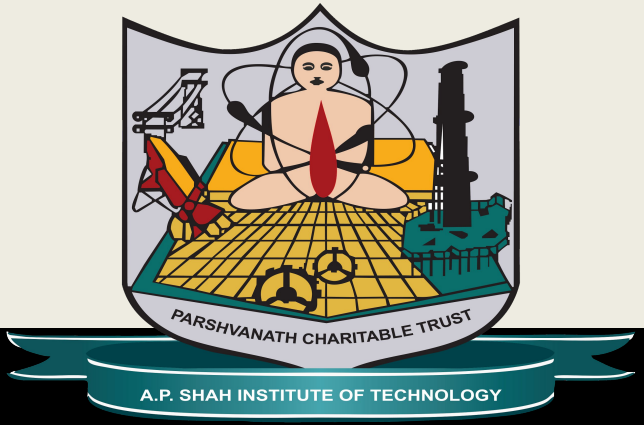

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UNIVERSITY OF MUMBAI

Academic Year 2020-2021

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

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Under the Guidance of
Prof. Kiran Deshpande

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

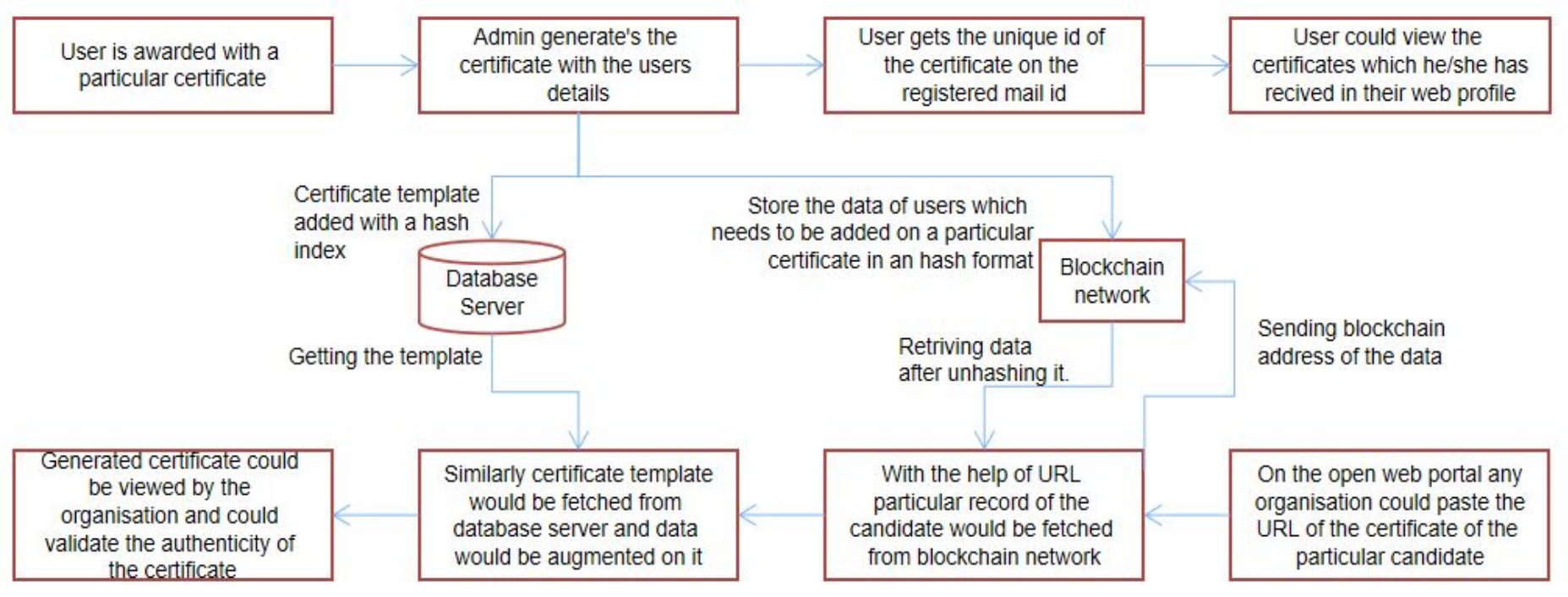
- React
- MetaMask
- Ganache
- Truffle
- Etherium
- Node JS
- Postgresql

