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Sahaay: An Ai and Blockchain-Enhanced Crowdfunding Platform

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Abstract

Even while modern crowdfunding platforms have become quite popular, they still have problems that won't go away, especially when it comes to centralized control, possible fund misappropriation, and not being open enough. People who would want to help with a project often don't because they don't believe it will work out or because they don't like how the money is being handled. This article presents Sahaay, an innovative crowdfunding platform aimed at resolving these challenges through the integration of blockchain technology and Artificial Intelligence (AI). Sahaay employs a decentralized ledger to make sure that all transactions, from pledges to giving out money, are entirely open and can't be modified. Smart contracts are designed to automatically distribute money to the proper persons when particular project milestones are reached. This means that people are more responsible and don't have to perform things by hand as often. An AI-based assessment tool also checks the text, team, and market aspects of prospective campaigns to see how likely they are to work. The AI also lets a complicated recommendation system find the best sponsors for initiatives. This article discusses how the Sahaay platform is created in layers, what its primary pieces are (including machine learning models and smart contract logic), and how it functions. We also discuss crucial moral concerns and present a complete set of rules for figuring out how well the system works, how safe it is, and how easy it is to use. Sahaay combines the security of blockchain with the analytical power of AI to make a smart, safe, and efficient ecosystem that is ready to alter crowdfunding by generating trust and making projects more likely to succeed.

Index Terms—crowdfunding, blockchain, smart contracts, artificial intelligence, decentralized applications (DApps), fintech, project vetting, DAO

1. INTRODUCTION

ROWDFUNDING is a terrific way for creative people, artists, and businessmen to get money. It helps everyone

get money more easily. The global crowdfunding market was valued at more than $17.2 billion in 2023, and it is likely to expand a lot. This indicates how crucial it is to the economy today [1]. Kickstarter and Indiegogo are two examples of platforms that have helped thousands of projects get off the ground by cutting out the need for traditional financial middlemen.

But this method of thinking isn't always right. Crowdfund-

ing isn't operating right now because of campaigns that didn't work or were dishonest. People can misuse funds when there is centralized authority, hefty transaction costs, and a lack of transparency. This can cause

backers to lose faith [2]. These mistakes have a huge effect on the economy and society. Not only do they cost backers money, but they also make people less willing to believe in new ideas, which slows down progress. After providing money, backers often don't know what happens to it. It's hard for creators to get people to trust them when there are so many of them. This lack of trust is a huge problem for progress.

Blockchain creates a decentralized system that naturally promotes openness and data integrity. This is a wonderful way to reestablish trust [3]. Blockchain can improve accountability like never before by keeping track of all transactions on a public, distributed ledger. Once a transaction is written down, cryptography makes sure that it can't be modified. This gives everyone a single, verified source of truth. From gathering pledges to giving money based on milestones, smart contract can automate the whole process of funding. This makes sure that the money will be spent as promised [5], [8].

Despite these advantages, a major challenge remains: accu- rately predicting project viability. There is still a huge problem: finding just how probable it is to work on a project. This is an example of information imbalance, where the folks in charge of the project know a lot more about how likely their proposal is to work and what they can do better than others who could help. AI techniques can get ideas from knowledge that isn't too dissimilar by historical and contextual information [4]. By looking at a lot of data, AI models can look at data and forecast how probable it is that a project will work, find suspected fraud, and match campaigns with those who are likely to be interested in them—supporters who are interested [9], [10].

This paper presents Sahaay, an integrated platform that combines blockchain and AI to produce a new generation of things, a means for people to get money for their projects. The major point of Sahaay is putting together AI's capac- ity to make predictions with blockchain's ability to prove trust. Intelligence can help with the two greatest challenges with crowdfunding funding: the "can't trust" problem that blockchain fixes and AI can help with the "don't know" dilemma [11].

The main contributions of this study are a new, multi- DApp design with layers that has an AI analytics engine, a blockchain-based engine, and a smart contract system; a comprehensive smart contract design that guarantees payments are received when specified events take place and backer voting to lower risk; a description of the AI models that can anticipate viability scores and give advice, data, and real- time fraud detection; and a full way to judge that talks about the system's most significant aspects and moral consequences, especially with AI bias.

This work is structured as follows: Section II examines pertinent work. Part III goes into great detail about how the Sahaay platform was made. Section IV is about the suggested structure for evaluation. Part V talks about things that are wrong and things that can't be done. Part VI: The report finishes with Section VII, which talks about work in the future.

2. Literature Survey

The idea of using new technology to improve crowdfunding. This area of study is continually changing. This part looks at the parts that are already there, grouping books into important groups.

