EDUCATIONAL RECORDS
Using BLOCKCHAIN

A MINI-PROJECT REPORT

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NOVEMBER 2022

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BONAFIDE CERTIFICATE

Certified that this B.Tech mini-project report titled "Educational Record using Blockchain**"** is the bonafide work of **Rohit Goyal and Prathmesh Joshi** who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion for this or any other candidate.

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ABSTRACT

Blockchain stores a series of transactions in form of a sequence of linked blocks. Hence, the concept of a single decentralized ledger is easily maintained. Transactions and interactions that take place among the participants accessing the distributed and decentralized but cooperative blockchain network are held through a single ledger. An Educational Record using Blockchain (ERB) can make use of a decentralized, reliable, and highly trusted ledger that stores vital information. Traditional education systems encounter problems such as centralized record keeping where fault tolerance depends on a single cloud provider; not to mention locally hosted databases. The implementation of blockchain in the education sector provides a new horizon for set of non-functional requirements including but not limited to: security, immutability, independence from the institution, immutability of official records and certificates. In addition, total trust in the accuracy and infallibility are all gathered in the decentralized ledgers of blockchain. The proposed models emphasize on the data availability; represented in students' ability to access all of their data at any time. This project proposes three models for using blockchains to implement fully functional ERB that maintains transactions such as students' and faculty members' records, course registration records and student marks. In addition, avoiding the role of a super administrator or a centralized exposed store where data integrity is vulnerable. Using the proposed models pushes towards an electronic community where genuine certificates can be easily issued and published to the interested parties without the need for involving a centralized administration.

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CHAPTER 1

INTRODUCTION

Blockchain introduces a new horizon for achieving data integrity using decentralized and well-maintained data stores. Blockchain can be implemented within the automated management systems of individual higher education institutions or groups of educational institution.

Education is a core area where different stakeholders need to share and modify shared information. Modification of records can take place in different levels of security levels. The motivation of using blockchain in SIS comes from the growing need for acquiring high security and trust in such critical systems. In addition, a blockchain system emphasizes on making use of a decentralized, reliable, and highly trusted ledger that stores vital information.

Regardless of the marked enchantment in technology, there is a growing need for reliability and data integrity. Students would have full independence over their personal data in Blockchain. It will provide students with complete independence from the institution as well as complete control over their data while keeping integrity of immutable data. The blockchain stores data that is permanently recorded and encrypted using cryptographic technologies into decentralized blocks. Cryptographic procedures used in block generation and connecting blocks improve the security of each blockchain transaction, and the data recorded on the blockchain are immutable records whose states cannot be changed once they are generated. Security, resilience, and irreversibility are all connected to immutability. The blockchain's promise in education extends much farther, allowing students to add flavor of anonymity over their personal data, independence from the institution, immutability of records of official papers and certificates, and total trust in the accuracy and infallibility owing to network design. The proposed models emphasize on the data availability; represented in student's ability to access all their data at any time. Blockchain technology enables an alternative approach to teaching. Many institutions, organizations, and businesses are establishing their own blockchain efforts to investigate the advantages and uses in education.

The motivation for this project arises from the fact that; in education sector, students' information is critical and sensitive. The existence of a super administrator who can retrieve data of general administrative framework, learning and research may be seen as a big vulnerability. In conventional education framework relying on a centralized system, there are some challenges regarding record keeping. The goal of the new this research is to find other alternatives for record keeping. Based on blockchain technology; the new model can provide a more protected and trusted archive of records which represents depending on time-stamps can be a big assist for all stakeholders.

This project proposes an approach for using blockchain to implement fully functional ERB that maintains students' records, course registrations record and student marks. It provides significant, safe, and transparent methods for building a global system for educational learning.

Chapter 2
LITERATURE REVIEW

2.1 EXISTING SYSTEM:

The system has come up with many functionalities for educational institutions. Various case studies has described the problems faced by the users during sharing Certificates.

