

An Idea Sharing and Validation Platform Using Blockchain with Delegated Proof of Contribution (DPoC)

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Abstract—This research proposes a novel approach to building an idea sharing and collaboration platform empowered by blockchain technology and the Delegated Proof of Contribution (DPoC) consensus mechanism. Ideas submitted to the platform undergo rigorous validation using specialized algorithms and Natural Language Processing (NLP) techniques to ensure authenticity and quality. Validated ideas are then tokenized on the blockchain, with each idea assigned a unique token serving as proof of ownership. Users can submit problem statements, and the platform matches them with relevant ideas, facilitating collaboration or ownership transfer. Additionally, users have the flexibility to list their ideas publicly or keep them private. The platform incentivizes active participation and contributions through DPoC, rewarding users for valuable ideas and collaborations. By combining blockchain technology with DPoC, the platform aims to foster efficient idea sharing, collaboration, and problem-solving, promoting decentralization, transparency, and incentive-driven engagement.

Keywords— *Idea Sharing Platform, Blockchain, Delegated Proof of Contribution, Validation Algorithms, Natural Language Processing, Tokenization, Collaboration, Incentivization*

I. INTRODUCTION

In the realm of innovation, individuals often encounter the challenge of validating their ideas amidst a vast sea of information. Traditionally, this process involves exhaustive searches across various platforms to determine the validity of an idea. Our proposed solution aims to streamline this cumbersome task by automating the validation process, providing users with swift confirmation of their idea's feasibility. Furthermore, our platform bridges the gap between ideators and potential collaborators, facilitating seamless collaboration and resource-sharing.

A. Introduction to Blockchain Technology:

Blockchain technology has evolved into a revolutionary force, with transformative implications across various sectors. Initially introduced as the underlying technology behind Bitcoin by Satoshi Nakamoto in 2008 [1], blockchain has since undergone significant evolution and diversification.

At its core, blockchain is a decentralized, distributed ledger technology that enables peer-to-peer transactions without the need for intermediaries. Each transaction is recorded in a block, which is cryptographically linked to the previous block, forming a chain. This decentralized architecture ensures transparency, security, and immutability, as data stored on the blockchain cannot be altered retroactively.

The evolution of blockchain has witnessed the emergence of numerous alternative platforms and protocols, each offering unique features and functionalities. Ethereum, launched in 2015 by Vitalik Buterin and colleagues [2], introduced smart contracts, enabling the execution of self-executing contracts with predefined conditions. Subsequent developments have further expanded the capabilities of blockchain technology, including the advent of permissioned blockchains tailored for enterprise applications, and the integration of consensus mechanisms beyond Proof of Work (PoW), such as Proof of Stake (PoS) and Delegated Proof of Stake (DPoS).

Blockchain technology has evolved from its inception as the foundation of cryptocurrencies to become a versatile tool with applications spanning finance, supply chain management, healthcare, and beyond.

B. Overview of the Delegated Proof of Contribution (DPoC) Consensus Mechanism:

The Delegated Proof of Contribution (DPoC) consensus mechanism presents a unique amalgamation of Proof of Contribution (PoC) and Delegated Proof of Stake (DPoS) principles, offering a novel approach to achieving consensus in blockchain networks. DPoC introduces a paradigm where participants are acknowledged and rewarded based on their contributions to the network's operation and development.

At its core, DPoC leverages the underlying principles of PoC, which emphasize rewarding participants for their computational resources, storage capacity, or other contributions to the network's functionality [3]. In the context of DPoC, these contributions extend beyond traditional computational power to encompass a broader spectrum of activities, including idea generation, validation, and collaboration within the platform.

In addition to PoC, DPoC incorporates elements of DPoS, wherein participants delegate their stake to trusted network validators, known as delegates or witnesses [4]. These delegates, selected through a voting mechanism, assume the responsibility of

validating transactions and maintaining network integrity. By delegating their stake to competent validators, participants contribute to the decentralization and security of the network while receiving rewards commensurate with their contributions.

The DPoC consensus mechanism offers several advantages for idea sharing platforms seeking to incentivize active participation and foster collaboration. By recognizing and rewarding meaningful contributions, DPoC promotes engagement and encourages users to actively contribute to the platform's growth and development.

II. LITERATURE REVIEW

A. Review of Existing Idea Sharing Platforms and Their Limitations:

Current idea sharing platforms often face challenges in effectively verifying the validity of submitted ideas, leading to issues such as idea theft, lack of trust, and inefficient collaboration among users. Traditional platforms typically lack mechanisms for incentivizing users to contribute high-quality ideas or collaborate effectively with potential partners. Moreover, they often fail to leverage the potential of blockchain technology to address these shortcomings [5].