Limitations of Traditional Crowdfunding Platforms

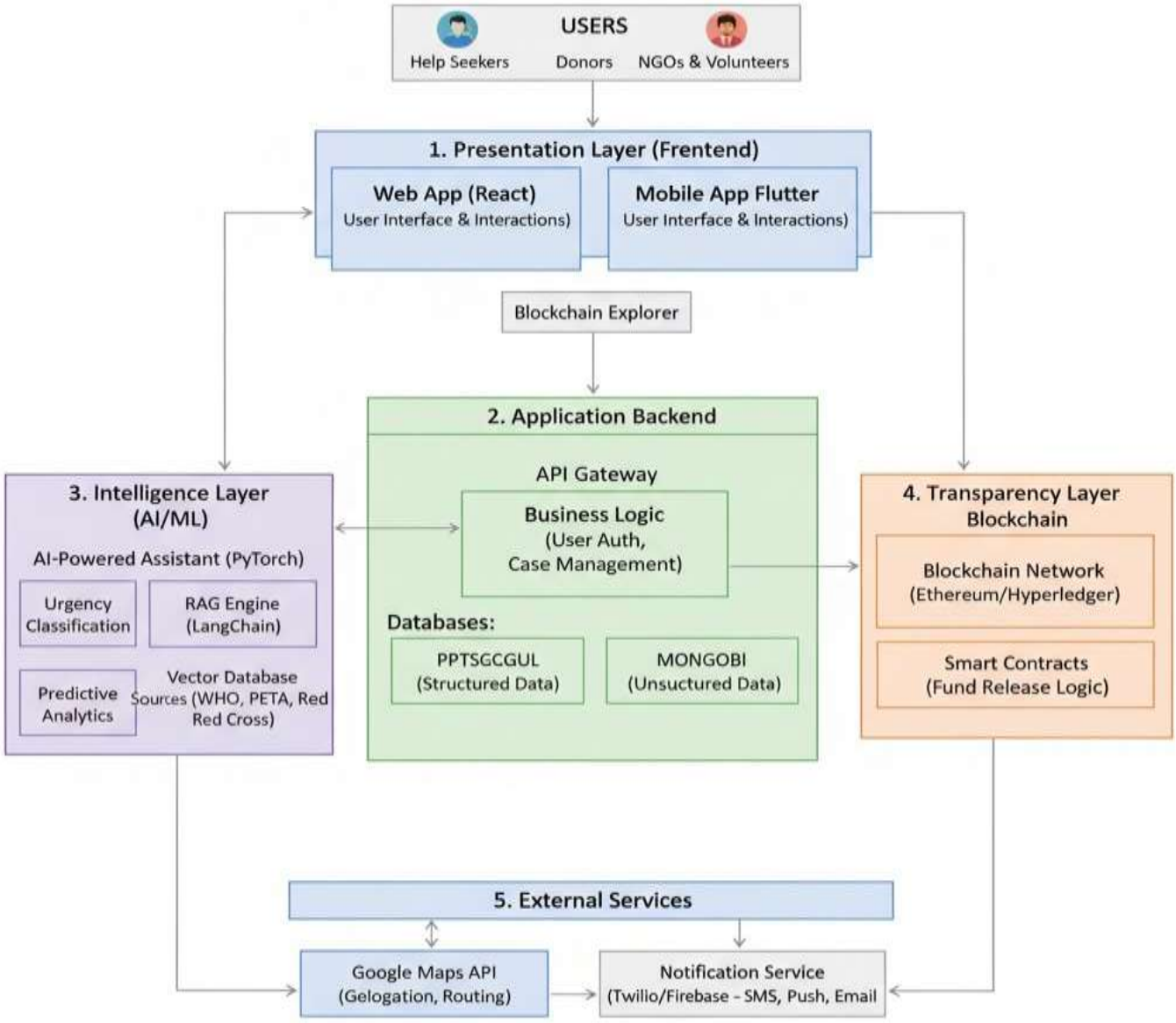
Kickstarter and GoFundMe are two well-known sites for crowdfunding. FundMe runs campaigns from one

central place
and agreements. Their success shows that crowdfunding works as an idea, but everyone knows what they did wrong [2]. Their one issue is that they depend on centralized servers, which makes them weak. ity to operational faults, possible censorship, and significant fees for fairness of operations after receiving payment. People who are in favor have to believe in the project and the platform completely, as well as the creator, which is a model that many people refer to as "trust-based." This model is weak because it depends on the promises of the inventor and the reputation of the platform instead of rules that can be tested by code.Blockchain Integration in Crowdfunding
Some projects have sought to leverage blockchain tech- nology to acquire money from a number of people. More advanced platforms use smart contracts that make it easy to deal with money. Recent studies have been conducted to put up many strategies for crowdfunding based on blockchain, putting greater emphasis on automating essential procedures and making things clearer for payouts depending on [8]. But a lot of these platforms don't have better approaches to make sure a project is good before a campaign starts, but it still puts a lot of stress on the analysis on the person who backs it. They largely fix the problem of "don't trust" but not the "don't know" problem (faith in viability).
AI in Project Evaluation and FinTech
AI is used a lot in the FinTech area as a whole for credit scoring, finding fraud, and trading using algorithms [9]. Researchers have utilized machine learning methodologies, particularly Natural Language Processing (NLP), which is one of the technologies used to study crowd messages to see how well they will succeed in getting money for campaigns [10].
Hybrid AI-Blockchain Systems
A new and expanding area of research is examining the direct combination of AI and blockchain [11].
Trust and Governance Models in Decentralized Systems
One essential element about decentralized networks is that they are run by management. DAOs, which stands for Decen- tralized Autonomous Organizations, have discovered a new technique to handle protocols and treasuries without a main power [6], [13].

