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An Analysis of Decentralized and Centralized Freelancing

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ABSTRACT

In today's constantly evolving digital realm, the conventional freelance marketplace model encounters obstacles concerning trust, transparency, and efficiency. Previous research has introduced a concept: a centralized Freelance Marketplace utilizing centralized server-based infrastructures. These systems relied on centralized technology to establish a highly scalable and fast freelancing platform. However, due to shortcomings in certain areas of these platforms, a new approach has emerged - a Decentralized Freelance Marketplace. This innovative model offers a secure, transparent, and trustless environment for freelancers and clients to interact peer-to-peer. This study examines the design, implementation, and potential advantages of this decentralized freelance marketplace, exploring the underlying blockchain architecture and smart contract functionalities that support its operations.

Keywords: Blockchain; Smart Contract; Decentralization; Freelance; Ethereum.

INTRODUCTION

This introduction serves as an initial probe before delving into a forthcoming discussion exploring the conception, implementation, and potential advantages of a decentralized marketplace. It aims to provide a glimpse into the inner workings of blockchain technology, the practical aspects of smart contracts, and the transformative potential of this model for the freelance industry. As readers progress through subsequent sections, they will uncover the promise of a Decentralized Freelance Marketplace leveraging blockchain technology to potentially reshape the employment landscape, offering freelancers and clients a vision of a more equitable, efficient, and decentralized future.

What is Freelancing?

Freelancing involves self-employment, where individuals offer their services on a contract or project basis rather than being employed by a company. Freelancers market their skills directly to clients or through online platforms, creating profiles, portfolios, and bidding on projects. They often use social media for promotion. Typically hired on a contractual basis, freelancers are compensated based on the work's scope and duration. While companies of various sizes and industries can engage freelancers, freelancers must cover taxes, health insurance, pension, holiday costs, and sick pay. Despite these responsibilities, freelancers enjoy the flexibility of setting their own working hours and arrangements, including working remotely or from clients' offices.

Blockchain

Blockchain serves as a decentralized and distributed digital ledger technology, facilitating secure and transparent recording of transactions across multiple computers. Originally designed as the foundation for cryptocurrencies like Bitcoin, its applications have expanded to various industries and use cases. Blockchain ensures data security, transparency, and immutability. Despite claims of being "unhackable," the reality is that 51% attacks can compromise the integrity of the ledger by allowing threat actors to control over half of a blockchain's computing power. Although executing such an attack is costly and challenging, its effectiveness underscores the need for security professionals to view blockchain as a valuable technology rather than a panacea for all security issues.

Ethereum

Ethereum stands as a decentralized global software platform fueled by blockchain technology, renowned for its native cryptocurrency, ether (ETH). It provides a versatile foundation for creating secure digital technologies, accessible to

anyone. While Ethereum features a token primarily for supporting its blockchain, participants can also employ it for purchasing goods and services, provided they're accepted. The platform's programmable capabilities have catalyzed a significant transformation, empowering developers to craft smart contracts. These contracts automate various freelancing processes, including job creation, matching, payment, and dispute resolution. Leveraging Ethereum's native cryptocurrency, Ether, these platforms offer secure, borderless payment solutions, circumventing the constraints of traditional banking systems and currencies.

Importance of Decentralized systems:

This paper delves into the concept of a Decentralized Freelance Marketplace and its integration of blockchain technology within the swiftly evolving digital landscape. The fundamental aim is to establish a system facilitating direct, peer-to-peer (P2P) interactions between freelancers and clients, thereby obviating the necessity for intermediaries and nurturing an atmosphere of trust and responsibility. Leveraging blockchain and smart contracts, the marketplace guarantees secure and automated transactions, mitigating the risk of fraud and facilitating transparent dispute resolution. By harnessing secure, immutable, and self-executing smart contracts, the platform diminishes fraud and intermediary expenses, while ensuring punctual payments and conflict resolution. Key attributes of the decentralized marketplace encompass intermediary elimination, fee reduction, global accessibility, and a reputation mechanism fostering accountability within a secure framework.