1.7 Benefits for environment & Society

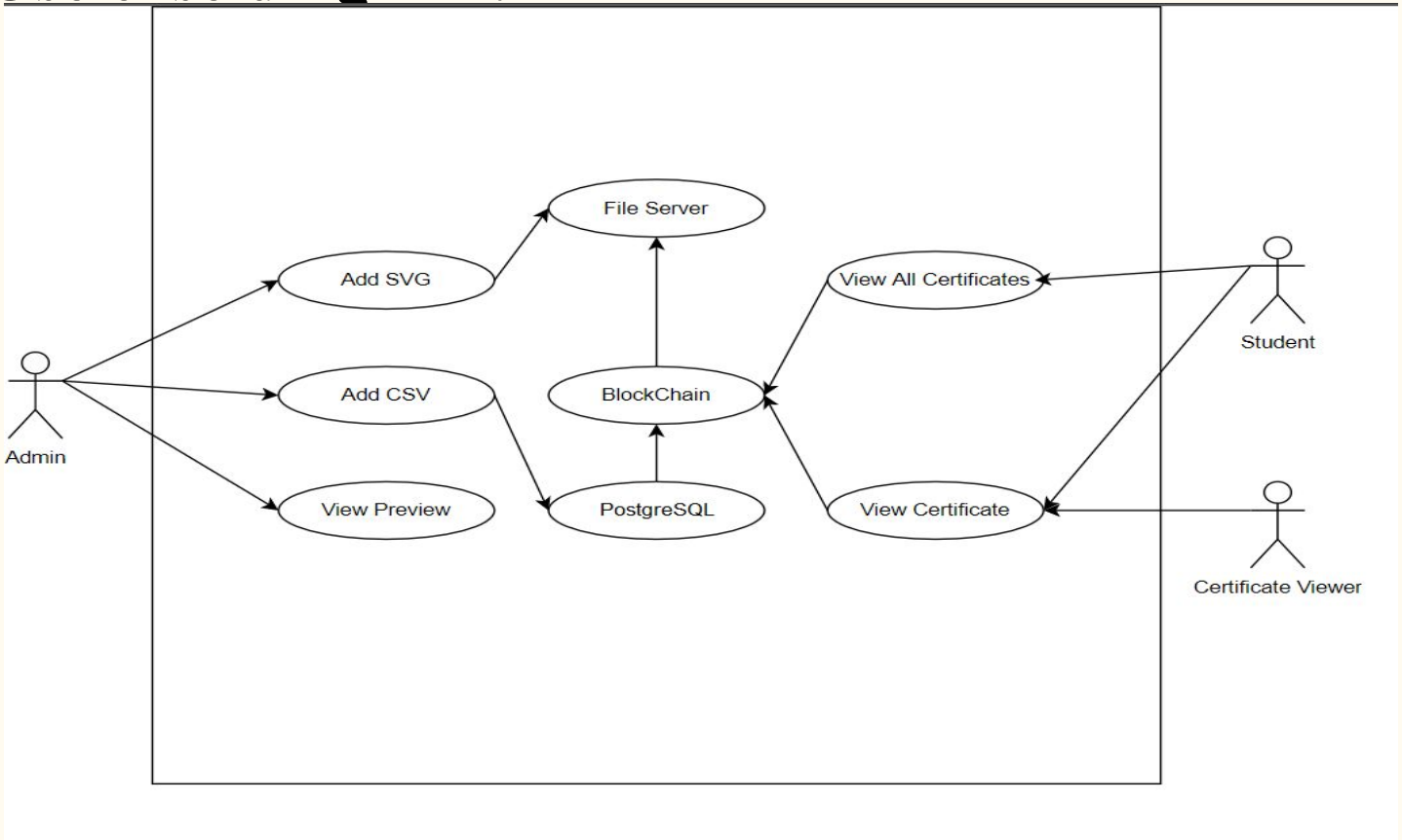
- Blockchain is a completely online system and can be accessed easily from around the world.
- Reduces the usage of physical certificates that are vulnerable to damage over a long period.
- The system eliminates the risk of misplaced certification or late delivery of certificates.
- Having a visible 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



