A Project Report On

**Blockchain for Real Estate**

Submitted in partial fulfilment of the requirements of the degree of

**(Internet of Things and Cyber Security Including Block Chain Technology)**

**2022-23**

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**PROJECT GUIDE**

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2021-2022

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CERTIFICATE

This is to certify that the Project entitled

“Blockchain for Real Estate”

is a bonafide work of

Submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of Second Year Engineering in Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)

**(Prof.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)**

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**Mini Project Approval**

This Mini Project entitled “**Blockchain for Real Estate”** by **Fardin Samir D (06.) ,** **Nitin Gouda (08),** **Priyush B. Khobragade (52),** **Anish Desai (46) for** the course Mini Project– 1 B is approved for the degree of **third Year Engineering** in **Computer Science and Engineering (Internet of Things and Cyber Security Including Block Chain Technology)**

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Date:

Place:

**Abstract**

Despite the importance of real estate in the economy of a country there are many loopholes in the current system from searching for a property, lease agreements, sale and purchase, money transactions, involvement of middlemen and so on. The blockchain and real estate can go hand in hand. The business process for land adopts the blockchain model, to strongly put the real estate premise up in more than one of the components of its donning exercises. In any case, a critical bit of the digitized data is facilitated on different frameworks, which brings and end to absence of transparency and a higher occurrence of mistakes that makes a more prominent potential for fraudulence. Blockchain can bring improvement on trading apartment activities. The blockchain disintermediation for estates methods is a new approach for organizations that are consistently uncovering apart of the serialities.

Index Terms—Block chain, Smart Contracts, tokenization,

Commercial Real estate, Ethereum

**UNDERTAKING**

We declare that the work presented in this project “**Blockchain for Real Estate”** l submitted to the Computer Engineering Science (IOT) Department AC Patil College of engineering Kharghar Navi Mumbai to fulfil the requirements for the award of Degree in Computer Engineering and is my original work. I have to plagiarize or submitted the same work for the award of any other degree or examination. In case this undertaking found incorrectly I accept that my degree may be unconditionally withdrawn or may be punishable as per the norms of Institute.

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**CHAPTER 1**

**INTRODUCTION**

1. **INTRODUCTION**

A blockchain is “a distributed database that maintains a continuously growing list of ordered records, called blocks.” These blocks “are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network.

uses for blockchain, including these:

Blockchain for payment processing and money transfers. Transactions processed over a blockchain could be settled within a matter of seconds and reduce (or eliminate) banking transfer fees.

Blockchain for monitoring of supply chains. Using blockchain, businesses could pinpoint inefficiencies within their supply chains quickly, as well as locate items in real time and see how products perform from a quality-control perspective as they travel from manufacturers to retailers.

Blockchain for digital IDs. Microsoft is experimenting with blockchain technology to help people control their digital identities, while also giving users control over who accesses that data.

Blockchain for data sharing. Blockchain could act as an intermediary to securely store and move enterprise data among industries.

Blockchain for copyright and royalties protection. Blockchain could be used to create a decentralized database that ensures artists maintain their music rights and provides transparent and real-time royalty distributions to musicians. Blockchain could also do the same for open source developers.

Blockchain for Internet of Things network management. Blockchain could become a regulator of IoT networks to “identify devices connected to a wireless network, monitor the activity of those devices, and determine how trustworthy those devices are” and to “automatically assess the trustworthiness of new devices being added to the network, such as cars and smartphones.”

Blockchain for healthcare. Blockchain could also play an important role in healthcare: “Healthcare payers and providers are using blockchain to manage clinical trials data and electronic medical records while maintaining regulatory compliance.”

This paper introduces the Block chain and smart contract in both the commercial real estate and residential real estate . Presently, the real estate is in danger of fraudulence and insecurity. The fundamental goal of this undertaking is to make a stage to keep up transparency in the real estate sector with the goal that no fake exercises can occur because of bogus agreements and to introduce the transparency through the process. Objective is to create tamper proof systems and to eliminate third party dependability for transactions. Globally, Real Estate is experiencing a major evolution and change towards smart cities. Smart cities are being created and a plenty of network, services, and exchanges are coordinated into the city planning at first and day by day use. Innovation has not only moved forward the life of occupants but has also helped disentangle the method of exchanging of properties. But indeed, technological advancements come with security dangers. So, with advancement in Block chain after crypto currency, the immutable, tamper proof technology begun lying its roots in a wide extent of applications. Real Estate being unpredictable previously due to secretes in rent agreements and other reasons can presently be a transparent process with the Block chain technology.