LITERATURE REVIEW

Blockchain technology is versatile, extending beyond finance and digital currencies. It's valuable for applications requiring decentralized reliability and transparency among untrusting parties, like document validation, digital identity protection, supply chain management, secure voting systems, and automated smart contracts.

Decentralized Freelancing using Ethereum Blockchain [1] proposed a blockchain-based system to provide trust between employer and employee and ultimately, trying to solve different issues of centralized freelancing Marketplace websites. Their system contains Ethereum blockchain based backend which leads to higher security. They have implemented a fully decentralized freelancing system with all the aforementioned advantages.

A Case Study of Execution of Untrusted Business on Permissioned Blockchain [2] the work in this study analyzes varied studies done to boost the performance of centrally controlled business processes, and states that the foremost serious problems with the centralized systems square measure lack of trust and divided information on totally different confidential ledgers. To beat this, it suggests the utilization of blockchain technology, which solely eliminates the necessity of a trustworthy third party however conjointly provides a distributed shared ledger. A Blockchain-Based Decentralized System for Proper Handling of Temporary Employment Contracts.

The paper proposes a blockchain-based system that aims to ensure respect for the rights of all actors involved in temporary employment [3], in order to provide employees with the fair and legal remuneration of work performances and protection in the case employer becomes insolvent. Their system also assists employers in processing contracts with a fully automated and fast procedure Work Capacity of Freelance Markets: Fundamental Limits and Decentralized Schemes.

In this work, [4] tend to confirm the capability of freelance markets, in terms of most glad job requests, and propose centralized schemes that deliver the goods capability. To confirm decentralized operation and freedom of selection for purchasers and freelancers, they have presented straightforward compatible system with the working of present crowdsourcing platforms that around deliver the goods capability. How the blockchain enables and constrains supply chain performance.

The purpose of [5] paper is to understand the enabling and constraining roles of blockchain technology (BCT) in managerial work practices and conceptualize the technology–performance relationship in supply chain management (SCM). Design/methodology/approach A structured literature review and a theory-driven approach are used. A set of propositions are developed, suggesting how the use of BCT in supply chains can be understood to simultaneously enable and constrain SCM and performance.

A case Study on Gig Economy. [6] The trend toward a gig economy predicted that by 2025, 40% of American employees would be self-employed. Globally, India is the second-largest freelance workforce after the US. There are lots of issues in a centralized system handling this economic model which can be solved by a decentralized system.

Juxtaposing centralized and decentralized governance. [7] Crowd work is a novel form of digitally mediated work arrangement that is managed and organized through online labor platforms. This paper focuses on the governance of platforms that facilitate creative work—that is, complex work tasks that require highlevel skill and creative workers. Crowd work platform governance faces numerous challenges as a result of technology mediation, scalable and distributed workers, and temporary work arrangements. Creative crowd work platforms, such as Top coder, typically require additional governance structures to manage complex tasks. Hire Chain - Decentralized Freelancing System.

METHODOLOGY

This endeavor involves the creation of a comprehensive decentralized application that encompasses both front-end and back-end components. The front-end operation utilizes HTML, CSS, JavaScript, and Angular JS to establish an agile and adaptable graphical user interface. On the other hand, the back-end infrastructure relies on the Ethereum Blockchain, facilitated by the MetaMask Extension. Smart Contracts, scripted in Solidity, are deployed via the Remix IDE specifically on the Test Network. The communication bridge between the front end and smart contracts is established through Web3.js. To facilitate interaction, distinctive Ethereum addresses and Application Binary Interface (ABI) are employed. The Ethereum public blockchain houses three distinct smart contracts responsible for storing user account data, job details, and reviews. The association between content and users is maintained through unique hashes, while GitHub serves as the platform for project sharing, leveraging its robust CICD setup.