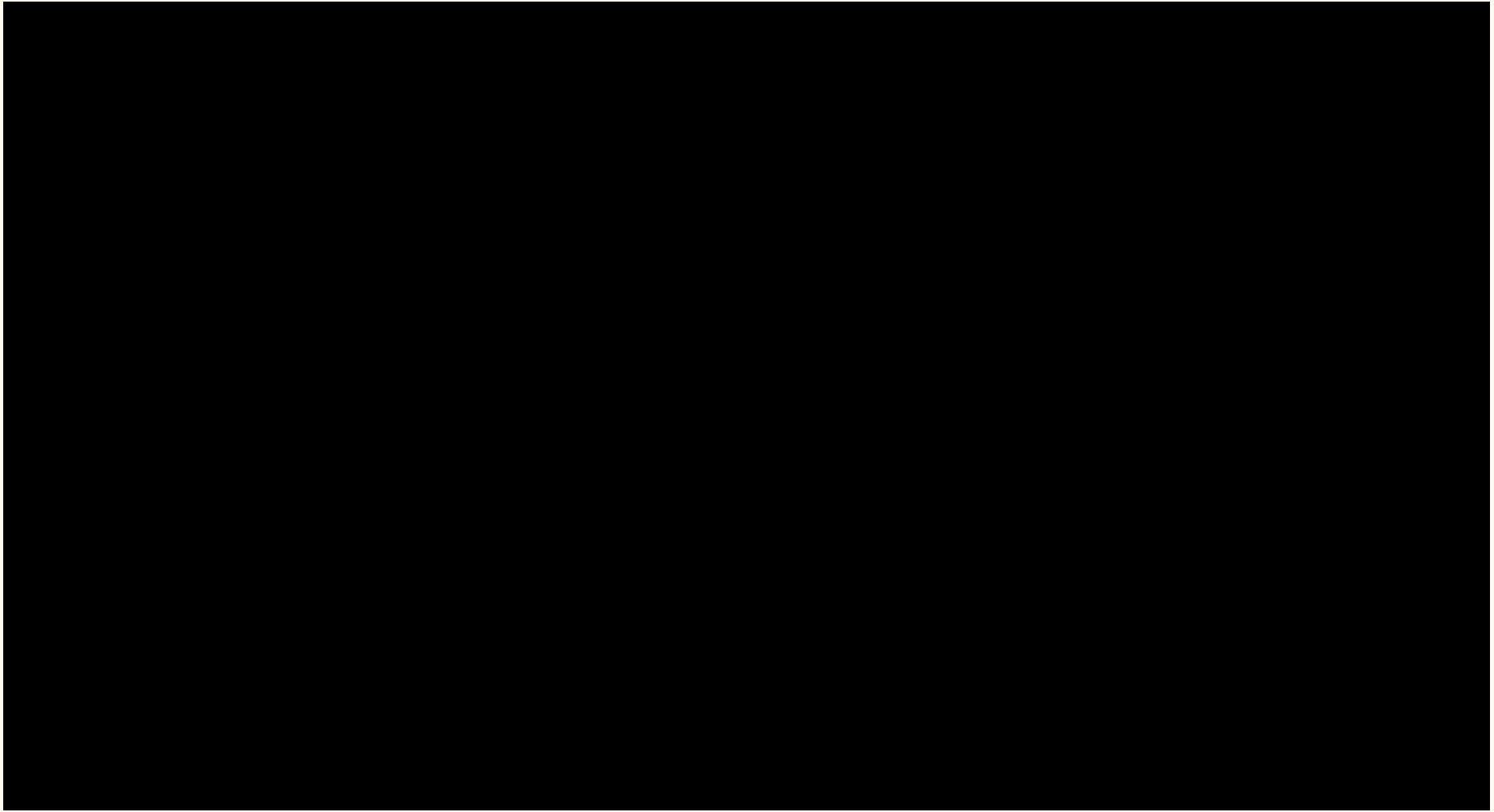
2.2 Use case diagram:



2.3 Description Of Use Case

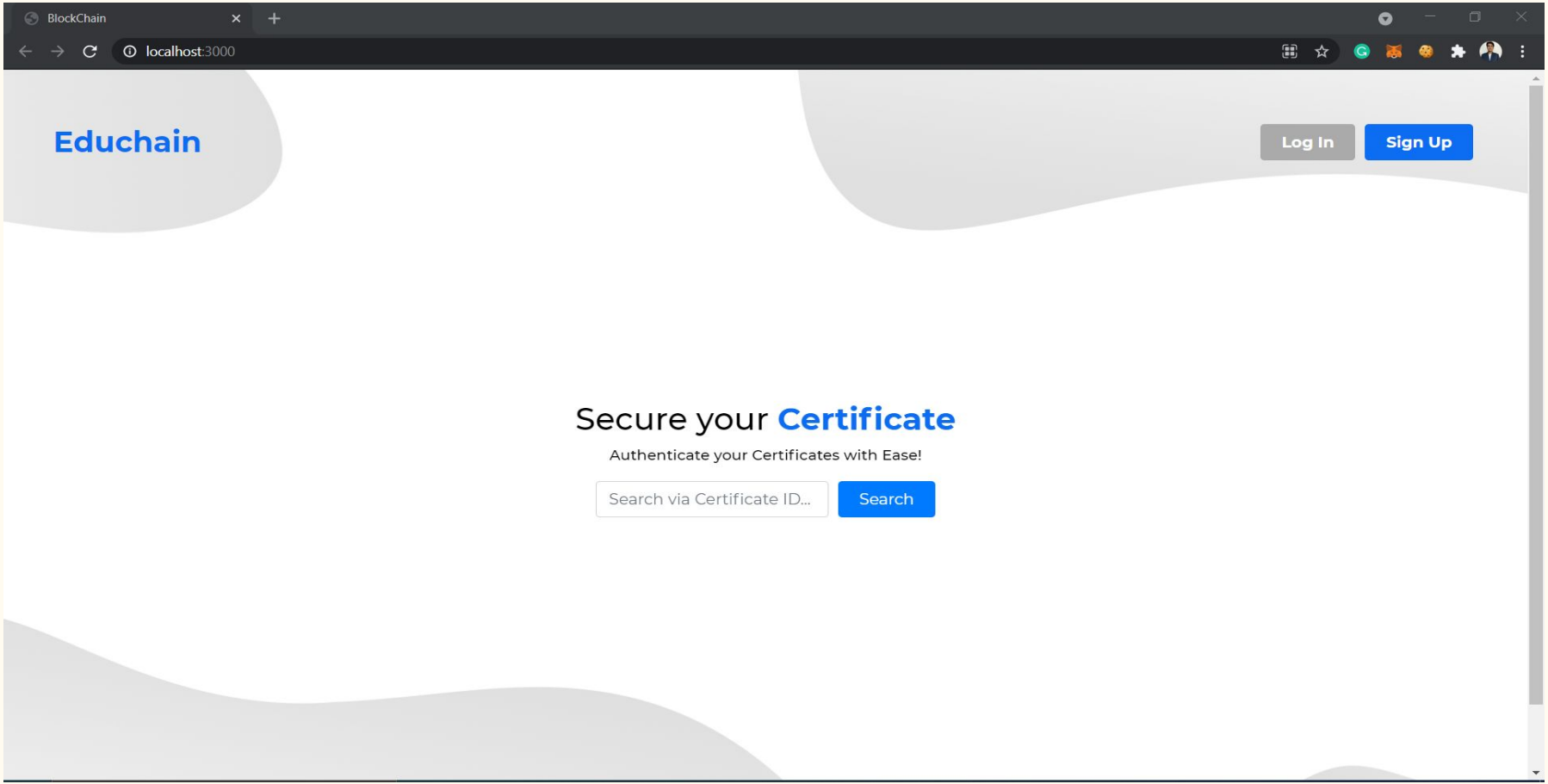
- Here, in the above diagram, admin is the actor and is able to add certificates in the form of SVG and CSV data, preview sample certificate before uploading data to Blockchain.
- The File Server and Postgresql are included by the Add SVG and Add CSV entities respectively.
- Student is another actor

