Mini Project Report on

"Blockchain based Application for Health Related Medical Record"

Submitted *By*

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In partial fulfilment of the requirements for The

award of the degree of

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For Academic Year 2023 – 2024

DEPARTMENT OF COMPUTER ENGINEERING

K.K.Wagh Institute of Engineering Education and Research,
Nashik – 422003

Certificate

This is to Certify That

Mr. Aditya Manish Limje [63]

Has completed the necessary
Mini Project Work and Prepared the Report on

"Blockchain based Application for Health Related Medical Record"

in Satisfactorily manner as a fulfilment of the requirement of the award of degree of the Bachelor in Computer Engineering in the Academic Year

2023 – 2024

Prof.K.P.Birla ***Prof.Dr.S.S.Sane***

Project Guide ***Head of Department***

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by

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ABSTRACT

Blockchain technology has the potential to revolutionize the healthcare industry, particularly in the area of medical records. Blockchain is a distributed ledger technology that allows for secure, transparent, and tamper-proof data sharing. This makes it an ideal platform for storing and managing sensitive medical information.

One of the key benefits of using blockchain for medical records is that it gives patients more control over their data. Patients can choose who has access to their records and can grant or revoke access at any time. This can help to improve patient privacy and security.

Another benefit of using blockchain for medical records is that it can help to improve the efficiency of healthcare delivery. By providing a single, shared view of a patient's medical history, blockchain can help to eliminate the need for patients to duplicate their records each time they see a new doctor. This can save time and money for both patients and providers.

INTRODUCTION

Blockchain is a distributed ledger technology that has the potential to revolutionize the healthcare industry, particularly in the area of medical records. Blockchain can provide a secure, transparent, and tamper-proof way to store and share medical data. This can help to improve patient privacy and security, streamline healthcare delivery, and facilitate clinical research.

One of the key benefits of using blockchain for medical records is that it gives patients more control over their data. Patients can choose who has access to their records and can grant or revoke access at any time. This can help to improve patient privacy and security, and can also make it easier for patients to share their records with authorized healthcare providers.

Blockchain can also help to improve the efficiency of healthcare delivery. By providing a single, shared view of a patient's medical history, blockchain can eliminate the need for patients to duplicate their records each time they see a new doctor. This can save time and money for both patients and providers.

In addition, blockchain can be used to facilitate clinical research. By providing a secure and transparent way to share data between researchers, blockchain can help to accelerate the development of new treatments and cures.

Overall, blockchain technology has the potential to significantly improve the way that medical records are stored and managed. By providing a secure, transparent, and tamper-proof platform for data sharing, blockchain can help to improve patient privacy and security, streamline healthcare delivery, and facilitate clinical research.

Problem Statement

Blockchain applications for health-related medical records aim to address several critical issues in the healthcare industry. The primary problem they target is the fragmentation and insecurity of patient data. Currently, patient records are often dispersed across various healthcare providers and systems, making it challenging for medical professionals to access a comprehensive patient history.

Additionally, patient privacy and consent are paramount in healthcare. The problem of data privacy breaches and unauthorized access to medical records needs to be addressed. Blockchain applications empower patients to have greater control over their health data. Patients can grant or revoke access to their records, ensuring that their privacy is respected.

Objective

Security:-
Blockchain is a distributed ledger technology that is tamper-proof and transparent. This means that medical records stored on a blockchain are highly secure and cannot be easily altered or deleted without the patient's consent.

Privacy:-
Blockchain allows patients to have complete control over their medical data. Patients can choose who has access to their data and can revoke access at any time. This is in contrast to traditional healthcare systems, where patients often have little to no control over their medical data.

Interoperability:-
Blockchain can help to break down the silos that exist between different healthcare providers. By storing medical records on a shared blockchain, patients can easily share their records with any authorized provider, regardless of where they are located. This can lead to improved care coordination and reduced costs.

SYSTEM REQUIREMENTS

Functional

Functional Requirement defines a function of software system and how the system must behave when presented with specific inputs or conditions. These may include calculations, data manipulation and processing and other specific functionality. The functional requirements of the project are one of the most important aspects in terms of entire mechanism of modules.