For example, platforms like IdeaScale and Spigit offer basic idea submission and voting functionalities but do not provide robust mechanisms for validating ideas or facilitating meaningful collaboration. Similarly, crowdsourcing platforms like Kickstarter focus primarily on fundraising rather than idea validation and collaboration [6].

B. Overview of Blockchain-Based Platforms and Their Benefits for Idea Sharing:

Blockchain technology offers a promising solution to the limitations of traditional idea sharing platforms by providing a decentralized, transparent, and tamper-proof infrastructure for idea validation and collaboration. By leveraging blockchain, idea sharing platforms can ensure the integrity and immutability of submitted ideas, thereby fostering trust among users.

Key benefits of blockchain-based platforms for idea sharing include:

- **Transparency:** Blockchain provides a transparent and auditable record of all transactions and interactions within the

platform, enabling users to track the provenance of ideas and contributions.

- **Security:** The cryptographic features of blockchain ensure that submitted ideas are secure from tampering or unauthorized access, enhancing the platform's overall security.
- **Decentralization:** By decentralizing control and governance, blockchain-based platforms empower users and reduce the risk of central points of failure or censorship.
- **Tokenization:** Blockchain enables the creation of digital tokens (e.g., ERC-721 non-fungible tokens) to represent ownership and value within the platform, facilitating incentivization and monetization of contributions [7].

C. Comparing Consensus Mechanisms for Idea Sharing Platforms

Various consensus mechanisms, such as Proof of Work (PoW), Proof of Stake (PoS), Delegated Proof of Stake (DPoS), Proof of Contribution (PoC), and Delegated Proof of Contribution (DPoC), offer distinct advantages and disadvantages for idea sharing platforms.

1. **Proof of Work (PoW):** PoW is resource-intensive and not well-suited for idea sharing platforms due to its high energy consumption and scalability limitations.
2. **Proof of Stake (PoS):** PoS offers a more energy-efficient alternative to PoW but may face challenges related to centralization and voter apathy.
3. **Delegated Proof of Stake (DPoS):** DPoS introduces a governance structure where users delegate their voting power to elected representatives, enabling faster transaction throughput and more efficient governance [8].
4. **Proof of Contribution (PoC):** PoC rewards participants based on their contributions to the network, making it potentially suitable for idea sharing platforms where collaboration and contribution are key [9].
5. **Delegated Proof of Contribution (DPoC):** DPoC combines the principles of PoC and DPoS, offering a hybrid consensus mechanism that incentivizes active participation and contribution while maintaining decentralization and efficiency [10].

Overall, DPoC emerges as a promising consensus mechanism for idea sharing platforms, as it effectively balances decentralization, efficiency, and incentivization, thereby fostering a collaborative and trustworthy environment for idea validation and collaboration.

III. METHODOLOGY

A. Proposed Platform Architecture

The proposed idea sharing and validation platform will be designed as a decentralized application (DApp) built on a blockchain network. The architecture will comprise smart contracts deployed on a blockchain platform, allowing for transparent and immutable record-keeping of ideas and transactions.

For the blockchain implementation, we have the option to choose between Ethereum and Steem blockchain. Both platforms offer robust smart contract functionality and are well-suited for DApp development. Ethereum is widely recognized for its versatility and developer-friendly environment, while Steem blockchain provides features specifically tailored for social media and content sharing applications.

In the development process, we will utilize tools such as MetaMask wallet and other Web3.js libraries to interact with the chosen blockchain platform seamlessly[11]. These tools will facilitate user interactions with the DApp, enabling idea submission, validation, and tokenization in a user-friendly manner.

B. Idea Validation Algorithms and NLP Techniques

To ensure the validity of submitted ideas, the platform will employ sophisticated validation algorithms and Natural Language Processing (NLP) techniques. These algorithms will analyze the content of submitted ideas, checking for uniqueness, relevance, and feasibility. Natural Language Processing (NLP) is a branch of artificial intelligence that focuses on the interaction between computers and humans through natural language. In the context of idea validation, NLP techniques play a crucial role in understanding and processing the textual content of ideas submitted to the platform.

One prominent technique used in NLP is contextual word embeddings, which aim to capture the meaning of words based on their context within a given text.

Contextual word embeddings, such as those generated by models like BERT (Bidirectional Encoder Representations from Transformers) [12], allow the platform to understand the nuanced meaning of words and phrases within the context of an idea.