3. Implementation

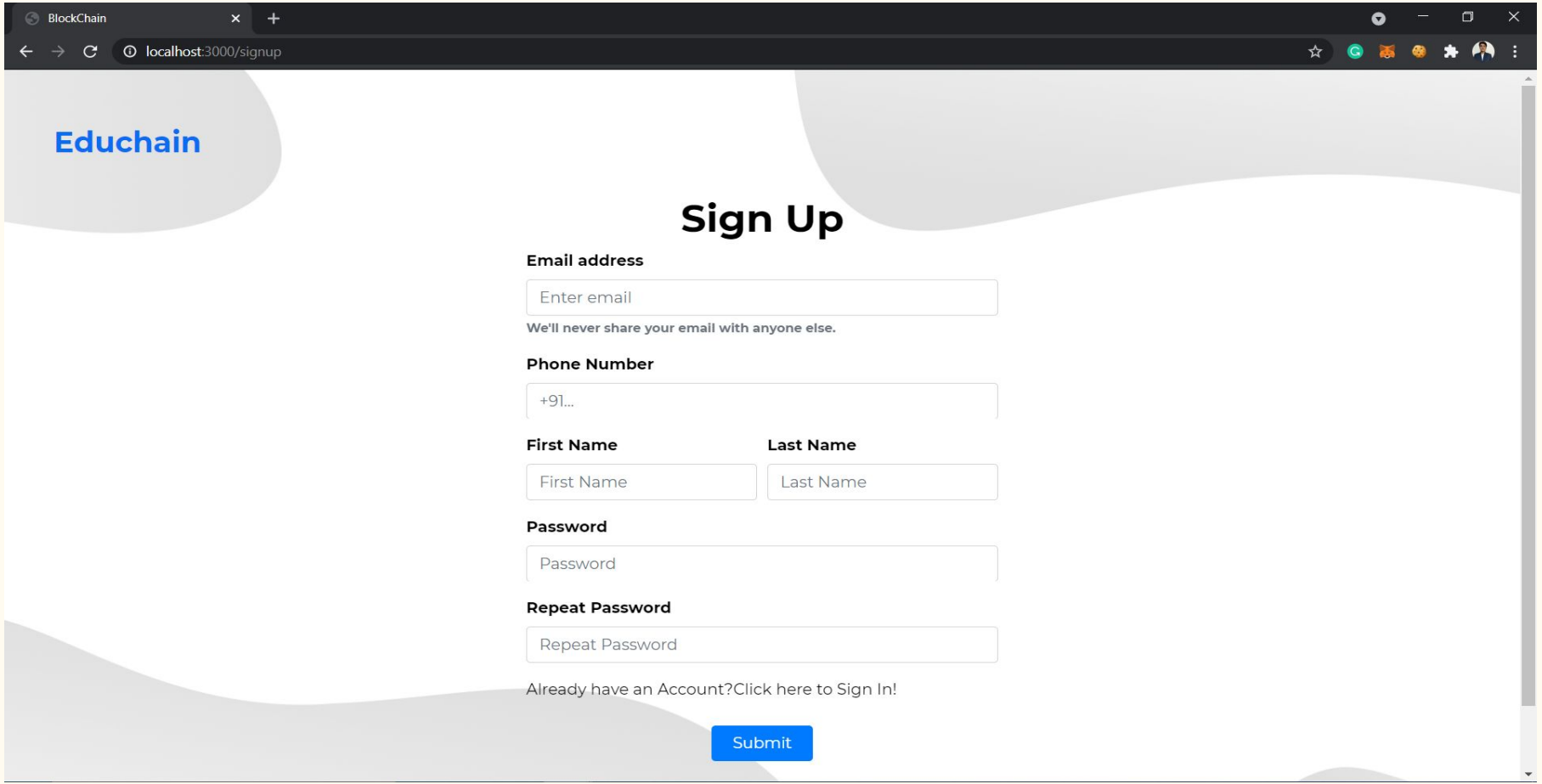


4. Result

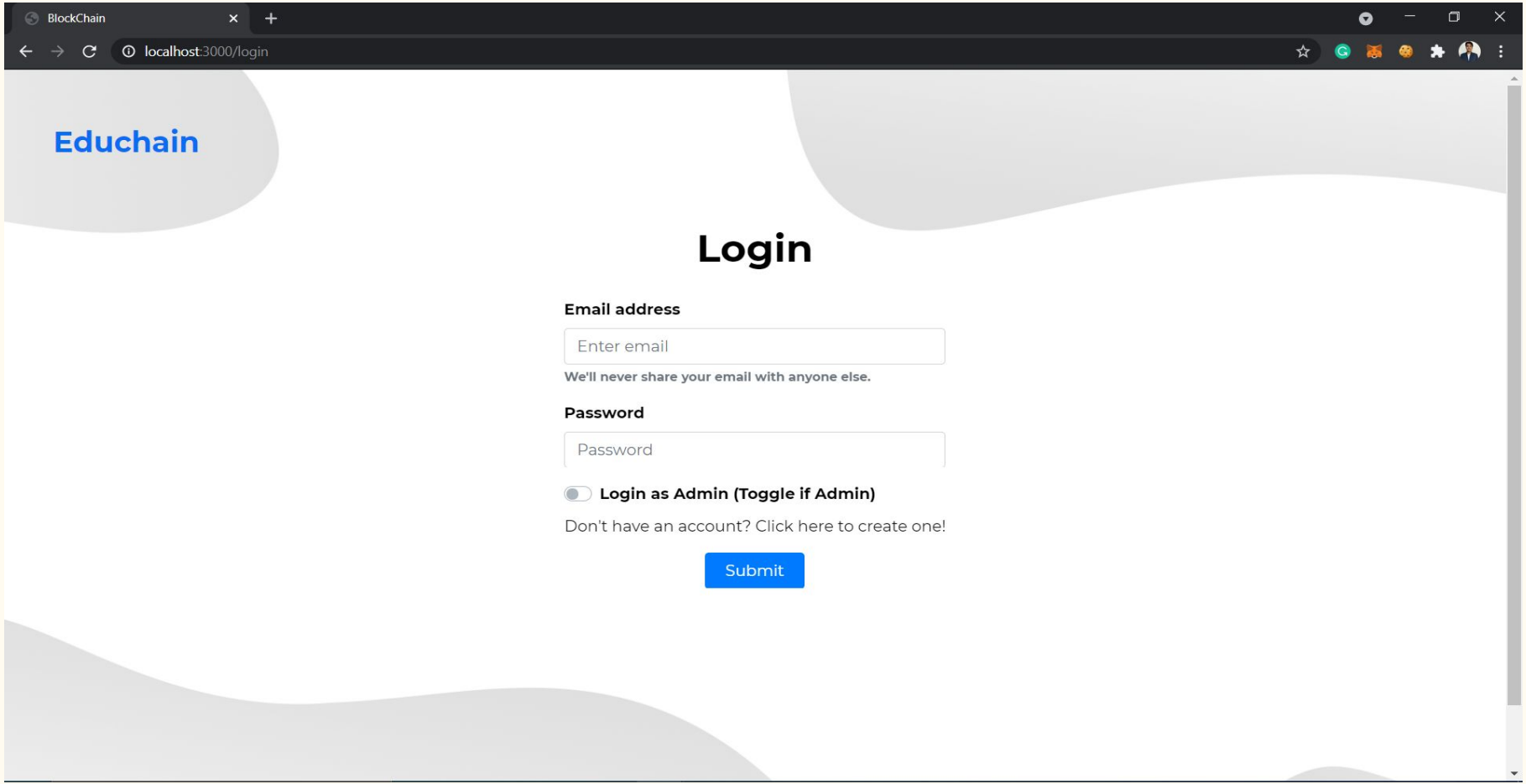
Home Screen:


BlockChain
localhost:3000
Educhain
Log In
Sign Up
Secure your Certificate
Authenticate your Certificates with Ease!
Search via Certificate ID...
Search

