to facilitate pre-orders of impending tangible items, blockchain offers asset tokenization tools. Asset tokenization combines the benefits of blockchain technology with the ability for investors to generate equity or fractional ownership of a real asset. An entrepreneur who plans to utilize the cash to produce multiple new items, for example, can give each new investor a tiny ownership share in the company in proportion to their contribution. It has the ability to bring whole new investment opportunities to the table. Any initiative using a blockchain-based crowdfunding mechanism has a good probability of succeeding. Anyone with an internet connection may contribute to such endeavors.

Cryptocurrencies, crowdfunded companies or product stakes are traded on a peer-to-peer basis. As a result, contributors would have more liquidity in their investments. It might be a good method to stimulate people's interest in the overall endeavor. It has the ability to give rise to a new type of marketplace.

You can streamline operations and eliminate third parties using smart contracts, saving fundraisers money and allowing them to spend exactly the amount they intended to invest

This project entails the establishment of a website that serves as an interface between the contracting parties, particularly the investing and receiving parties. Each partner will be given the option of securely logging in to a page that contains up-to-date information about their specific projects. Ethereum allows Smart Contracts to be implemented using blockchain technology. These enable for the creation of immutable and distributed contracts between an investor and an entrepreneur/NGO. There is sufficient study material and instruction on the usage of blockchain in this domain available online to allow us to properly implement our plan.

In today's world, a startup begins with a basic concept. They are supported by investors who share the entrepreneur's vision and/or interest. In this process, platforms like Kickstarter operate as a middleman, whereas smart contracts might put the investor and entrepreneur in direct communication. When prepared with the help of competent legal advice, smart contracts can be made totally clear in the case of a disagreement. In this project, blockchain will be used to the greatest extent possible to maximize security, ease, and practicality.This project uses a blockchain and the cryptocurrency Ethereum, which is now the market leader in the field of smart contracts.

Because no physical hardware, such as sensors, are involved, the project is built entirely with open source software. As a result, there are no expenditures associated with completing this project.

IV. METHODOLOGY

Smart Contract

A smart contract is a contract that may be executed automatically and must be carried out according to the provisions of the contract. While certain aspects of Smart Contracts may be done automatically by a machine, others require human input and control. Can be enforced both legally and via computer code that cannot be updated or approved in the implementation or execution of rights. Smart Contracts may be used on top of blockchain technology to automate complex transactions. To enable, execute, and enforce a transaction, a Smart Contract is a code that may be performed and executed on a blockchain network.

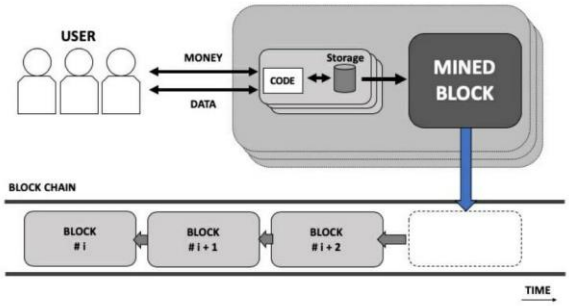

Fig1: Smart Contract

A Smart Contract is made up of an account balance, personal storage, and executable code (Fig 1). The status of the smart contract is updated in a single linked block every time the contract is invoked.The code in the blockchain cannot be modified once the contract has been submitted. Sending a transaction to a unique address can be used to execute it by using 20 bytes from the contract. The contract is then carried out by the network's miners in order to achieve consensus output, after which the contract's status is renewed.

Contracts can read and write transactions to personal storage, as well as deposit money into their accounts.

Blockchain

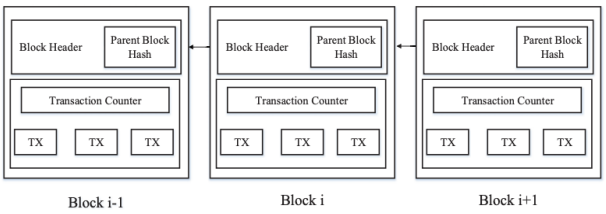

Fig 2 : A sequence of blocks

The above Fig 2 demonstrates how the structure of the series of blocks look like in the blockchain network. These are just a series of such blocks which hold information such as

the transaction details depending upon the block size of each of the blocks. The features of Blockchains include:

- Decentralization : Unlike any bank or central agencies which come under the direct power of the govt. which means each transaction done is regulated, this requires a lot of time, effort and storage. All these can be avoided by using a blockchain technology using the consensus protocol where all the blocks or nodes in a network take a vote in order to verify a transaction

- Persistency : All of the records entered into the blockchain ledgers can be verified quickly by the miners of the block. It is almost impossible to roll back or modify the changes in a blockchain network. Any block in the network that has been tampered with can be immediately found out.

- Anonymous: All the individuals in the network interact with each other through a generated address, no real identities are used in any interactions with each other.

- Proof Of Work: It is a consensus protocol in which the algorithm is used to confirm a new transaction and creates a new block into the network.

The main purpose of the blockchain used in our project is to tackle the increasing problems, particularly in terms of establishing trust. Blockchains basically are digital ledgers that are resistant to destruction. Blockchains is a distributed peer to peer database that houses a worldwide record of all completed transactions that is confirmed by the system's majority of consensus and then shared with all parties involved. After data has been entered into the ledger, it cannot be deleted under any circumstance. The blockchain, which keeps track of specific transactions, may be used to validate all the transactions that have ever taken place.

In our system, the campaigners will post their project ideas in the main campaign page and the parties who want to support the idea such as investors can donate funds in the form of ether for a particular project idea that they are interested in. How it differs from traditional crowdfunding approaches is that the money is digital currency such as Ether. All these ether transactions will be recorded and be stored in an immutable ledger which works on a peer to peer network system. The Donor has complete control over the donated ether. Only half of the investors need to approve the request made by the creators. By giving control on invested money the trust is made.

V. CONCLUSION AND FUTURE WORKS

Traditional crowdfunding systems have long been plagued with inconsistency and fraud. It's a preventable problem, and we feel we've put in place a strong solution that will put an end to these long-standing issues.

To a large extent, the goal of having a transparent, anti-fraudulent, decentralized platform has been met. This project addressed the flaws in typical crowdfunding platforms in order

to increase openness in the crowdfunding process and develop confidence among people, allowing them to donate their income to good causes without fear of fraud.We have taken that into consideration and designed this app so that even a common man can use it with ease. But this is not the end. With the evolution of Blockchain and introduction of ICOs, our application has a bright future and a large scope for improvement and evolution.

The world is still adapting to Blockchain and Cryptocurrencies, and Ethereum-based Dapps will take a few years longer to become popular and accepted by the community. In this context, a Blockchain-based crowdfunding application is a difficult notion for everyone to grasp. We've taken that into account and built this software to be simple enough for even the most inexperienced user to use. But this isn't the top of the story. Our application has a bright future and plenty of room for growth and evolution, thanks to the evolution of Blockchain and the advent of ICOs. Through our crowdfunding application, we hope to make it even simpler and safer for all ideas to come to life in the future.

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