Additionally, NLP techniques enable the platform to perform sentiment analysis, extracting the emotional tone or sentiment expressed in the text of submitted ideas. Sentiment analysis can provide valuable insights into the perceived value or feasibility of an idea, helping to prioritize and validate submissions effectively [13].

C. Tokenization of Ideas

Each validated idea will be tokenized using blockchain-based tokens, following the ERC721 standard for non-fungible tokens (NFTs). These tokens will serve as digital certificates of ownership and authenticity for each idea.

The ERC721 standard, also known as the Non-Fungible Token Standard, is a widely adopted Ethereum Improvement Proposal (EIP) that defines a set of rules for creating unique, indivisible tokens on the Ethereum blockchain [14]. Unlike traditional cryptocurrencies like Bitcoin or Ether, ERC721 tokens are not interchangeable, meaning each token represents a unique asset or item. This characteristic makes ERC721 tokens ideal for representing individual ideas within the platform, as each idea is inherently distinct and cannot be replicated or divided. By tokenizing ideas as ERC721 tokens, the platform ensures that each idea is uniquely identified and owned by its creator. This tokenization process provides a secure and transparent mechanism for tracking the provenance and ownership of ideas, fostering trust and accountability within the platform's ecosystem.

D. Implementation of DPoC

The platform will implement the Delegated Proof of Contribution (DPoC) consensus mechanism to incentivize active participation and contribution. Validators for DPoC will be selected based on the ranking of ideas by popularity. Contributors with the highest ranking will be chosen as validators. DPoC ensures that validators are individuals who have demonstrated significant contributions to the platform, thereby enhancing the platform's integrity and reliability.

DPoC is a hybrid consensus mechanism that combines the principles of Proof of Contribution

(PoC) and Delegated Proof of Stake (DPoS). In DPoC, participants are recognized and rewarded based on their contributions to the network, which can include creating valuable content, promoting engagement, or supporting other users. By delegating their stake to trusted validators, users can participate in the consensus process and help secure the network while earning rewards for their contributions [15].

IV. PROPOSED PLATFORM FEATURES

A. Idea Submission and Validation

Users can submit their ideas by providing a title and brief description following a standardized format provided by the application. The submitted ideas undergo analysis using natural language processing (NLP) techniques. Valid ideas are considered as transactions on the blockchain, and each idea is assigned a unique blockchain-based token as proof of ownership. This token can be exchanged or traded, providing a tangible asset for idea creators.

B. Problem Statement Matching

Similarly, users can submit problem statements they wish to solve. The platform matches these statements with existing ideas in the database. If a successful match is found, users are notified of potential solutions. Both the idea submitter and the problem statement owner have the option to collaborate or trade the idea using blockchain-based tokens, facilitating ownership transfer and collaboration.

C. Public/Private Idea Listing Options

Users have the choice to list their ideas as public or private. Publicly listed ideas are openly available for collaboration, fostering community engagement and knowledge sharing. Conversely, private listings restrict access to the idea, ensuring confidentiality. However, private ideas can still be searched for problem statement matches, with full visibility granted only upon agreement from the idea owner.

D. Ranking System and Incentivization Mechanisms

Ideas are ranked based on the number of matches received, reflecting their popularity and potential impact. Higher-ranked ideas and their creators are verified and recognized within the platform. This incentivizes active participation and encourages users to contribute valuable ideas. Additionally, high-ranking ideas open up opportunities for partnerships and collaborations, further incentivizing participation. Incentivizing user participation is crucial for the success of idea sharing platforms. Research by Smith et al. [16] emphasizes the importance of

incentivization mechanisms in fostering user engagement and contribution. The study found that platforms offering tangible rewards, such as tokens or reputation points, significantly increased user activity and collaboration. Moreover, incentivization encourages users to share high-quality ideas and actively participate in problem-solving processes. By integrating effective incentivization mechanisms, idea sharing platforms can harness the collective intelligence of their user base and drive innovation.

By leveraging insights from studies like Smith et al. [16], the proposed platform aims to implement robust incentivization mechanisms to foster user participation and collaboration. Through tokenization, ranking systems, and other incentive structures, the platform seeks to incentivize users to contribute valuable ideas and actively engage with the community.

By implementing these features, the platform aims to create a dynamic ecosystem where users can share, validate, and collaborate on ideas efficiently, while also providing incentives for active participation and contribution.

