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Smart Contract Based Property Registration and Time-Stamping Platform on Ethereum Blockchain

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Abstract-The traditional system for registering properties using paper has many issues like fraud, double ownership claims, lost documents and it takes a long time to verify ownership. These records are normally kept in physical filing systems or centralized databases which give a large possibility for either data manipulation or corruption. To overcome these problems, the Smart Contract Based Property Registration and Time-Stamping Platform using the Ethereum blockchain will be proposed in this project. In this system we came up with, people put in details about the property using a web app. Its pretty straightforward at first.They have to check their identity with a digital wallet thing before anything gets finalized. I think that step is important to make sure everything is legit. Once thats done, a smart contract takes over and handles the registration or transferring ownership. It just follows whatever rules are set up automatically. After the whole transaction wraps up, the property info gets turned into this secure hash, you know, and stored on the Ethereum blockchain with a timestamp too. Records like that cant be messed with later, which sort of stops fraud from happening. It also boosts transparency and keeps data safe in a better way. Some people might worry about how reliable it all is, but it seems solid.The paper goes into the design part, explains how the system runs, and talks about the results from applying blockchain to managing properties. Not everything is perfectly clear yet, like how it scales for bigger uses.

Keywords

Blockchain, Ethereum, Smart Contracts, Property Registration, Time-Stamping, Data Security

I. INTRODUCTION

Proper registration and ownership of real estate and land is a critical factor in managing these properties. Many areas around the world still include methods for maintaining property records based upon records that exist solely on paper and/or centralized systems (databases). Traditional methods of registration/error correction create many problems, such as paying for various types of fraud, duplicate ownership claims, missing files, long wait times, etc. The potential for manipulation and/or corruption of record-keeping exists due to these issues, and the properties being recorded as a singular entity with their respective owners is problematic. Thus, alternative methods that provide users with a more-transparent and verifiable method of handling property registration and ownership transfer(s) should be created.

Blockchain technology provides a secure way to record and maintain property records. Information is recorded in a decentralized network, which means no one entity can own the data. When a record is placed into the accrual of a blockchain, it cannot be reversed/altered which prevents any data stored from being manipulated.

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Smart contracts reduce human error and thus enhance the level of trust users place in the property registration and ownership transfer systems. The proposed Smart Contract Based Property Registration and Time-stamping Platform will provide those who utilize the platform with a secure and reliable method of managing their property records. Users can utilize this system to:. To sum up, the Resume Upload project demonstrates the use of AI (Artificial Intelligence) to help job seekers overcome difficulties finding employment by creating resumes through automation and using text generation and a user interface that is easy for them to use. with these features, job seekers are able to quickly get high-quality resumes in compliance with acceptable formatting guidelines used in the industry. A property online registration system simplifies property details management and facilitates the process without requiring participants to physically come to the office or submit multiple forms of paper documentation. Participants complete the online application form at their residences, and thus, the transaction of providing property ownership is recorded; therefore, it provides an accurate account of the timestamped and un-altered transaction record, which allows for the review of property ownership when required

II. RELATED WORK

Looking into how blockchains might work for official documents, scientists focused on real estate tracking first. Because old-school filing depends on one central hub, mistakes slip through easily - like double claims or shady changes. That rigidity opened doors for tech alternatives to take hold slowly. Information locked into this digital chain stays fixed, no exceptions after entry. Its resistance to edits turns out useful when deeds and titles need guarding. When details go live here, altering them later becomes impossible by design. Trust grows naturally since every update leaves a permanent mark. No single point controls everything, shifting power away from isolated authorities. Tampering fears drop because rewriting history across nodes takes near-impossible effort. Files stored this way carry their own proof of journey over time. Each addition ties firmly to what came before without gaps. Reliability climbs when nobody can erase traces at will. Proof lives inside the structure itself instead of external checks. This setup resists corruption simply by existing as built. Permanent marks replace fragile paper trails everyone questions. Security emerges not from promises but from mechanics hardwired in place.

On top of that, researchers have looked into how smart

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contracts might change the way we handle property. These digital agreements run themselves once certain requirements are fulfilled. Because no person needs to step in for them to work, mistakes caused by people tend to drop off sharply. Delays usually tied to checking and signing paperwork often vanish too. Some experts argue using blockchain to follow ownership of land could make transactions clearer. Trust among parties buying or selling may grow stronger at the same time.

Fig. 1. proposed smart contract-based property registration system architecture

The new property registration system will operate as a three-layered architecture, with the users, the smart contracts, and the Ethereum blockchain at the top of the hierarchy. Whoever owns property, buys it, or represents a public body through approved representatives can reach the Property Registration System using a website portal. Through this online entry point, people type in data about real estate to ask for title setup or pass ownership to someone else. Linking those involved directly to the Ethereum blockchain, the site carries typed entries safely into storage. When submissions happen, proof of who you are becomes necessary - done by opening your digital wallet where login facts already live. That wallet unlocks only after proper checks confirm it truly belongs to the person making the move. Only then does the call to create fresh titles - or shift existing ones - reach the part of the system built with code rules living on Ethereum's network. Should the system confirm the person holds valid rights to the asset - either by original ownership or approved delegation - it proceeds. Ownership details update instantly when access rules are met, triggered only by verified conditions. No individual needs to sign off; actions follow preset logic once eligibility is clear. Execution happens silently, embedded within code that reads status and acts. Authority checks run first, then record changes apply themselves under exact terms laid out earlier.

