



Department of Information Technology

NBA Accredited

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UNIVERSITY OF MUMBAI

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A Project Report on

Online Certificate Generation & Verification using Blockchain Framework

Submitted in fulfillment of the degree of
Bachelor of Engineering(Sem-8)
in
INFORMATION TECHNOLOGY

By

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1. Project Conception and Initiation

1.1 Abstract

- There are many cases reported of certificate forgery everyday and many of them go undetected.
- In this project we focus on Ethereum Blockchain as it is immutable, transparent,scalable, and also cost-effective.
- Universities would be able to generate their own certificates on the web portal itself.
- Each generated certificate would be allotted to the respective student within the system. Each certificate would be given a unique hash code so that it could be verified easily and there would be no scope of duplication.
- The authentication and verification would be done on the same web portal.
- To sum up, this system would save time and efforts that are required to verify a certificate manually and would result in an effective, secure way to generate certificates.

1.2 Objectives

- To create a central portal for all the Universities/ Institutions.
- To provide throughout data security by using Ethereum blockchain and also protecting certificates by allotting a unique hash code to each and every certificate.
- To make it possible for Universities/Institutions to generate certificate on the portal itself.
- To make the portal as simplistic as possible.
- To make the system cost effective.

1.3 Literature Review

- Shanmuga Priya R, Swetha N 'Online Certificate Validation Using Blockchain.'
- Nitin Kumavat, Swapnil Mengade, Dishant Desai, Jesal-Varolia 'Certificate Verification System using Blockchain'

1.4 Problem Definition

To develop an application to generate certificates online, the application should also be able to authenticate and verify the the certificate on a central online portal.

1.5 Scope

- Can be used to generate the certificate online.
- Can be used to authenticate certificates on a centralized online portal.
- Can be used to verify certificates on a central online portal.
- Can be used for easy access of any certificate from anywhere, anytime.

1.6 Technology stack

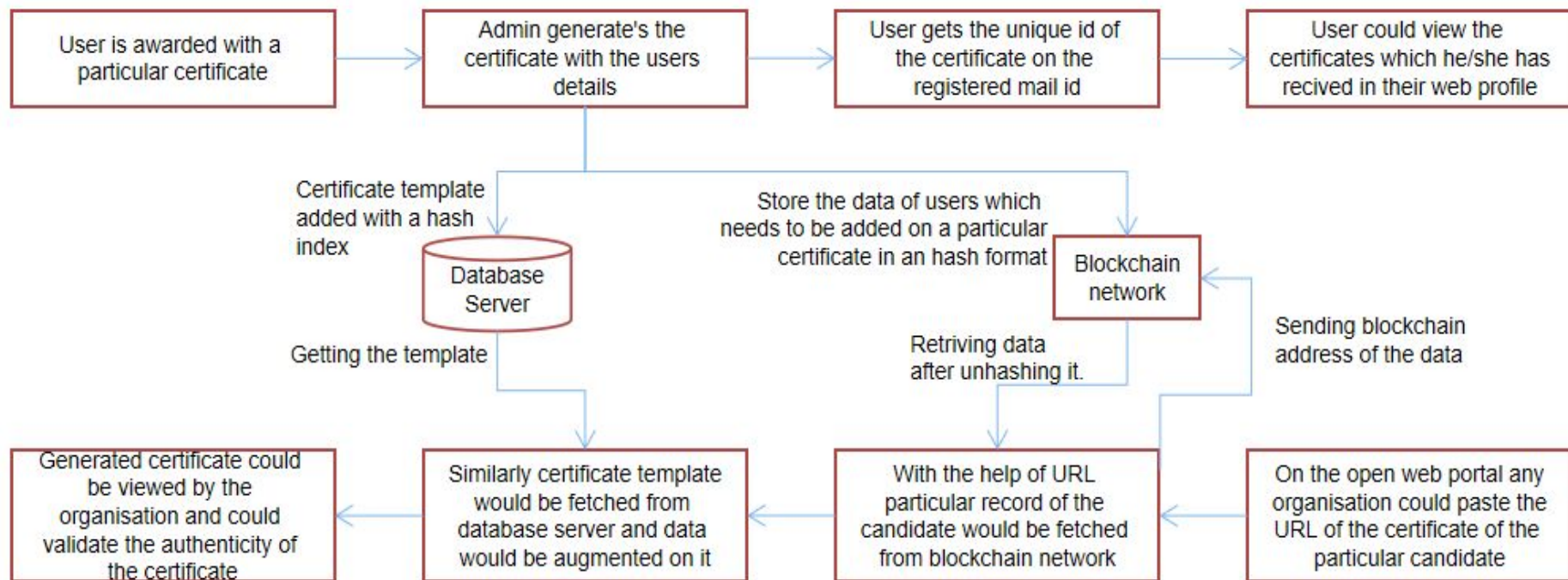
- React
- MetaMask
- Ganache
- Truffle
- Ethereum
- Node JS
- Postgresql