Functional Requirement are:-

Secure and tamper-proof storage and sharing of medical records: The application must provide a secure and tamper-proof way for patients to store and share their medical records with authorized individuals and organizations. This includes the ability to control who has access to the records and to audit all access attempts.

Patient consent and control: The application must give patients full control over their medical records. Patients must be able to grant or revoke access to their records at any time, and they must be able to view a complete audit trail of all access attempts.

Interoperability: The application must be able to interoperate with existing healthcare systems, including electronic health records (EHRs) and clinical decision support systems (CDSSs). This will allow patients to easily transfer their medical records to the application and to share their records with authorized healthcare providers.

Scalability and performance: The application must be able to scale to support a large number of users and transactions. It must also be able to perform quickly and efficiently, even when handling large amounts of data.

Non-Functional

Reliability

The framework ought to be dependable and solid in giving the functionalities. When a client has rolled out a few improvements, the progressions must be made unmistakable by the framework. The progressions made by the Programmer ought to be unmistakable both to the Project pioneer and in addition the Test designer.

Security

Aside from bug following the framework must give important security and must secure the entire procedure from smashing. As innovation started to develop in quick rate the security turned into the significant concern of an association. A great many dollars are put resources into giving security. Bug following conveys the greatest security accessible at the most noteworthy execution rate conceivable, guaranteeing that unapproved clients can't get to imperative issue data without consent. Bug following framework issues diverse validated clients their mystery passwords so there are limited functionalities for all the clients.

Maintainability

The framework observing and upkeep ought to be basic and target in its approach. There should not be an excess of occupations running on diverse machines such that it gets hard to screen whether the employments are running without lapses.

Performance

The framework will be utilized by numerous representatives all the while. Since the framework will be facilitated on a solitary web server with a solitary database server out of sight, execution turns into a noteworthy concern. The framework ought not succumb when numerous clients would be utilizing it all the while. It ought to permit quick availability to every last bit of its clients. For instance, if two test specialists are all the while attempting to report the vicinity of a bug, then there ought not to be any irregularity at the same time.

Hardware Requirement:

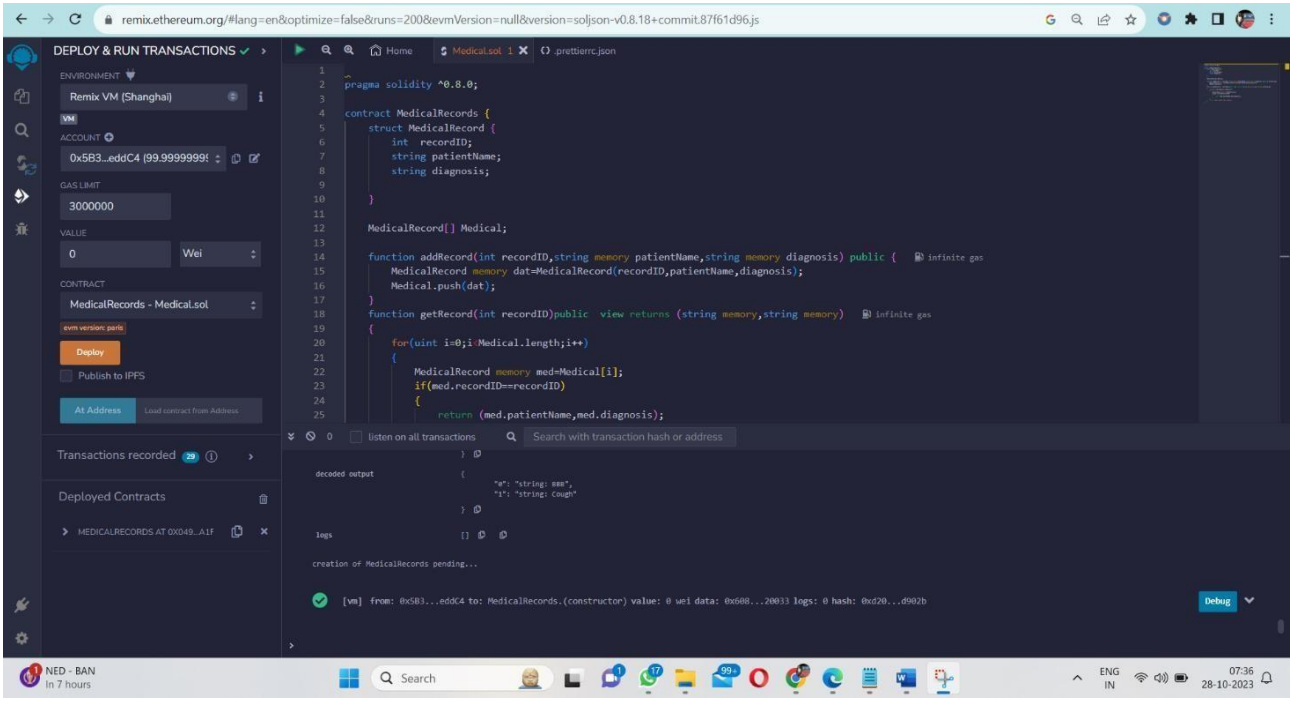
- Processor type : Intel core i5 and above Processor
- speed : Minimum 2.00 GHz and above
- RAM : 6-10 GB
- HARD DISK : 400 GB or more
- Monitor : 800x600 or higher resolution