V. PROPOSED IMPLEMENTATION STRATEGY

A. Blockchain Platform Selection:

The choice of blockchain platform is pivotal for the successful implementation of the idea sharing platform. Several platforms offer distinct features and capabilities, each catering to specific requirements:

1. Ethereum: Renowned for its robust smart contract functionality and extensive developer community, Ethereum stands as a compelling option [17]. Ethereum's scalability solutions, such as Ethereum 2.0 and layer 2 protocols, address scalability challenges [18].
2. Steem Blockchain: Leveraging its Delegated Proof of Stake (DPoS) consensus mechanism, Steem blockchain offers fast transaction processing and low fees, making it an attractive alternative [19].
3. EOSIO: Known for its high transaction throughput and low latency, EOSIO provides scalability benefits suitable for high-traffic applications [20].
4. Tezos: Emphasizing formal verification for enhanced security, Tezos offers robust security measures and governance capabilities [21].

5. Cardano: Positioned as a third-generation blockchain platform, Cardano boasts scalability, interoperability, and sustainability features [22].

6. Polkadot: With its heterogeneous multi-chain framework, Polkadot facilitates seamless interoperability and scalability across diverse blockchains [23].

7. Binance Smart Chain (BSC): Offering compatibility with Ethereum Virtual Machine (EVM) and low transaction fees, BSC provides an alternative for Ethereum-based applications seeking scalability and cost-efficiency [24].

B. Evaluation of scalability, security, and usability aspects is essential for informed platform selection:

- Scalability: Ethereum's scalability solutions, EOSIO's high transaction throughput, and Polkadot's multi-chain architecture address scalability concerns [18], [20], [23].
- Security: Ethereum's established security features, Tezos' emphasis on formal verification, and Cardano's focus on rigorous security protocols ensure robust security measures [21], [22].
- Usability: Ethereum's extensive developer ecosystem, developer-friendly tools, and community support make it a popular choice among developers [17]. Additionally, BSC's compatibility with Ethereum-based applications simplifies migration and adoption [24].

By evaluating these factors, the most suitable blockchain platform can be chosen based on the specific requirements and objectives of the idea sharing platform.

VI. HYPOTHETICAL EVALUATION FRAMEWORK

A. Proposed Impact:

The proposed idea sharing platform holds the potential to revolutionize the process of idea validation and collaboration. By streamlining idea submission and validation processes, the platform aims to make idea validation more efficient and accessible. According to a study by Smith et al. [16], traditional methods of idea validation often involve cumbersome processes and lack transparency. In contrast, our proposed platform leverages natural language processing and blockchain technology to automate validation procedures, resulting in improved accuracy and reliability.

Moreover, collaboration has been shown to enhance creativity and problem-solving abilities [25]. By facilitating collaboration between ideators and potential collaborators, the platform encourages the exchange of diverse perspectives and expertise, ultimately leading to more innovative solutions. Additionally, incentivizing participation through tokenization encourages users to actively engage with the platform and contribute valuable ideas. Research by Johnson et al. [26] suggests that incentivization mechanisms play a crucial role in driving user engagement and fostering a sense of ownership within online communities.

B. Expected Outcomes:

Based on theoretical analysis and insights from existing research, we anticipate several outcomes from the proposed platform. Firstly, we expect a significant improvement in validation accuracy, as the platform leverages natural language processing algorithms to analyze and validate submitted ideas more effectively. This aligns with findings from previous studies [27] highlighting the potential of machine learning techniques in enhancing idea validation processes.

Secondly, we predict an increase in user engagement metrics, including user activity, interaction levels, and community participation. Research by Wang et al. [28] indicates that collaborative platforms with clear incentives for participation tend to attract more active users and foster a vibrant community environment. By incentivizing users through token rewards for their contributions, the platform encourages sustained engagement and fosters a sense of belonging among users.

Thirdly, we anticipate high token utilization rates, with users actively exchanging tokens for various purposes within the platform ecosystem. Studies [1] have shown that well-designed token economies can drive user behavior and facilitate value exchange within decentralized platforms. By integrating tokenization features into the platform, we aim to create a robust economic system that rewards and incentivizes meaningful contributions.

C. Theoretical Assessment:

From a theoretical perspective, the platform's design and features align with established principles of idea sharing and blockchain technology. By combining natural language processing for idea validation and blockchain for secure record-keeping, the platform ensures transparency, immutability, and trust in the validation process. Furthermore, the emphasis on collaboration and incentivization reflects the

importance of community-driven innovation and user empowerment in idea sharing platforms.

The integration of tokenization features provides a novel approach to incentivizing participation and rewarding valuable contributions. Through the issuance and exchange of tokens, users are incentivized to actively engage with the platform, share their ideas, and collaborate with others. This theoretical framework positions the platform as a catalyst for innovation, creativity, and knowledge sharing within the idea sharing ecosystem.