Core Technologies Used :

Ethereum: Ethereum serves as a global, open-source platform enabling decentralized applications. It empowers developers to write code governing digital value, ensuring it operates precisely as intended and is accessible worldwide.
Solidity: Solidity is the programming language utilized for creating and deploying smart contracts on the Ethereum Blockchain. It's an offering of the Ethereum project itself.

The six steps in this process are as follows:

1. Registering onto the Platform: Users can visit the website and register using their Ethereum blockchain addresses. Users can be freelancers or users who post jobs.

2. Posting a Job : Once registered, if a user wants to post a job, he can post it with the information such as job completion deadline as well as Ethers he is willing to pay to the freelancer. After a job is posted, interested freelancers will apply for the given job.

3. Applying for the Job: Jobs will be classified as open, closed and in progress. Freelancers can apply for open jobs.

4. Selecting a Freelancer : User can select a freelancer based on their previous reviews and Ratings. Once a freelancer is selected by the user the Ethers will be debited from the user's account.

5. Confirmation of Work : Once a freelancer completes the work, he can confirm the same. Then, if the user confirms the same the Ethers will be transferred to the freelancer's account. That is, there will be two-way confirmation.

6. Cancelling the Job : If a freelancer wants to opt-out of the job, he can cancel the job. The job will be open and other freelancers can apply for it. Ethers debited from the user's account will be credited.

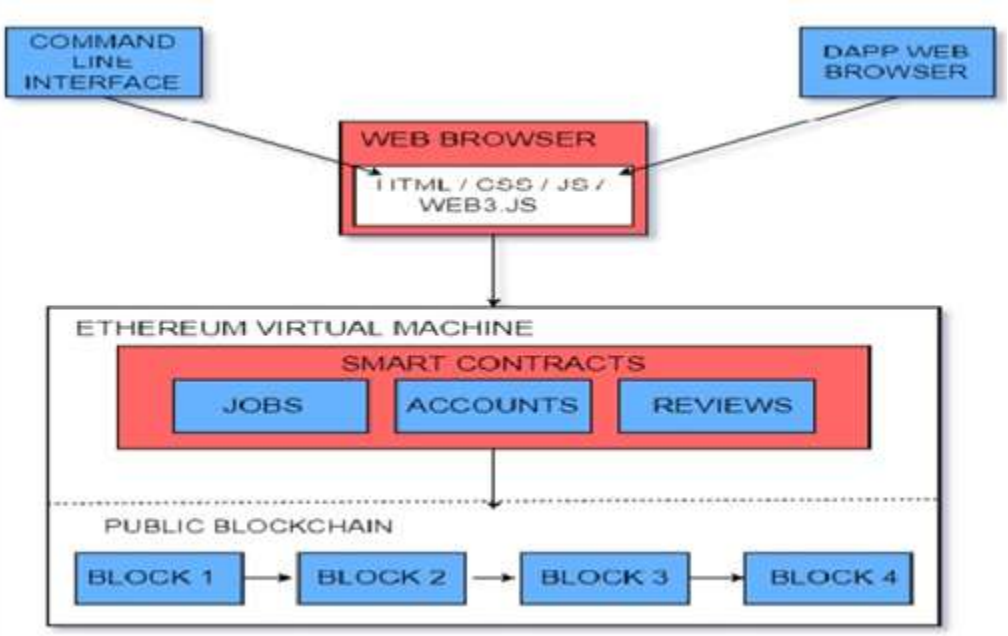

Fig. 3.1. Proposed System implementation.

RESULT

1. Login Page : This is the login page where clients and freelancers both can login as per their reference, after successful login client will be promoted to client dashboard and freelancers to freelance dashboard respectively.