* 1. **Motivation**

There are several potential motivations for a project focused on using blockchain technology to store and manage medical records.

Security and privacy: One of the main benefits of using blockchain technology for medical records is that it can provide a high degree of security and privacy. By using cryptographic techniques and distributed storage, blockchain can ensure that medical records are protected from unauthorized access, tampering, or deletion. This is particularly important for sensitive medical data that could be used for nefarious purposes if it fell into the wrong hands.

Interoperability: Another potential benefit of using blockchain for medical records is that it could facilitate greater interoperability between different healthcare providers and systems. By using a shared, decentralized database, blockchain could allow different providers to access and update patient records in a secure and standardized way, without the need for complex data-sharing agreements or intermediaries.

Patient empowerment: By giving patients greater control over their own medical records and allowing them to grant or revoke access to different doctors, blockchain could also empower patients to take a more active role in their own healthcare. This could help to improve patient outcomes and satisfaction, as well as reduce administrative overhead for healthcare providers.

Research and analytics: Finally, using blockchain to store medical records could also facilitate greater research and analytics capabilities. By providing a standardized, secure, and verifiable database of medical data, blockchain could help researchers to gain new insights into disease patterns, treatment effectiveness, and other important healthcare topics. This could ultimately lead to better healthcare outcomes for patients

* 1. **Problem Statement & Objectives:**

In the proposed future system, the patient should have right to access his EHRs for managing and sharing them independently. The patient can be access his medical report directly and can use the digitalized report with anyone. By storing the data in the blockchain the user’s data is encrypted and stored as blocks in the etherscan. The user stores data by two way authentication process such as getting secret key generated by the Metamask. Electronic Health Record Systems are proprietary that is centralized by design. This means that, there's a single supplier that controls the code base, database and the system outputs and supplies the monitoring tools at the same time. It is difficult for centralized systems to gain trust from patients and doctors and hospital management. Open source, independently verifiable systems solves this issue. This system was designed to allow patients to possess the control of generating, managing and sharing

EHRs with family, friends, healthcare providers and other authorized data consumers. Moreover, provided that the healthcare researcher and providers of such service access these EHRs across-the aboard, the transition program of healthcare solution is expected to be achieved.

A blockchain is managed by a network of computers where there is no single computer is responsible for maintaining or storing the data, and any computers can enter or leave this network at any time Using Blockchain for records can make the whole process End to End verifiable and transparent. The stored data will be transactions, from which we can create a blockchain that will keep track of the database of the patient records. Using this approach, all the patients can make use of the records by themselves, and because of the blockchain they can use these records without any permission request from the organization directly by using the secret key given to them.

A decentralized system is a distributed network where no party has the full control over the data and the operations, but the decisions are made collectively through a consensus process. The parties forming the network are called nodes and communicate through message passing. Generally speaking, by sharing and replicating the information, the network provides availability and robustness especially in case of extensive failures. Moreover, Peer-to-peer systems (P2P) can even provide data ownership as the private information can be stored and requested only to the proprietary node. However, reaching consensus while preserving anonymity, security, and correctness despite failures has been a challenging problem studied in the literature. The introduction of blockchain made possible to achieve it while preserving anonymity and providing security and traceability.

**CHAPTER 2**

**LITERATURE REVIEW**

1. **LITERATURE REVIEW**

**2.1 Survey of Existing System:**

Literature review will focus on analysing current trends in the real estate market. Impact of block chain technology on various applications including commercial real estate is focused. The real estate sector in line with other sectors is expected to undergo major changes due to the Covid-19 [1]. Consumer sentiments in investments, retail, shopping patterns , organization operations are going to take a new turn. Though there is sharp difference in global sentiment among the counties, consumer spending behaviour is same [2]. During and after these unprecedented times, to recover from the effect of pandemic, a strong technological based delve- potent is required. The most value addition provided by the block chain technology on commercial real estate (CMR) would be safety and security [3]. The digitization of records is the major positive impact of blockchain technology. The paper focuses on technical aspects of block chain along with its impact and feature of real estate market.