To track the student progress and managing attendance. It helps both student and guardian to keep track of student progress without visiting to the college. It helps Customer, do not have knowledge of trading also at same time the interfaces are so notifies student and guardian during the time of important events which are complex that it makes it difficult for user to share grades, it happens in institution. One more feature is guardian get alerted whenever student takes a lot of time to update an order of buying or selling and data of user is not get failed in the exam or student not able to meet the expected attendance average. ERB is application software and which has kept safe, intention to begin a conductive and direct interchanging the statistics in a secure platform to coalesce with students, faculties, parents and the college/school administration. The student information has the particulars (like register number, name, date-of-birth, sex, parent phone number, address, parent name, etc.) invade to the system by the faculties. All these particulars is stored in the database. ERB application is trouble free to use in schools, colleges, universities, and any other educational institutions. It can be customized as per the need. It can be used in private and government educational institutions also. ERB application is an internet-based application we can login to the system from anywhere irrespective of geographical area it will give seamless navigation. Existing system has following drawbacks

1. Customer data is not secured

2. Interface is dull

3. Trading process takes a lot of time

4. Customer follow- up is difficult

Chapter 3

SYSTEM ANALYSIS

3.1 PROBLEM STATEMENT:

College & Universities has to handle records for many number of students so maintenance was difficult. Though it has used an information system, it was totally manual or semi-automated. Hence, Blockchain at the university level is needed because of the increasing rates of forgery and the generation of fake degrees. The university should have a standard authenticated and decentralized database that can store all records of the students who have graduated from the university. These academic data should not be manipulated or deleted by any outside influence, thereby ensuring the credibility of the system

3.2 PROPOSED SOLUTION:

In proposed project Blockchain and its various properties are to be used to ensure that the proposed system caters to what is needed for security, easy accessibility, and availability. This also makes it easy to keep a track of all the data and to ensure that no document is fake or forged.

3.3 SOFTWARE and HARDWARES

1. Software Requirements
   Operating System: Windows/MacOS/Linux
   Tool Used: SQL, Django
2. Hardware requirements:
   Processor: Intel i3 or Amd Ryzen 3 and above
   Hard disk: minimum 2 GB space
   RAM: Atleast 2GB

Chapter 4

SYSTEM DESIGN AND MPLEMENTATION

Front End

HTML:

The Hypertext Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript. Web browsers receive HTML documents from a web server or from local storage and render the documents into multimedia web pages. HTML describes the structure of a web page semantically and originally included cues for the appearance of the document.

HTML elements are the building blocks of HTML pages. With HTML constructs, images, and other objects such as interactive forms may be embedded into the rendered page. HTML provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes, and other items.

CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML (including XML dialects such as SVG, MathML or XHTML).CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. CSS is designed to enable the separation of content and presentation, including layout, colors, and fonts.

This separation can improve content accessibility; provide more flexibility and control in the specification of presentation characteristics; enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, which reduces complexity and repetition in the structural content; and enable the .css file to be cached to improve the page load speed between the pages that share the file and its formatting.

JAVASCRIPT:

JavaScript is a text-based programming language used both on the client-side and server side that allows you to make web pages interactive. Where HTML and CSS are languages that give structure and style to web pages, JavaScript gives web pages interactive elements that engage a user.

Common examples of JavaScript that you might use every day include the search box on Amazon, a news recap video embedded on The New York Times, or refreshing your Twitter feed. Incorporating JavaScript improves the user experience of the web page by converting it from a static page into an interactive one. To recap, JavaScript adds behavior to web pages.

BOOTSTRAP:

Bootstrap is an HTML, CSS & JS Library that focuses on simplifying the development of informative web pages . The primary purpose of adding it to a web project is to apply Bootstrap's choices of color, size, font and layout to that project. As such, the primary factor is whether the developers in charge find those choices to their liking. Once added to a project, Bootstrap provides basic style definitions for all HTML elements. The result is a uniform appearance for prose, tables and form elements across web browsers. In addition, developers can take advantage of CSS classes defined in Bootstrap to further customize the appearance of their contents. For example, Bootstrap has provisioned for light- and darkcolored tables, page headings, more prominent pull quotes, and text with a highlight.

Back End

PHP:

PHP is a general-purpose scripting language geared toward web development. It was originally created by Danish-Canadian programmer Rasmus Lerdorf in 1993 and released in 1995. The PHP reference implementation is now produced by The PHP Group. PHP originally stood for Personal Home Page, but it now stands for the recursive initialism PHP: Hypertext Preprocessor.