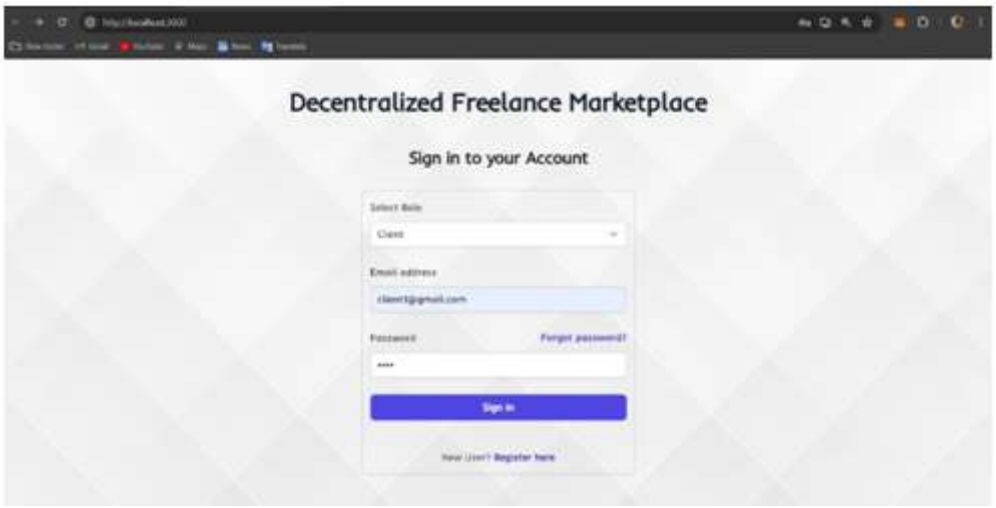

Fig. 4.1. Login Page.

2. Add Job :Clients can post jobs with their requirements and only after successful transactions. Transactions should be approved to post a successful job.

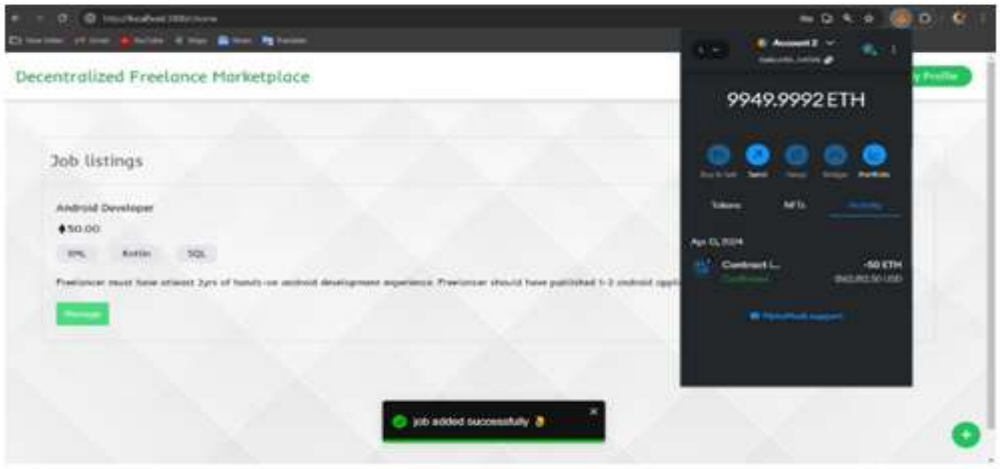

Fig. 4.2. Add Job Page

3. Progress of task : Once task is completed by the freelancer, the client can mark progress as completed and then the payment option will be visible.

Fig. 4.3. Progress of Task.

4. Payment Option : There will be two options for the payment, whether it can be through Ethers or other country focused currencies. Ethers based payment has been done with a fully decentralized manner whereas for country focused currencies payment razor pay is used.

Fig. 4.4. Payment Gateway.

CONCLUSION

The study talk about how blockchain technology can improve trust, security, and efficiency in freelancing and decentralized work platforms. They highlight blockchain's role in eliminating the need for intermediaries and ensuring data security. Some also focus on fair compensation, decentralized operation, and supply chain management in the gig economy. Overall, they underscore blockchain's potential to enhance freelancing and work platforms.

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