**CHAPTER 3**

**PROPOSED SYSTEM**

**3.4 Project Planning:**

**THE OVERALL PROJECT DESIGN CONSISTS OF:**

* **Ethereum**

Ethereum is smart contract platform that is inspired by block chain technology. Its elemental unit is called ether. Ether, similarly to bitcoin is divisible up to 10-18, its smallest subunit is called wei. Due to the fee-by-computation18 policy, Ether (abbr. ETH) is sometimes referred as the fuel of Ethereum. The intention of Ethereum is to merge together enhanced scripting possibilities, meta protocol and time stamped database to allow development of an arbitrary application. The key difference from other block chain protocols is built-in programming language, various types of accounts and unlimited variation of application that can be built on top of it.

* **Smart Contract**

A smart contract is a self-executing contract that automatically enforces the terms of an agreement between two or more parties. It is a computer program that runs on a blockchain, a decentralized and distributed ledger technology that allows for secure and transparent transactions without the need for intermediaries.

* **Truffle Framework**

Truffle is a popular development framework for Ethereum smart contracts. It provides a suite of tools that simplifies the process of building, testing, and deploying smart contracts on the Ethereum blockchain.

* **Npm**

npm (short for "Node Package Manager") is a package manager for the JavaScript programming language. It is the default package manager for the Node.js runtime environment and is used to manage packages and dependencies for JavaScript projects.

With npm, developers can easily install, share, and manage packages of code that are available on the npm registry. These packages can include libraries, frameworks, and tools that can be used to build web applications, server-side applications, and other JavaScript-based projects**.**

* **Reactjs**

React is based on a component-based architecture, which means that UI elements are broken down into reusable and modular components. These components can be easily combined to create complex user interfaces. React also uses a "virtual DOM" approach, which allows it to efficiently update only the parts of the UI that need to be changed, rather than re-rendering the entire UI.

* **Web3js**

Web3.js is a JavaScript library that allows developers to interact with the Ethereum blockchain. It is a popular tool for building decentralized applications (dApps) and for integrating Ethereum into existing web applications.

* **Lite-server**

lite-server is a lightweight development server for web applications. It is designed to be simple and easy to use, while also providing powerful features for developing and testing web applications.

**DETAILS OF HARDWARE & SOFTWARE**

1. Software Requirements:

b) Hardware Requirements:

* Processor : Intel I5 core
* RAM : 2GB
* Monitor : 15 inches color
* Ethernet connection (LAN) OR Wireless adapter (WIFI)
* Hard Drive : Minimum 32 GB; Recommend 64 GB or More
* Memory (RAM) : Minimum 1GB ; Recommend 4GB or ab
* Keyboard : Optical
* Mouse : Optical

**CHAPTER 5**

**DATABASE**

**REAL-TIME DATABASE**

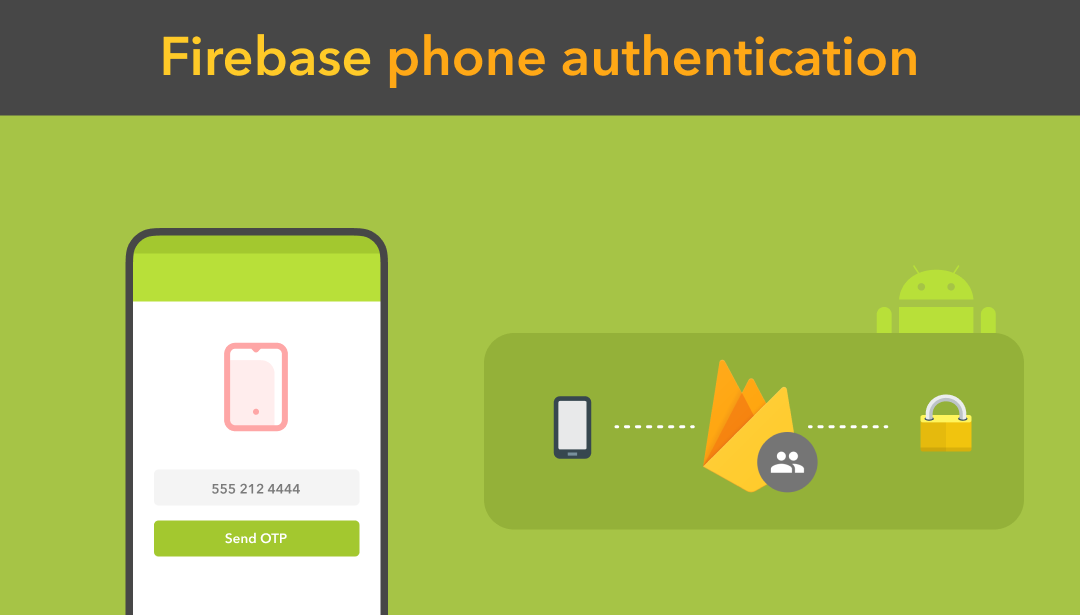
In the era of rapid prototyping, we can get bright ideas, but sometimes they are not applicable if they take too much work. Often, the back-end is the limiting factor - many considerations never apply to server-side coding due to lack of knowledge or time.