3. The Sahaay Platform Architecture

The Sahaay platform is supposed to be an app that runs on its own application (DApp) with a multi-layered structure that ensures the ability to segregate issues and modularity.

Fig. 1. Overview of the Sahaay platform, illustrating the interaction between users, the intelligence layer (AI/ML), the application backend, and the transparency layer (blockchain).



System Layers

There are three primary sections to the architecture. The first one is the Presentation Layer, which is a web interface that is easy to use. The second half is the business logic layer, which has a centralized backend service and an AI engine that is spread out. An AI engine that is spread out and a backend service that is all in one place. The last tier is the Data and Execution tier. The blockchain network that the smart contracts are constructed on. You can employ both on-chain and off- chain approaches because of this split. Smart contracts are aspects of the system that take care of things that require a lot of trust, such as taking care of money, while off-chain parts (AI engine), handle tasks that require a lot of processing resources, including training models and managing users, which makes things safer and.

TABLE I

COMPARISON OF CROWDFUNDING PLATFORMS

Feature	Traditional (e.g., Kickstarter)	Blockchain-Only (e.g., Gitcoin)	Sahaay (AI + Blockchain)
Transparency	Low	High	High
Security	Centralized Vulnerability	High (Protocol-level)	High (Protocol + AI Monitoring)
Transaction Fees	High (5-10%)	Low (Gas Fees)	Low (Optimized Gas + Platform Fee)
Fund Control	Centralized Escrow	Smart Contract	Smart Contract
Project Vetting	Manual / Community-reliant	None	Automated and AI-Driven
Backer Risk	High	Moderate	Low
Governance	Centralized	Decentralized (Optional)	Hybrid (On-chain + Off-chain)
User Identity	Centralized (Email/Pass)	Wallet Address (Anonymous)	DID / Self-Sovereign (SSI)
Fraud Detection	Basic / Manual Review	None (Protocol-level only)	Real-time AI Anomaly Detection
Dispute Resolution	Platform Adjudication	None / Basic DAO Vote	Hybrid (Backer Voting)

User Identity and Onboarding

Sahaay is trying to improve both security and the user ex- perience besides the normal checking of email and password. We believe in a model of identification that uses Decentralized Identifiers (DIDs) and the thoughts that led to Self-Sovereign Identity (SSI) [7], [14].

The Blockchain Layer

A. Choice of Blockchain: Ethereum is the best choice. utmost security [5], yet the high gas prices can be a concern. So, we advise using Layer-2 scaling for our approach. Polygon is a cheaper approach that works with EVM. Lower prices for transactions and shorter times to confirm them [15].

B. Smart Contract Design: Each crowdfunding cam- paign—a smart contract that only the campaign may run—conveys passes through well-defined states, including starting, being active, money, winning, or losing. The contract has functions for guaranteeing money, asking for refunds (if they don't work), and a very crucial function for taking out money according to goals. This job is "gated," which indicates that money is locked up until a certain goal is reached. Most of the people who support it vote for it to finish the goal right now. This system sends power from the people who use the platform.

The AI-Powered Analytics Engine

A. Project Viability Prediction Model: This is a type of classification model that predicts a binary result: likely to succeed, or probably won't work. We employ a model called a boosting classifier with a gradient. A lot of FinTech uses it since it works well with table data [9].
B. AI Model Training and Data Pipeline: For the AI engine to perform successfully, it needs a good data flow. We recommend starting by gathering information from the web scraping of public crowdfunding sites. This information that hasn't been handled yet is that they were cleaned, processed, and stored away. What does "feature engineering" mean? done to get the vectors that are needed for training. Models are tested with 5-fold cross-validation to make sure they work for all. The pipeline is built such that it can be educated again and again. This retraining is highly critical to stop "model drift" and make sure the AI adjusts as there are new things going on [10], [16].
C. Fraud Detection: An anomaly detection model, based on works in the background, using an isolation forest method [17].
D. Proposed Evaluation Framework

To confirm the efficacy of the Sahaay platform, a multi- faceted evaluation framework is advised.