III.OVERVIEW OF THE PROPOSED MECHANISM

Overview of the Proposed Mechanism

One goal here: create a system using smart contracts for logging property details securely. Instead of paper titles stored with one central group, people use Ethereum's blockchain. Owners transfer holdings; buyers receive them - each step locked in digital form. Access stays limited to those allowed, like sellers letting go or new owners claiming rights. No middle office needed when changes happen on chain. Records appear exactly as entered, never altered after stamping. This method swaps old filing ways for something harder to tamper with. Each event gets time-marked, visible only to approved users. People involved act directly without handing forms to third parties.

A fresh start could mean building a system where property details are locked in digital agreements. Ownership timelines might live on a shared ledger, updated only when everyone agrees. This way, tracking changes feels more like watching a clock than chasing paperwork. Control shifts back to those who hold the rights, not just those who manage files. Records stay clear because each entry carries its moment in time, stamped without dispute. (Seller) of their respective property by utilizing the Ethereum Blockchain instead of utilizing just physical copies of Certificate of Title (holdings) and through a Centralized Authority.

We want to establish a Smart Contract Based Registration and Time Stamp Platform that gives us full control of how we use property records. Property Owners, Purchasers (Buyers) and others with permission can register transactions (Buyers of a Property) or pass ownership (Seller) of their respective property by utilizing the Ethereum Blockchain instead of utilizing just physical copies of Certificate of Title (holdings) and through a Centralized Authority.Using a secure online application will enable us to swiftly and easily enter property information for creating either a new Registration or Transfer of Property transaction. We have created a process diagram that outlines how to utilize the application for your transaction process.

IV. System Design and Approach

A fresh way to handle property records shows up using blockchain. Instead of paperwork or one central server handling changes, something more distributed steps in. Smart contracts living on Ethereum take charge from there. Transactions move forward by themselves once started, safely handled top to bottom. Four connected parts make the whole thing run without hitches. Up front, people meet a digital space where forms go in online. Filling out details happens right inside a browser window. Each step links quietly behind the scenes.

Once the form is filled out, your identity gets checked through your digital wallet. Only those approved can move forward with actions after that step. When the system finishes confirming who you are, it passes the request along to the Smart Contract Layer. That layer checks whether conditions like asset ownership and permission status are properly met before allowing anything to proceed. Once every requirement checks out, execution kicks off through the Smart Contract Layer, handling the user's request start to finish with zero need for people stepping in. A transaction wraps up on Ethereum when someone finishes sending data through the network. That person's property details get transformed into a locked digital fingerprint, stored permanently on the Ethereum Blockchain together with exact timing down to seconds. Out comes a full snapshot from the system - each entry shows unique identifiers tied to real estate, paired with the blockchain address of its owner plus precise

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moments deals go live, ready if questions pop up later about legitimacy. After the smart contract checks and accepts the property details, the deal gets locked into the Ethereum blockchain forever. Systems tracking every property transfer - along with their unique codes, dates, times - make it possible to follow who owned what, whenever needed. Finishing this sequence brings a notice: the exchange went through without issues. A "Transaction ID" arrives too, serving as solid evidence it was completed.

One piece fits into another, yet each runs on its own. Connected they may be, still every part works apart from the rest. Think of the screen users see - it stands alone, even as it talks to what lies beneath. Fingerprint checks open the door, not by force, but through quiet coordination. Smart deals run when told, following code that does not bend or guess. Later, those moments get tucked away - or pulled back out - from a digital record kept publicly. Change one layer, say how things look or behave, and the core stays untouched. Even if rules shift inside the agreements written in code, the base remains steady. Parts grow better over time because none are glued too tightly to the others. Tweak here,adjust there -

no need to fear breaking something unseen

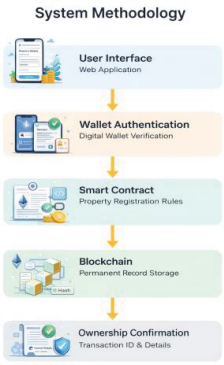

Fig 2. System Methodology

V.PERFORMANCE EVALUATION

A test checked how well the new land registration setup works under various situations. Its main goal: seeing how quickly and correctly property records get updated or moved between owners. Since it runs on Ethereum blockchain, strong protection and steady operation matter just as much as speed. Different actions were tried during testing - recording new plots, shifting ownership. Looking closely at those operations showed processing times along with differences in behavior across request kinds. Each step revealed how smoothly things ran depending on what type of change happened.
In evaluating the performance of the system, four primary performance metrics were utilized:

- Transaction Processing Time: The amount of time from the confirmation of a land registration or ownership transfer to when that transaction is confirmed on the blockchain.
- Gas Consumption: The total amount of computational resources (including memory, processing power, and bandwidth) needed to execute the smart contract on the Ethereum network.
- Verification Time: The amount of time needed to verify that the owner of a piece of land is indeed the true owner using the property registration transaction hash.