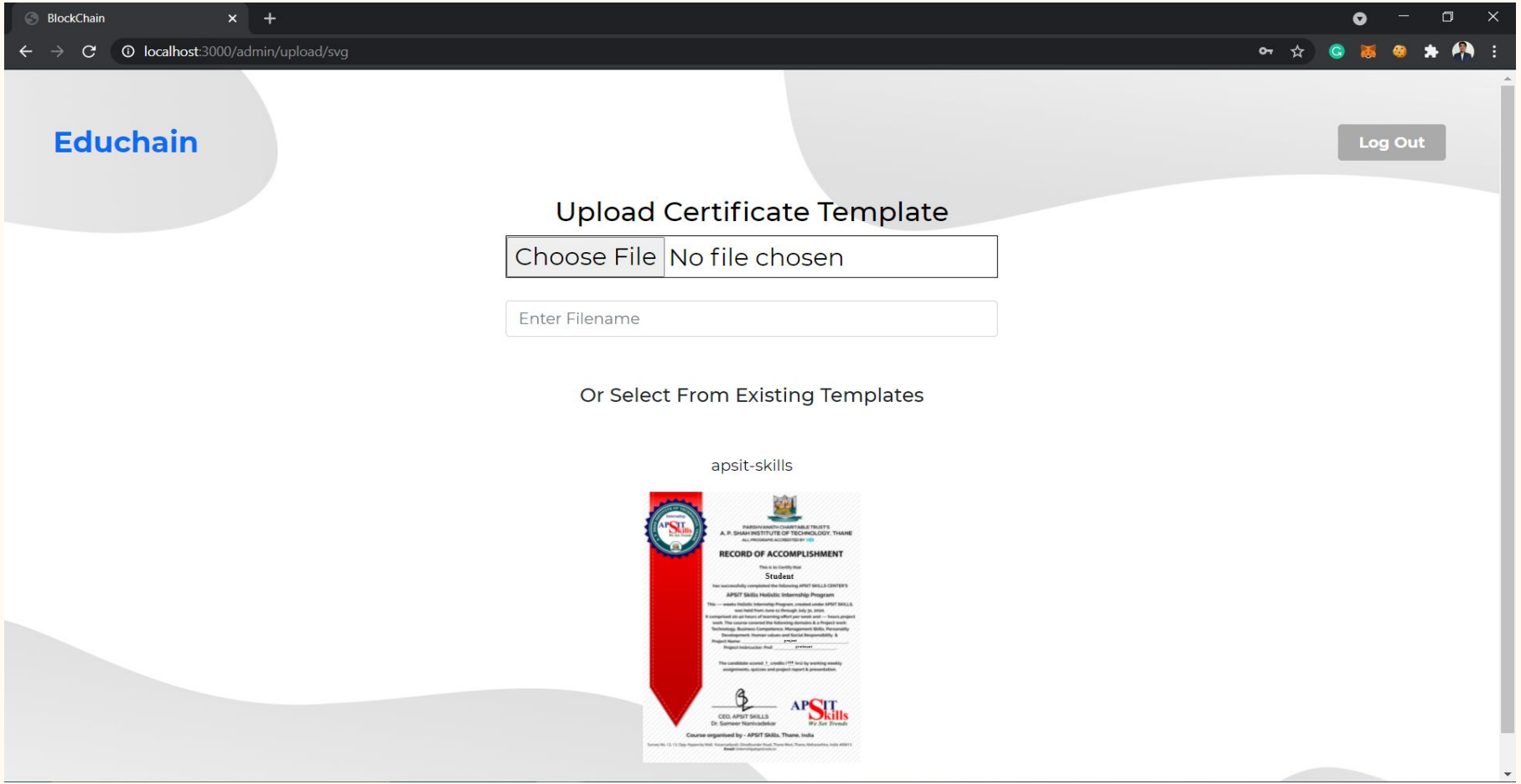
Registration Page:



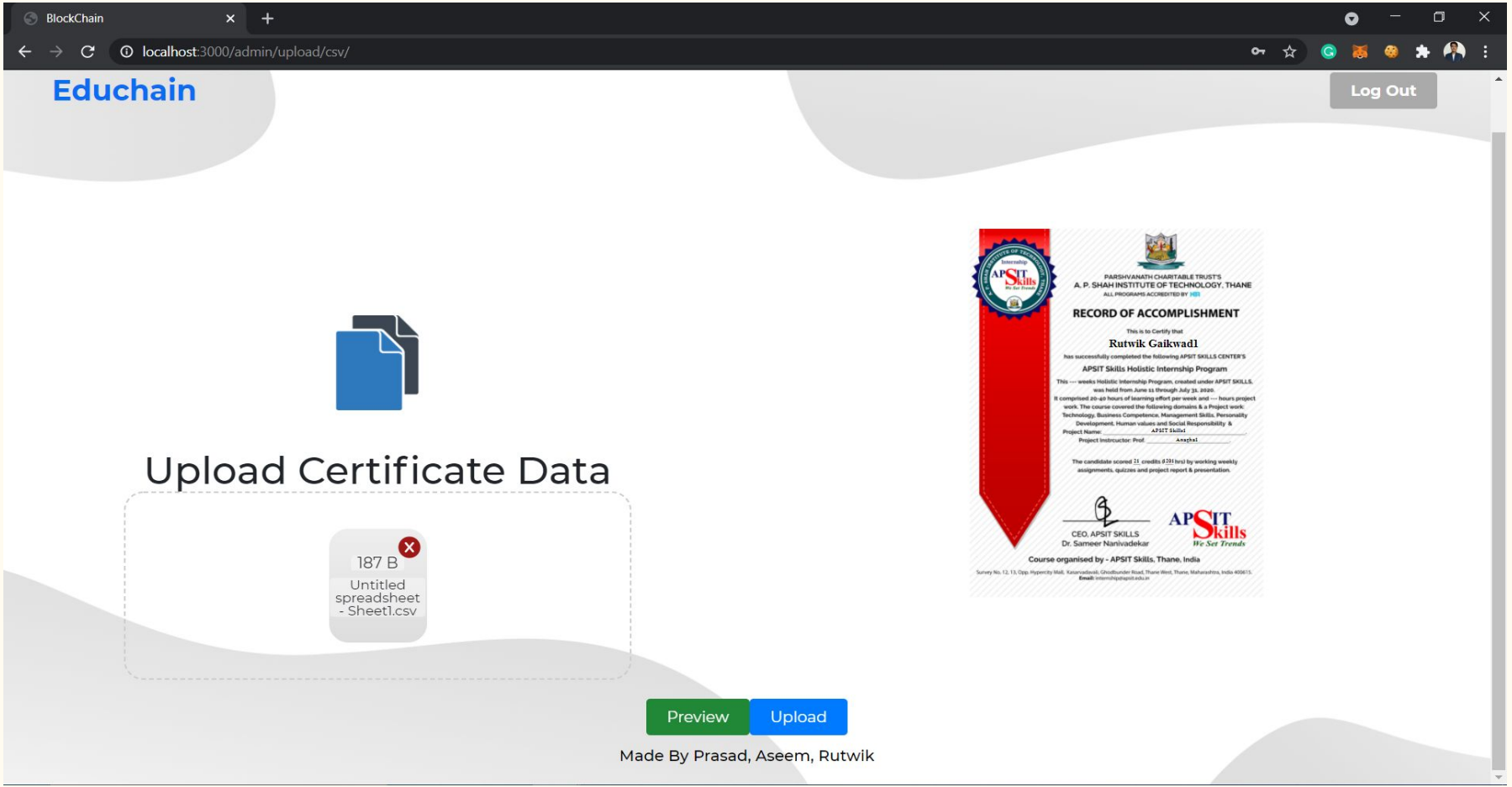
Login Page:


BlockChain
localhost:3000/login
Educhain
Login
Email address
Enter email
We'll never share your email with anyone else.
Password
Password
Login as Admin (Toggle if Admin)
Don't have an account? Click here to create one!
Submit

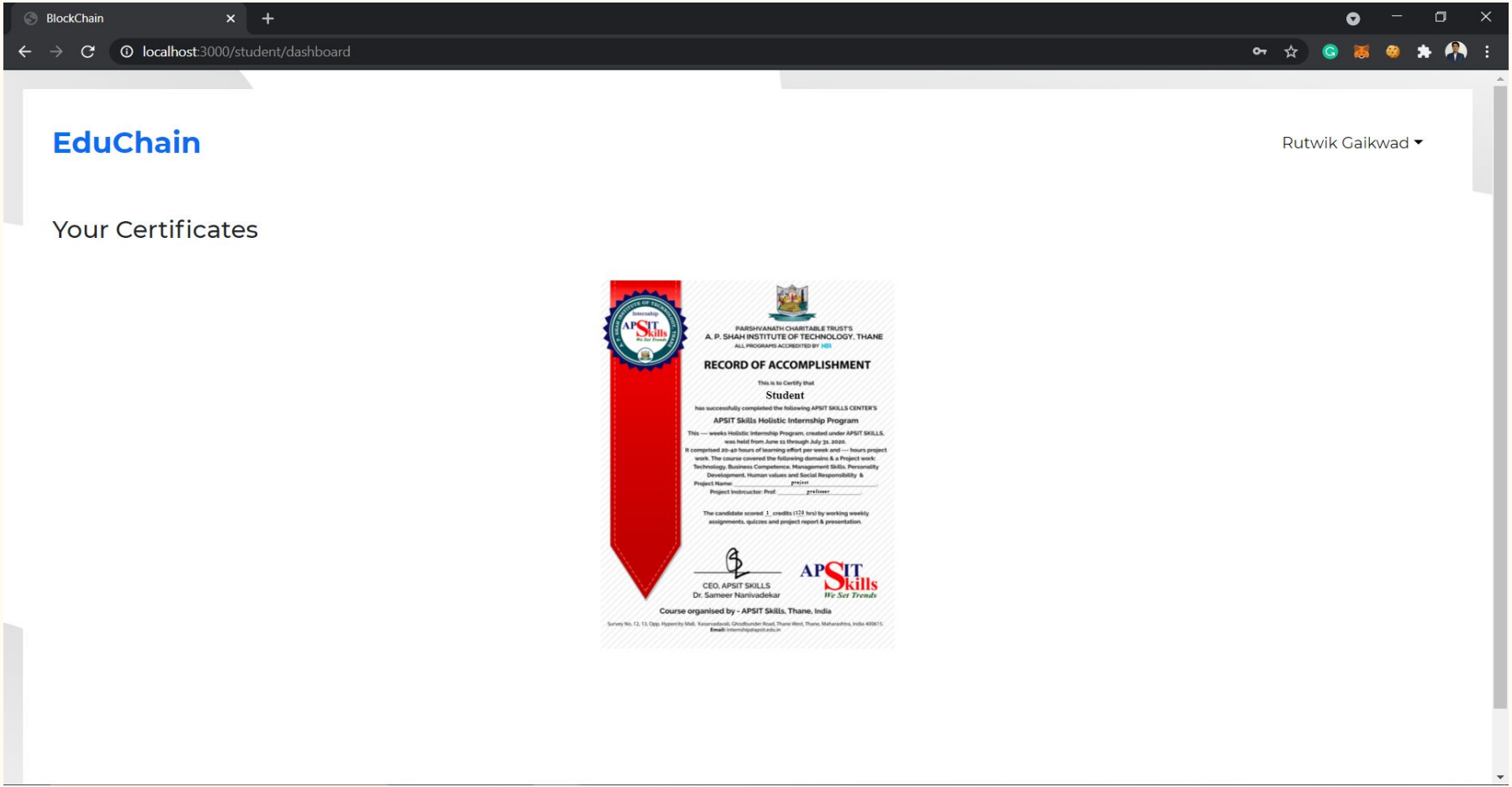
Admin portal to add certificate template:



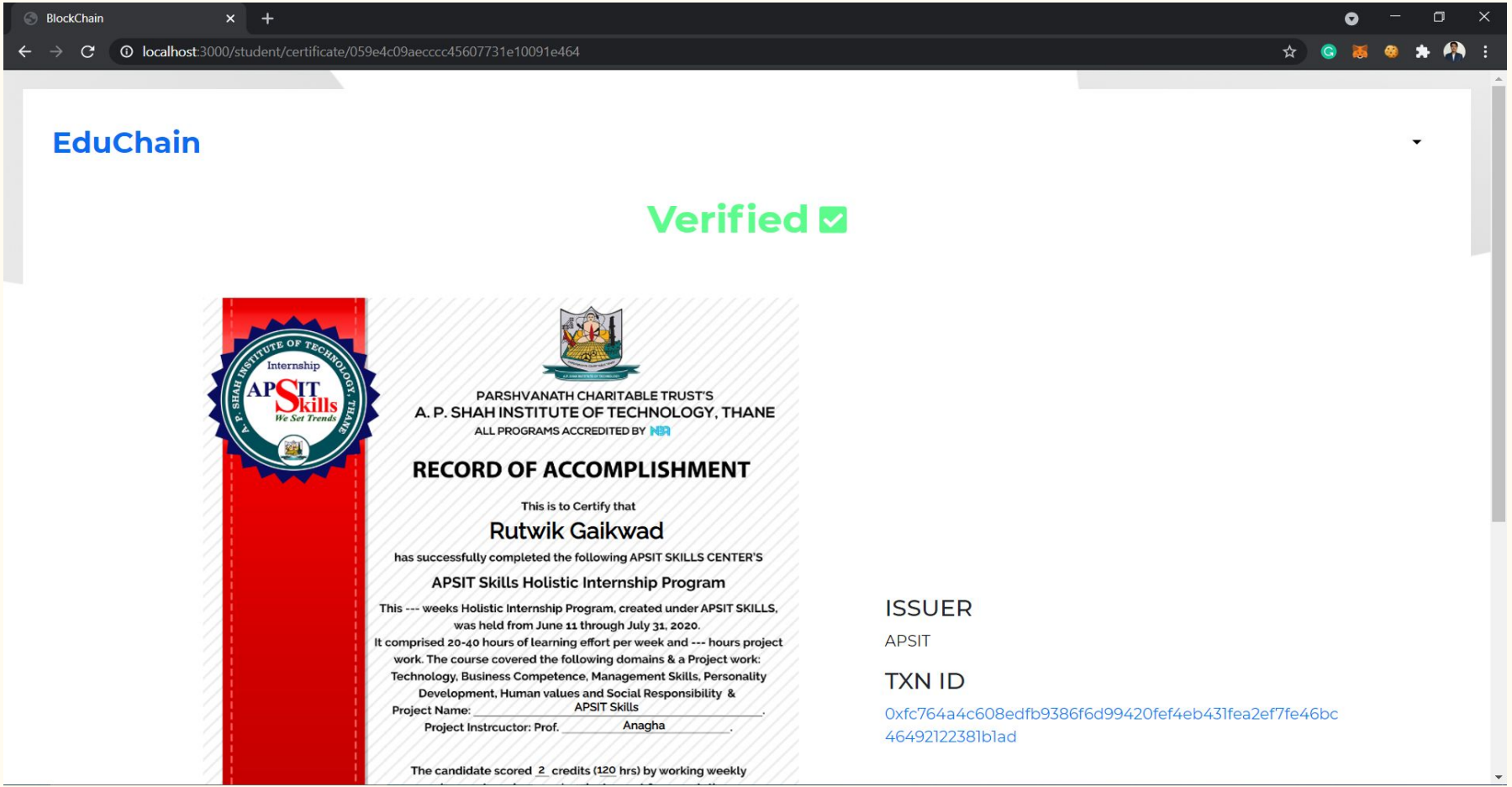
Admin portal to add CSV file and view preview of the certificate:



Student dashboard to view his/her certificates:



Verified certificate:



6. Conclusion and Future Scope

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.

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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