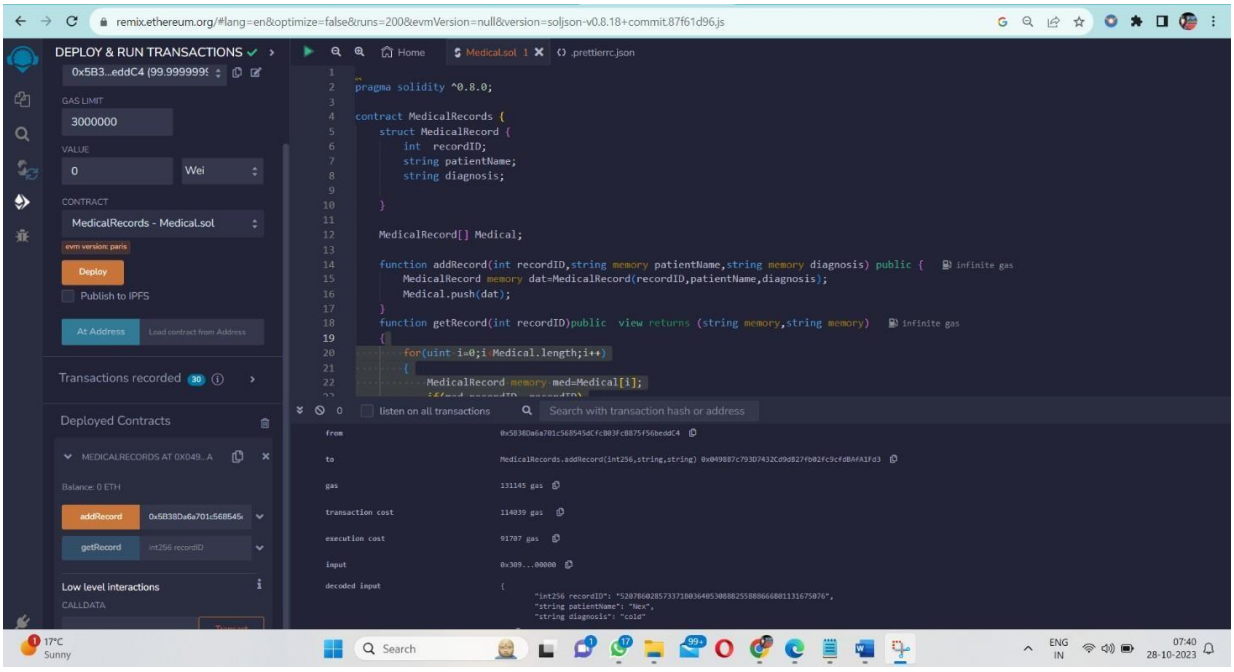
Software Requirements

- Operating System : Windows 7 (32 bit and 64 bit) and Above
- Development Environment : Solidity Programming, Web Development (CSS, HTML,JAVA SCRIPT)
- Scripting Language : Solidity Programming
- Decentralized Applications : Ethereum Framework ie. Truffle and Ganache