PHP code is usually processed on a web server by a PHP interpreter implemented as a module, a daemon or as a Common Gateway Interface (CGI) executable. On a web server, the result of the interpreted and executed PHP code – which may be any type of data, such as generated HTML or binary image data – would form the whole or part of an HTTP response.
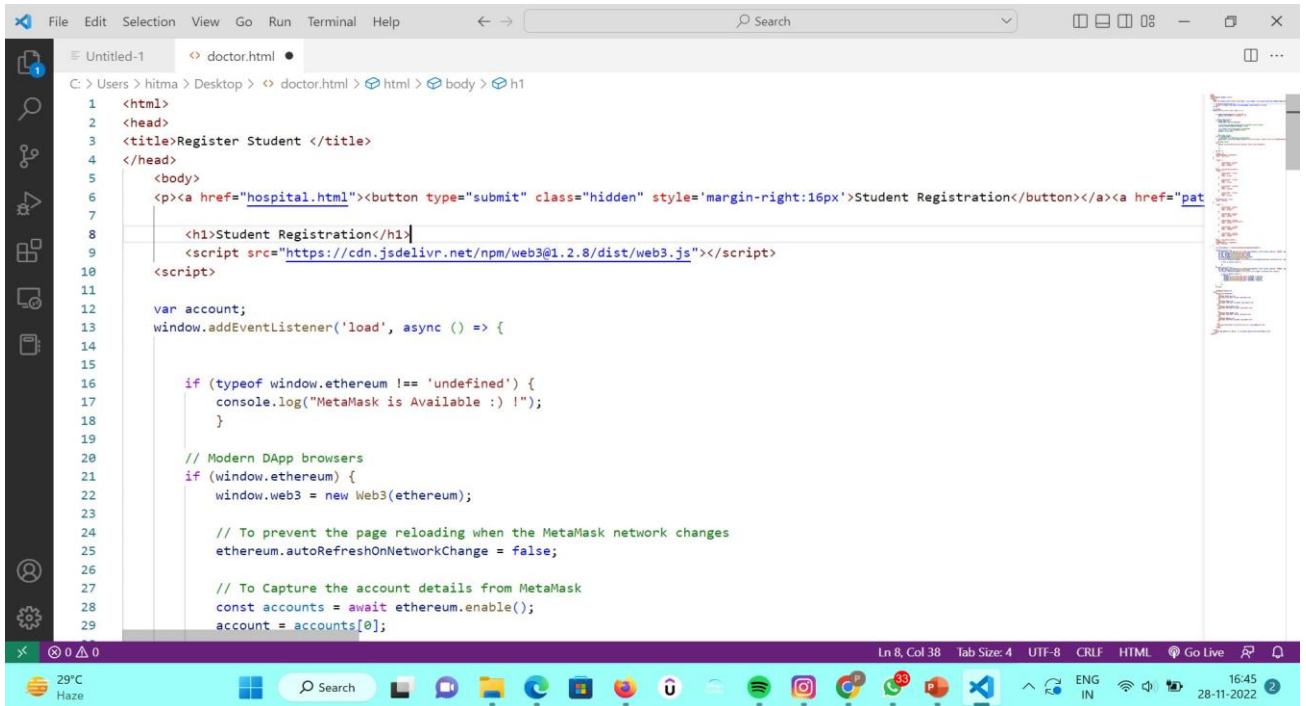
The standard PHP interpreter, powered by the Zend Engine, is free software released under the PHP License. PHP has been widely ported and can be deployed on most web servers on a variety of operating systems and platforms.

MYSQL:

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Micro systems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB.
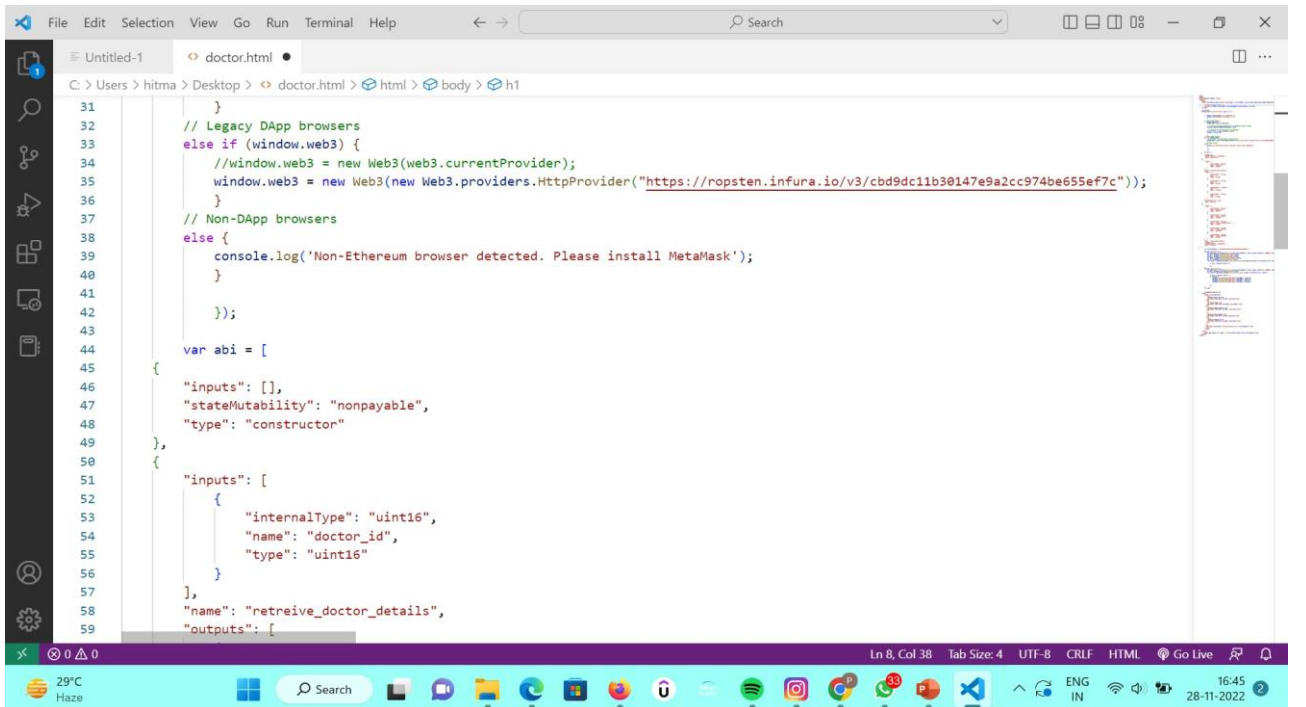
MySQL has stand-alone clients that allow users to interact directly with a MySQL database using SQL, but more often, MySQL is used with other programs to implement applications that need relational database capability. MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used by many database-driven web applications, including Drupal, Joomla, php, BB, and WordPress. MySQL is also used by many popular websites, including Facebook, Flickr, Media, Wiki, Twitter, and YouTube.