VII. THEORETICAL DISCUSSION

A. Interpretation of Projected Results and Hypothetical Implications:

The projected results of the proposed idea sharing platform suggest several hypothetical implications for the idea sharing ecosystem. By streamlining the process of idea validation and collaboration, the platform aims to enhance the efficiency and effectiveness of idea sharing activities. The automation of validation procedures using natural language processing algorithms is anticipated to result in improved validation accuracy and reliability, leading to a higher rate of successful idea implementations. Additionally, the incentivization mechanisms embedded within the platform are expected to drive increased user engagement and participation, fostering a vibrant and active community of ideators and collaborators. These hypothetical implications underscore the potential of the proposed platform to revolutionize the way ideas are shared, validated, and implemented in various domains.

B. Theoretical Comparison with Existing Platforms and Consensus Mechanisms:

In comparison to existing idea sharing platforms and consensus mechanisms, the proposed platform offers several theoretical advantages. Unlike traditional platforms that rely on centralized validation processes and lack transparency, the proposed platform leverages decentralized blockchain technology to ensure transparency, immutability, and trust in the validation process. Furthermore, the integration of incentivization mechanisms, such as tokenization, sets the proposed platform apart by providing tangible rewards for user contributions and fostering a culture of collaboration and innovation. In contrast to conventional consensus mechanisms like Proof of Work (PoW) or Proof of Stake (PoS), the Delegated Proof of Contribution (DPoC) consensus mechanism offers a unique approach that combines the benefits of stakeholder involvement with delegated validation,

ensuring both decentralization and efficiency in platform operations.

C. Collaborative Opportunities:

One of the key theoretical advantages of the proposed idea sharing platform lies in its ability to facilitate collaboration among users. Unlike traditional idea sharing platforms where users typically operate in isolation, the proposed platform incentivizes collaboration through its innovative features such as problem statement matching and tokenization. By allowing users to submit problem statements and matching them with relevant ideas, the platform creates opportunities for collaboration between ideators and problem solvers. Additionally, the tokenization of ideas enables users to collaborate on projects by exchanging or trading ownership rights, thereby fostering a dynamic ecosystem of idea sharing and collaboration. These collaborative opportunities distinguish the proposed platform from traditional solutions and have the potential to catalyze innovation across various domains.

D. Anticipated Challenges and Potential Theoretical Solutions:

While the proposed platform holds great promise, several challenges may arise during hypothetical implementation. One potential challenge is ensuring the scalability of the platform to accommodate a growing user base and increasing transaction volumes. To address this challenge, theoretical solutions such as sharding or layer-two scaling solutions could be explored, leveraging insights from existing literature on blockchain scalability. Another challenge is maintaining the security and integrity of the platform in the face of potential cyber threats and attacks. Theoretical solutions such as robust cryptographic protocols and smart contract auditing mechanisms could mitigate these risks and enhance platform security. Additionally, ensuring user privacy and data protection is paramount, requiring theoretical solutions such as zero-knowledge proofs or privacy-preserving algorithms to safeguard user information while maintaining transparency and auditability. By addressing these anticipated challenges with theoretical solutions grounded in existing literature and expert opinions, the proposed platform can overcome obstacles and realize its full potential in the idea sharing ecosystem.

VIII. CONCLUSION

In conclusion, this research paper has proposed a novel idea sharing and validation platform leveraging blockchain technology and decentralized consensus mechanisms. Throughout the paper, we have explored

the theoretical foundations, design principles, and potential implications of the proposed platform.

The key findings suggest that the integration of blockchain and decentralized consensus mechanisms can address the limitations of traditional idea sharing platforms by offering enhanced validation accuracy, incentivized participation, and collaborative opportunities. By implementing features such as idea submission, problem statement matching, and tokenization, the platform aims to foster a vibrant ecosystem of innovation and collaboration.

Looking ahead, future research and platform enhancements could focus on several areas. Firstly, empirical validation of the proposed platform in real-world settings could provide valuable insights into its effectiveness and user adoption. Additionally, further exploration of scalability, security, and usability considerations is essential for ensuring the platform's long-term viability and sustainability. Moreover, ongoing research in blockchain technology and decentralized governance models may lead to advancements that enhance the platform's functionality and performance.

In summary, the proposed idea sharing platform holds great promise for transforming the way ideas are validated, shared, and collaborated upon. By embracing the principles of decentralization, transparency, and incentivization, the platform has the potential to unlock new avenues of innovation and collaboration in the idea sharing ecosystem.

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