1.7 Benefits for environment & Society

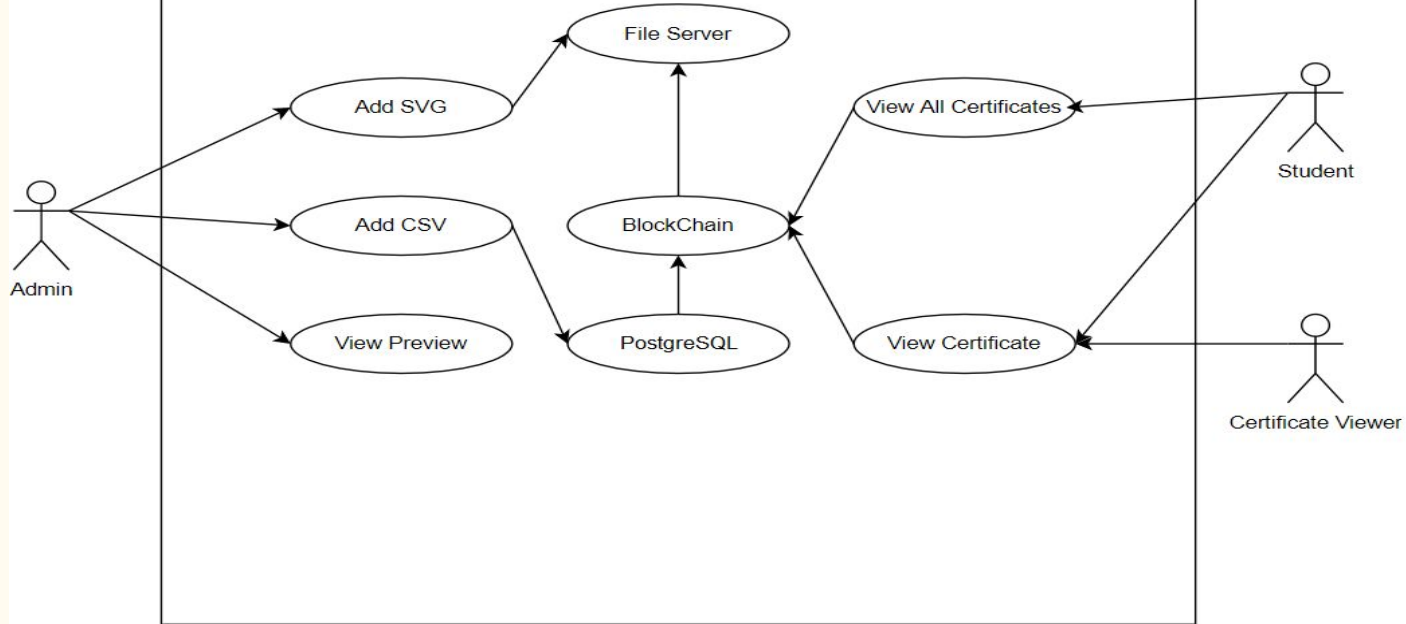
- Blockchain is a completely online system and can be accessed easily from around the world.
- Reduces the usage of physical certificates that are vulnerable to damage over a long period.
- The system eliminates the risk of misplaced certification or late delivery of certificates.
- Having a visible digital footprint or online identity will give an added advantage to students to help crack any interview with ease.