Coding

```html
<html>
<head>
<title>Register Student </title>
</head>
    <body>
    <p><a href="hospital.html"><button type="submit" class="hidden" style='margin-right:16px'>Student Registration</button></a><a href="pat

    <h1>Student Registration</h1>
    <script src="https://cdn.jsdelivr.net/npm/web3@1.2.8/dist/web3.js"></script>
<script>

var account;
window.addEventListener('load', async () => {


    if (typeof window.ethereum !== 'undefined') {
        console.log("MetaMask is Available :) !");
        }

    // Modern DApp browsers
    if (window.ethereum) {
        window.web3 = new Web3(ethereum);

        // To prevent the page reloading when the MetaMask network changes
        ethereum.autoRefreshOnNetworkChange = false;

        // To Capture the account details from MetaMask
        const accounts = await ethereum.enable();
        account = accounts[0];
```

```javascript
        }
    // Legacy DApp browsers
    else if (window.web3) {
        //window.web3 = new Web3(web3.currentProvider);
        window.web3 = new Web3(new Web3.providers.HttpProvider("https://ropsten.infura.io/v3/cbd9dc11b30147e9a2cc974be655ef7c"));
        }
    // Non-DApp browsers
    else {
        console.log('Non-Ethereum browser detected. Please install MetaMask');
        }

    });

var abi = [
{
"inputs": [],
"stateMutability": "nonpayable",
"type": "constructor"
},
{
    "inputs": [
        {
            "internalType": "uint16",
            "name": "doctor_id",
            "type": "uint16"
        }
    ],
    "name": "retreive_doctor_details",
    "outputs": [
```

```
57          ],
58          "name": "retreive_doctor_details",
59          "outputs": [
60              {
61                  "internalType": "string",
62                  "name": "",
63                  "type": "string"
64              },
65              {
66                  "internalType": "string",
67                  "name": "",
68                  "type": "string"
69              },
70              {
71                  "internalType": "uint256",
72                  "name": "",
73                  "type": "uint256"
74              },
75              {
76                  "internalType": "string",
77                  "name": "",
78                  "type": "string"
79              }
80          ],
81          "stateMutability": "view",
82          "type": "function"
83      },
84      {
85          "inputs": [
```

```
85          "inputs": [
86              {
87                  "internalType": "uint16",
88                  "name": "doctor_id",
89                  "type": "uint16"
90              },
91              {
92                  "internalType": "string",
93                  "name": "_doctor_name",
94                  "type": "string"
95              },
96              {
97                  "internalType": "string",
98                  "name": "_doctor_specialisation",
99                  "type": "string"
100             },
101             {
102                 "internalType": "uint256",
103                 "name": "_doctor_ph_no",
104                 "type": "uint256"
105             },
106             {
107                 "internalType": "string",
108                 "name": "_doctor_address",
109                 "type": "string"
110             }
111         ],
112         "name": "store_doctor_details",
113         "outputs": [],
```

```
118         var contractaddress = '0x466147A21E54F6a7A22Cc86004ab5841C00bE41f';
119
120     function add_details() {
121         var myContract = new web3.eth.Contract(abi,contractaddress, {from: account, gasPrice: '5000000', gas: '500000'});
122         var ds1 = document.getElementById("spec").value;
123         var ds2 = document.getElementById("pno").value;
124         var ds3 = document.getElementById("addr").value;
125         var tname = document.getElementById("name1").value;
126         var id = document.getElementById("id1").value;
127         var result = myContract.methods.store_doctor_details(id,tname,ds1,ds2,ds3).send(function (err, result) {
128
129             if (err) { console.log(err); }
130
131         });
132     }
133     function show_details() {
134         var myContract = new web3.eth.Contract(abi,contractaddress, {from: account, gasPrice: '5000000', gas: '500000'});
135         var idd = document.getElementById("tid").value;
136         var result = myContract.methods.retreive_doctor_details(idd).call(function (err, result) {
137
138             if (err) { console.log(err); }
139             if (result) {
140                 document.getElementById("get_name").innerHTML = result[0];
141                 document.getElementById("get_spec").innerHTML = result[1];
142                 document.getElementById("get_pno").innerHTML = result[2];
143                 document.getElementById("get_addr").innerHTML = result[3];
144             }
145
146         });
```

```
151         <h2>Register Student</h2>
152     <form>
153         <table style="width:25%">
154             <tr>
155             <td>Enter Student Id:</td>
156             <td><input type="text" id="id1" name="id1"></td>
157         </tr>
158             <tr>
159             <td> Student Name:</td>
160             <td><input type="text" id="name1" name="name1"></td>
161         </tr>
162         <tr>
163             <td>Studnet Specification:</td>
164             <td><input type="text" id="spec" name="spec"></td>
165         </tr>
166
167         <tr>
168             <td>Student Phone Number:</td>
169             <td><input type="text" id="pno" name="pno"></td>
170         </tr>
171         <tr>
172             <td>Student Address:</td>
173             <td><input type="text" id="addr" name="addr"></td>
174         </tr>
175
176         <tr>
177         <td><input type="button" onclick="add_details()" value="Register"></td>
178         </tr>
179     </table>
```

Output

Chapter 5

CONCLUSIONS

When going through various technologies used in the educational discipline for the betterment of students, it was noted that the use of blockchain technology has worked successfully in mitigating the risk of forgery of student achievements, and that the use of Blockchain provides students with predictions about future occurrences. Therefore, in this project, a system was discussed that combines blockchain and other technologies, providing the user with the benefits of both approaches. In addition, a trusted dataset validated through blockchain helps increase the veracity of a machine-learning-based model. This project described how a university mines the blocks of the students and provides proof of work. This project can obtain the input of the trusted data and is capable of achieving a more accurate prediction. Hence, the main aim of this paper is to represent a system containing a blockchain that manages the student data in the form of a decentralized database (ledger), in which a job placement company can inquire about the student data directly on a blockchain and obtain the validated and verified data of a student extremely quickly, thereby obtaining accurate predictions regarding a suggested job for the student with the help of a trained the model.

CHAPTER 6

REFERENCES

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2. https://vciba.springeropen.com/articles/10.1186/s42492-021-00084-y
3. youtube.com
4. Wikipedia
5. https://www.slideshare.net/1amitgupta/studentmanagementsystem