Firebase is a Backend-as-a-Service (BaaS) which started as a YC11 startup. It grew up into a next-generation app-development platform on Google Cloud Platform. Firebase (a NoSQL’s database) is a real-time database that allows storing a list of objects in the form of a tree. We can synchronize data between different devices.

Google Firebase is Google-backed application development software which allows developers to develop Android, IOS, and Web apps. For reporting and fixing app crashes, tracking analytics, creating marketing and product experiments, firebase provides several tools.

* Firebase manages real-time data in the database. So, it easily and quickly exchanges the data to and from the database. Hence, for developing mobile apps such as live streaming, chat messaging, etc., we can use Firebase.
* Firebase allows syncing real-time data across all devices - iOS, Android, and Web - without refreshing the screen.
* Firebase provides integration to Google Advertising, Ad Mob, Data Studio, Big Query DoubleClick, Play Store, and Slack to develop our apps with efficient and accurate management and maintenance.
* Everything from databases, analytics to crash reports are included in Firebase. So, the app development team can stay focused on improving the user experience.
* Firebase applications can be deployed over a secured connection to the firebase server.
* Firebase offers a simple control dashboard.
* It offers a number of useful services to choose from.

**AUTHENTICATION.**



**FIG 6.1**

Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app. It supports authentication using passwords, phone numbers, Email and popular identity providers like Google, Facebook and Twitter, and more.

In this tutorial, we will be learning about how to log in and authenticate in our Android application with the help of Firebase Auth phone number authentication method by sending an SMS message to the user’s phone.

Password-less phone number authentication flow will be something like this:

* User has to enter their phone number along with the country code
* Initiate the verification flow by tapping the CTA
* Once the user clicks the CTA, a verification code is sent to the respective phone number.
* The user is requested to enter the verification code, received by SMS.
* Firebase validates the verification code, and create an account if the code is valid
* Let’s begin the implementation.

**CHAPTER 5**

**TESTING**

**TESTING**

**The benefits of an effective test case include:**

* Guaranteed good test coverage.
* Reduced maintenance and software support costs.
* Reusable test cases.
* Confirmation that the software satisfies end-user requirements.
* Improved quality of software and user experience.
* Higher quality products lead to more satisfied customers.
* More satisfied customers will increase company profits.

**Pre-requisite:**

1. Internet should be available.

2. Application should be installed on the device.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **TEST CASE ID** | **FEATURE** | **STEPS TO EXECUTE** | **TEST DATA INPUT** | **EXPECTED RESULT** | **ACTUAL RESULT** | **STATUS** |
| **TC\_001** | **Screen** | **1. Enter login Activity** | **Enter login Activity** | **Enter login Activity** | **Enter login Activity** | **Pass** |
| **TC\_002** | **Login** | **1. Enter invalid login details. 2. Press Login button.** | **valid mobile no and password** | **user should be able to login** | **user is able to login** | **Pass** |
| **TC\_003** | **Login** | **1. Enter invalid login details. 2. Press Login button.** | **valid mobile no and password** | **user should not be able to login.** | **user is unable to login** | **fail** |
| **TC\_004** |  |  |  | **.** |  |  |
| **TC\_005** |  |  |  |  |  |  |
| **TC\_006** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **TC\_007** | **Scan** | **1. click on "Scan btn.** | **Scan** | **Not Open camera and scan** | **Display result.** | **fail** |
|  |  |  |  |  |  |  |

**APPENDIES**

**CODING**

**APPLICATION CODE:**

**REFERENCE**

**Conclusion:**