  Browser
- : Google Chrome
- Add-on in Browser : MetaMask
- Software : Visual Studio or Similar ID

Output:


remix.ethereum.org/#lang=en&optimize=false&runs=200&evmVersion=null&version=soljson-v0.8.18+commit.87f61d96.js
DEPLOY & RUN TRANSACTIONS
ENVIRONMENT
Remix VM (Shanghai)
ACCOUNT
0x5B3...eddC4 (99.9999999
GAS LIMIT
3000000
VALUE
0
Wei
CONTRACT
MedicalRecords - Medical.sol
evm version: paris
Deploy
Publish to IPFS
At Address
Load contract from Address
Transactions recorded 29
Deployed Contracts
MEDICALRECORDS AT 0X049...A1F
Home
Medical.sol 1
.prettierrc.json
pragma solidity ^0.8.0;
contract MedicalRecords {
struct MedicalRecord {
int recordID;
string patientName;
string diagnosis;
}
MedicalRecord[] Medical;
function addRecord(int recordID,string memory patientName,string memory diagnosis) public {
infinite gas
MedicalRecord memory dat=MedicalRecord(recordID,patientName,diagnosis);
Medical.push(dat);
}
function getRecord(int recordID)public view returns (string memory,string memory)
infinite gas
{
for(uint i=0;i<Medical.length;i++)
{
MedicalRecord memory med=Medical[i];
if(med.recordID==recordID)
{
return (med.patientName,med.diagnosis);
listen on all transactions
Search with transaction hash or address
decoded output
"0": "string: ###",
"1": "string: Cough"
logs
creation of MedicalRecords pending...
[vm] from: 0x5B3...eddC4 to: MedicalRecords.(constructor) value: 0 wei data: 0x608...20033 logs: 0 hash: 0xd20...d902b
Debug
NED - BAN
In 7 hours
Search
ENG
IN
07:36
28-10-2023


remix.ethereum.org/#lang=en&optimize=false&runs=200&evmVersion=null&version=soljson-v0.8.18+commit.87f61d96.js
DEPLOY & RUN TRANSACTIONS
0x5B3...eddC4 (99.9999999
GAS LIMIT
3000000
VALUE
0
Wei
CONTRACT
MedicalRecords - Medical.sol
evm version: paris
Deploy
Publish to IPFS
At Address
Load contract from Address
Transactions recorded 30
Deployed Contracts
MEDICALRECORDS AT 0X049...A
Balance: 0 ETH
addRecord
0x5B38Da6a701c568545
getRecord
int256 recordID
Low level interactions
CALLDATA
Home
Medical.sol 1
.prettierrc.json
pragma solidity ^0.8.0;
contract MedicalRecords {
struct MedicalRecord {
int recordID;
string patientName;
string diagnosis;
}
MedicalRecord[] Medical;
function addRecord(int recordID,string memory patientName,string memory diagnosis) public {
infinite gas
MedicalRecord memory dat=MedicalRecord(recordID,patientName,diagnosis);
Medical.push(dat);
}
function getRecord(int recordID)public view returns (string memory,string memory)
infinite gas
{
for(uint i=0;i<Medical.length;i++)
{
MedicalRecord memory med=Medical[i];
listen on all transactions
Search with transaction hash or address
from
0x5B38Da6a701c568545dCfcB03FcB875f56beddC4
to
MedicalRecords.addRecord(int256,string,string) 0x049887c793D7432C09d927fb02fc9cfdBAFA1Fd3
gas
131145 gas
transaction cost
114039 gas
execution cost
91707 gas
input
0x309...00000
decoded input
"int256 recordID": "52078602857337100364053088825588866680113167507 6",
"string patientName": "Nex",
"string diagnosis": "cold"
17°C
Sunny
Search
ENG
IN
07:40
28-10-2023

Conclusion

Overall, blockchain technology has the potential to significantly improve the way that medical records are stored and managed. By providing a secure, transparent, and tamper- proof platform for data sharing, blockchain can help to improve patient privacy and security, improve the efficiency of healthcare delivery, and facilitate clinical research.

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