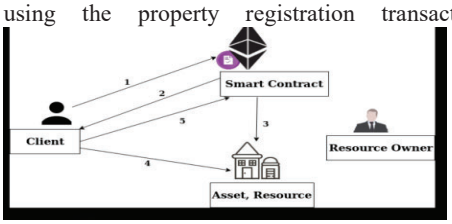

Fig 3. Performance Metrics

Evaluating the system revealed that it was able to process transactions fairly quickly and in near real-time under “normal” operating conditions of the blockchain. The amount of gas used for processing a standard real estate transaction was consistent as well. Once the transaction was confirmed, the property ownership verification process was completed nearly instantaneously. The diagram shows how a smart contract operates while registering and transferring property ownership, which includes measuring how long it takes to complete those transactions and how much gas was consumed. In a blockchain environment, when a smart contract executes any action (i.e. registering a new property or transferring ownership), it incurs a gas fee that reflects the cost of computing the transaction on the blockchain. Thus, the chart serves as an evaluation tool for the efficiency of the overall system and demonstrates whether stable transaction processing times are being achieved during typical usage of the overall system.

VI. EXPERIMENTAL SETUP AND RESULTS

A small trial called SIGI checked how well smart contracts work when tracking who owns land and when records are made, using tech built on Ethereum. Inside a private test space that mimics Ethereum, researchers ran several simulations showing what happens when people buy or claim property. Instead of one person doing everything, many acted separately - some owning, others buying - to see how the system handles back-and-forth changes. Each deal went through SIGI's design while also being measured against older ways of handling paperwork. Results looked at whether automated agreements speed things up - and keep data safer - than standard processes.

From the tests came numbers on how fast transactions confirm, gas used per deal, how quickly ownership checks reply, plus the full system response duration. It turned out property records and shifting ownership work fine using smart contracts, no human checker needed at all. After info lands on the blockchain, altering it becomes impossible - proving the setup keeps data trustworthy and steady.

Users were also able to verify ownership by checking the associated transaction hash for the transaction.Tests were also conducted to see if records could remain secure throughout many transfers of ownership for a given property; if any attempts at duplicate ownership were blocked; and how quickly ownership data could be verified using the transaction hash. Ending things off, folks got questionnaires about whether they thought the new setup felt smooth to move through plus did it cut down on headaches during property sign-up tasks. Every

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round showed this planned blockchain method kept records way more open, sped up handling times, left solid traces proving who owns what. Test outcomes pointed clearly toward the SIGI Smart Contract Property Log and Stamp System being tougher against sneaky deals compared to old-school paper trails. Even though sometimes blockchains stumble when their base networks act up, SIGI held steady across every trial run. Down the line, newer versions might polish tools while stretching how far the engine underneath can reach.

Figuring out how well the SIGI system works meant looking at various measures. Transaction speed played a big role, along with how correctly ownership updates happened. Data kept inside the system had to stay intact, just like user feedback mattered. Instead of guessing, real comparisons showed how SIGI stacked up next to old-style property registration. Paper-heavy steps define those older methods, where people check every detail by hand. All that paper handling slows everything down - sometimes taking hours, sometimes stretching into days. But under SIGI, when agreement terms are fulfilled, changes go through without delay. Registration plus title shifts happen almost instantly after conditions clear. Time spent drops sharply compared to past ways. By using this blockchain framework, once information is added to a given property data record, that information cannot be changed. Because all transactions are stored on a distributed system, there is a lower probability that the information contained in that record will be compromised by any fraudulent activity or by someone making an unauthorized change. Therefore, the user can verify ownership information without fully relying on a third party.

VII. CONCLUSION

One day might show up in different corners of property work while building a connected way to handle estates. Starting now, blockchain changes the game - reshaping how homes shift hands and how every deal gets locked into shared digital logs.

A deal unfolds piece by piece inside code instead of paper. When both sides agree on price and timing, those details get locked into a digital agreement. One step must finish before the next begins - like proof of funds appearing prior to ownership shifting. The moment conditions match, transfer happens without waiting. Rules set at the start guide every move until completion.

Once the buyer meets every condition laid out in the agreement, ownership shifts automatically. Blockchain steps in here - handling the handover without paperwork or delays. The change gets locked into a shared digital record built just for local property deals, where every past transaction already lives. No extra steps needed, no exceptions made.

After property ownership changes hands, the deal gets saved on the Ethereum blockchain so everyone can see who owns what. That way, both people in the sale have clear proof that updates quickly and stays protected. Instead of old paper trails, this system uses digital tracking that keeps data correct and locked in place. Later versions could connect directly to official land registries run by governments. With time, more regions might adopt it, letting the network grow steadily.

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