2. Project Design

2.1 Proposed System



2.2 Use case diagram:



2.3 Description Of Use Case

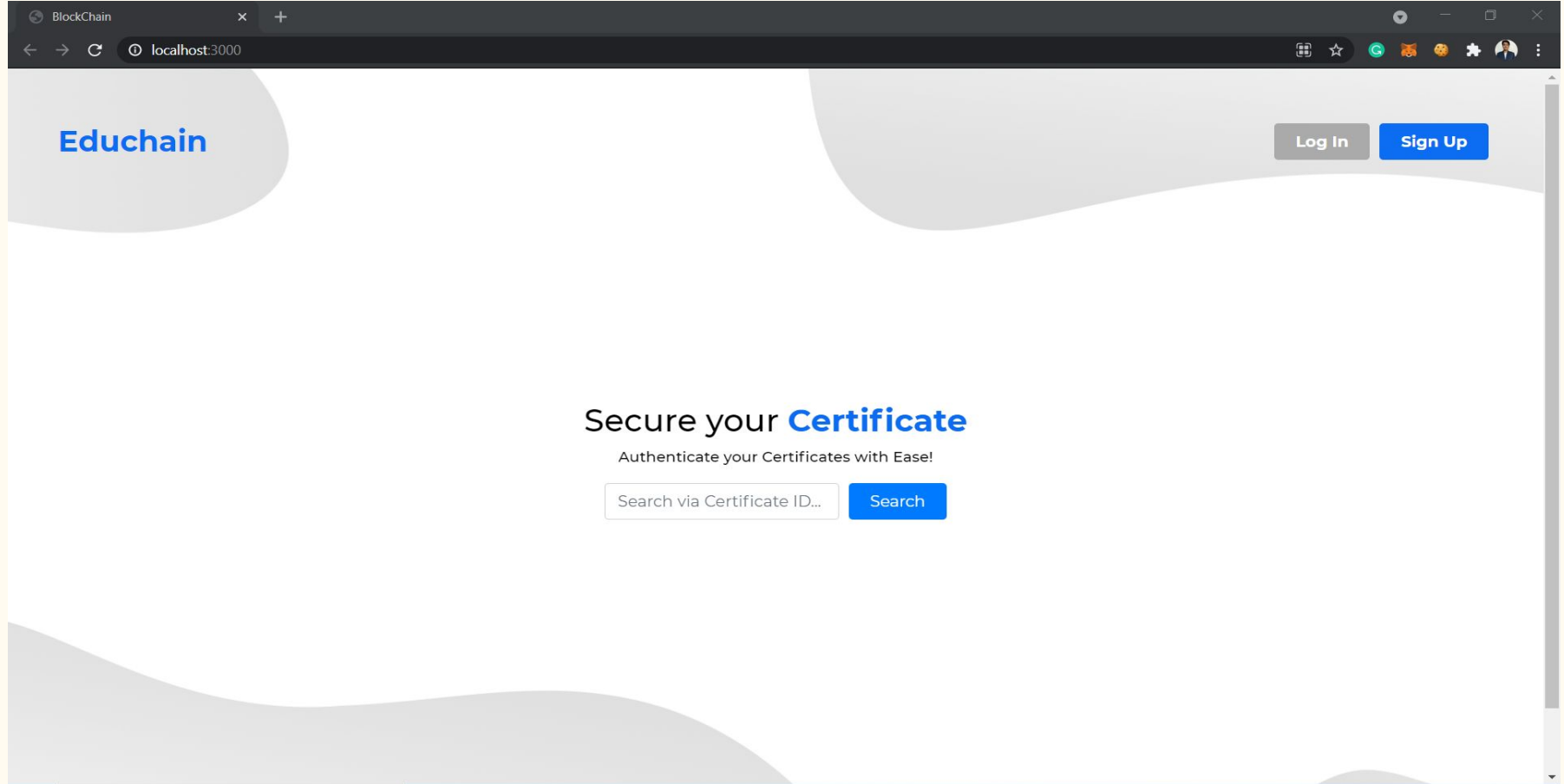
- Here, in the above diagram, admin is the actor and is able to add certificates in the form of SVG and CSV data, preview sample certificate before uploading data to Blockchain.
- The File Server and Postgresql are included by the Add SVG and Add CSV entities respectively.
- Student is another actor

3. Implementation



4. Result

Home Screen:



Registration Page:

BlockChain

localhost:3000/signup

Educhain

Sign Up

Email address

We'll never share your email with anyone else.

Phone Number

First Name

Last Name

Password

Repeat Password

Already have an Account?Click here to Sign In!