Performance Metrics

We'll utilize Sev to check how well the platform functions. a few significant numbers. We will learn how quickly blockchain operates in terms of transactions per second (TPS). The deal will be tracked by finding out how much gas costs on average. In the end, we will use the AUC-ROC statistic to find out how accurate the model for predicting viability is (since it works well for this). the model's ability to detect the difference between classes and nDCG for the recommendation engine (since it analyzes the quality of a list of ranks).

Security Analysis

A complete security check of the smart contracts will be done to detect and address prevalent security holes like integer

overrun, front-running, and reentrancy. Not long ago, investi- gating AI-enhanced auditing technologies could facilitate this process [18].

Economic and Game-Theoretic Analysis

We suggest looking into the platform's incentive schemes. must make sure they are powerful enough to stop bad behavior and cheating conduct. For instance, the method individuals vote on milestones must be able to avoid Sybil attacks, which arise when a creator uses more than one phony name to provide the go-ahead for their own fund releases. This attack makes the "one backer, one vote" rule less strong. We will use game

theory to describe this, taking cues from recent models to cut down on the chances of Sybil attacks on networks that aren't centralized [19].

Usability Study

There will be two groups of persons in the user study. finished. One group will use Sahaay, and the other will use a standard. a site where numerous individuals can give you money. We'll see if the work is done on time, success rates, and how happy users are with the system using a survey for the System Usability Scale (SUS). This is particularly crucial since DApp usability is a known barrier to adoption [20].

1. Ethical Considerations and Limitations

A comprehensive examination of a system such as Sahaay necessitates talking about its moral effects and built-in limits.

AI Bias and Fairness

Any AI model can be biased based on the data it was trained on. data. Our project vetting model might learn how to, on its own, penalize projects from groups that aren't well- represented or aren't in traditional project categories if not a lot of individuals are working on them. information from the past. This is a well-known concern in AI for money [12].

Challenges of Decentralization

Decentralization has a lot of wonderful aspects, but it also has difficulties. It is challenging for users to keep track of cryptographic keys. Most people have a lot of trouble with keys and wallets adoption [20]. The saying "not your keys, not your coins." People expect easy password resets to work this way. Because the blockchain can't be modified, bugs in a smart contract can last forever and do. losing money that you can't get back. This means that you have to stick to very rigorous rules. testing and checking [18].

Regulatory Uncertainty

The laws and norms that govern blockchain and cryptocur- rency in many places are still working out how to deal with DAOs and cryptocurrencies. Sahaay and other sites like it operate in a gray area, and in the future, rules could change how they operate a lot, especially when it comes to rules about KYC (Know Your Customer) and securities standards for customers and putting an end to money laundering. The law: The position of DAOs, in particular, is still not clear [13].

2. Future Work

We need to do the next thing now. proposed design. First, we'll build a whole working test version of the Sahaay plat- form on a server that anyone can use. testnet, like Polygon's Mumbai, to thoroughly do the tests described in Section IV. This will be very important for not simply how well the blockchain works in practice (gas fees, TPS) and how well AI models work (AUC-ROC), but also how well the users get along with one another. a way to vote on milestones.

Second, we want to completely put into action the suggested DID-based identification system based on the principles of self-sovereign identification (SSI). This is a major technical difficulty because it needs to be put together. Using DIDs

[7] and verifiable credentials that follow W3C standards and existing wallet solutions (like MetaMask) to make it easier to use an easy way to get started that keeps your privacy safe, and taking care of business

[14].

Lastly, we will find out how to make a full-fledged Sahaay DAO to provide a core architecture for governance. This would go beyond voting on project milestones and offer a group of token holders around the world power. This DAO would design the platform's rules, decide significant arguments, and most importantly, watch over the AI models, like screening for bias and voting on a fair algorithm—things that are new. This solves the "meta-governance" issue of who checks out the AI [13].

CONCLUSION

This study introduced Sahaay, a new hybrid platform de- signed to fix the two primary problems with mod crowd- funding. It has two significant drawbacks right now: it's not particularly open, and it's quite hazardous of Project Doubt. By utilizing blockchain and smart contracts, Sahaay employs contracts to protect all of its transactions. explicit and unchanging, replacing the weak "trust-based" escrow of traditional platforms with automated, verifiable code. Adding an AI analytics engine at the same time, the engine solves the big problem of information asymmetry. giving backers a
"viability score" based on data and fraud research and giving advice that is specific to each person.

In brief, blockchain is the technology that ensures trans- actional integrity, and AI lets individuals use data to make choices for as long as the money is there. The suggested multi- layered architecture gives you a clear and practical way to go on the path to a better and fairer approach to raising money. We come to the conclusion that AI and blockchain work well together. is a major step forward for smart and open financial ecosystems. It could create a strong environment that can make projects considerably more likely to succeed and provide them additional strength and trust that may be shown between the people who make things and the people who use them.

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