Submit

Login Page:

BlockChain

localhost:3000/login

Educhain

Login

Email address

We'll never share your email with anyone else.

Password

☐ **Login as Admin (Toggle if Admin)**

Don't have an account? [Click here to create one!](#)

Submit

Admin portal to add certificate template:

BlockChain

localhost:3000/admin/upload/svg

Log Out

Educhain

Upload Certificate Template


Choose File

No file chosen

Enter Filename

Or Select From Existing Templates

apsit-skills




Admin portal to add CSV file and view preview of the certificate:

BlockChain

localhost:3000/admin/upload/csv/

Log Out

Educhain




Upload Certificate Data

187 B
Untitled spreadsheet - Sheet1.csv

Preview

Upload

Made By Prasad, Aseem, Rutwik



The image shows a sample certificate from APST Skills. It is a 'RECORD OF ACCOMPLISHMENT' for Rutwik Gaikwad, who has successfully completed the APST Skills Holistic Internship Program. The certificate details the program's duration (June 11 to July 31, 2020), the total hours of learning (20-40 hours per week), and the domains covered: Technology, Business Competence, Management Skills, Personality Development, Human Values and Social Responsibility, and Project work. The project name is 'Axax121' and the project instructor is 'Prof. Axax121'. The candidate scored 11 credits (933 hrs) by working weekly assignments, quizzes, and project report & presentation. The certificate is signed by Dr. Sameer Nankhadekar, CEO of APST Skills, and is organized by APST Skills, Thane, India.


Verified certificate:


Blockchain

localhost:3000/student/certificate/059e4c09aecccc45607731e10091e464

EduChain

Verified ✓



PARSHVANATH CHARITABLE TRUST'S
A. P. SHAH INSTITUTE OF TECHNOLOGY, THANE
ALL PROGRAMS ACCREDITED BY 

RECORD OF ACCOMPLISHMENT

This is to Certify that
Rutwik Gaikwad
has successfully completed the following APSIT SKILLS CENTER'S
APSIT Skills Holistic Internship Program
This --- weeks Holistic Internship Program, created under APSIT SKILLS,
was held from June 11 through July 31, 2020.
It comprised 20-40 hours of learning effort per week and --- hours project
work. The course covered the following domains & a Project work:
Technology, Business Competence, Management Skills, Personality
Development, Human values and Social Responsibility &
Project Name: _____ APSIT Skills
Project Instructor: Prof. _____ Anagha _____

The candidate scored 2 credits (120 hrs) by working weekly

ISSUER

APSIT

TXN ID

0xfc764a4c608edfb9386f6d99420fef4eb431fea2ef7fe46bc
46492122381b1ad

6. Conclusion and Future Scope

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6.1 Conclusion

In this project, we have successfully proposed a system where blockchain technology can be used to store and retrieve certificate data. The project will help companies issue certificates securely through Blockchain and can be verified by anyone with the unique link/code to each certificate. The system uses the concept of SVG templates for the certificates which would be stored on a local server and to store data over the blockchain for secure and reliable storage. This will minimize the cost of storing the entire certificate on the blockchain network. Storing only the data of the certificate will minimize cost and thereby turn out to be cost-efficient. The only drawback of this system is that the template of the certificate needs to be properly created with the SVG's textarea ID to match with the header of the CSV file. Only a properly crafted SVG and CSV pair will result in proper certificate generation through Blockchain.

6.2 Future Scope

- Currently, the certificate template which is stored on local file storage is the weakest link in the system. The template relies on the security of the File System used. The use of IPFS - InterPlanetary File System can secure the certificate template stored thereby adding to the security of the system.
- IPFS has the capacity to store files over Blockchain allowing secure storage and retrieval of the certificate template.
- The system can be further extended to store other online documents of importance to ensure the integrity of data and documents being stored securely.

References

- <https://www.ijana.in/papers/37.pdf>
- <http://ijraset.com/files/serve.php?FID=20914>
- <https://www.blockcerts.org/>
- <https://www.blockchain-council.org/blockchain/document-verification-system-using-blockchain/>

Paper Publication

Paper entitled “Online Certificate Generation & Verification using Blockchain Framework” is presented at “ICSCS 2021 : International Conference on Soft Computing For Security Applications” by Prasad Jadhav, Rutwik Gaikwad, Aseem Godambe and Kiran Deshpande.

Thank You

