Team Number: JAPE009

Project Title: Acredemic-chain

Project Type: Invention

To our best knowledge and after thorough literature research, as at <u>2022/2/22</u>, there <u>are</u> / are no* similar works. If there are, the reference links are as below:**

https://registry.hkust.edu.hk/verify/upload

The enhancement our project has made for the existing related products or research is summarized as below:

Acredemic-chain was not developed with the base of Blockcerts or other existing related platforms such that our system provides different features compared to the existing related products.

***Please delete if not applicable. HKSSPC values the originality of works. Students must conduct literature research thoroughly to ensure that their works are unique, and to list relevant reference materials to complement the research or invention.**

I.   Background

According to the 2019 HireRight Asia-Pacific Employment Screening Benchmark Report, 20.8% of job seekers provided fake academic qualifications in Hong Kong. However, the process of verifying job seekers' certificates one by one is rather tedious, complicated and time-consuming for employers. Some employers will blindly trust the job seekers' false qualifications, leading to a decrease in productivity.

Blockchains are chains of blocks linked together by cryptography, which makes it difficult to tamper with and more trustworthy. By creating Acredemic–chain, qualifications are issued and presented digitally on the same platform, reducing the use of hardcopy profiles which could be fake, and lowering the chance of employers being tricked.

II.   Objectives

We aim to tackle the problem of forged certificates presented to employers by job seekers.

III.   Methodology

With the use of HTML and JavaScript, we developed the front-end web application where users can log in, issue certificates or verify the integrity of them. As for the back-end blockchain system, JavaScript and node.js along with the crypto-js library that provides the hashing function is used.

As mentioned, blockchains are difficult to tamper with due to the use of cryptography to link the blocks together. Using this feature, we can use the blockchain to store qualification information, then others can check the information from the blockchain while knowing that it is real and trustworthy.

IV.   Design of Invention

In the Acredemic-chain system, there are three main roles: issuers, holders and verifiers. Issuers are authorized representatives of an official organization, such as an institution. They can issue certificates to holders of the qualifications, commonly students or awardees. These qualifications can be viewed and their integrity can be verified by employers with the role of verifiers. Acredemic-chain can play the bridge between all three roles, no matter sending the credentials to the holder, presenting them to the verifier, or letting the verifier trust the integrity of the credentials and the issuers.
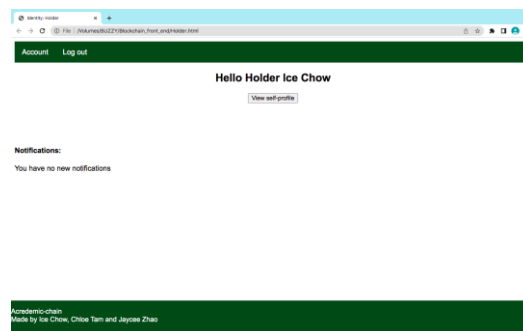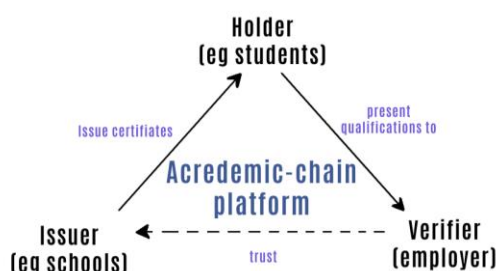
Left: Self-sovereign Identity (SSI) diagram; right: Acredemic-chain holder page
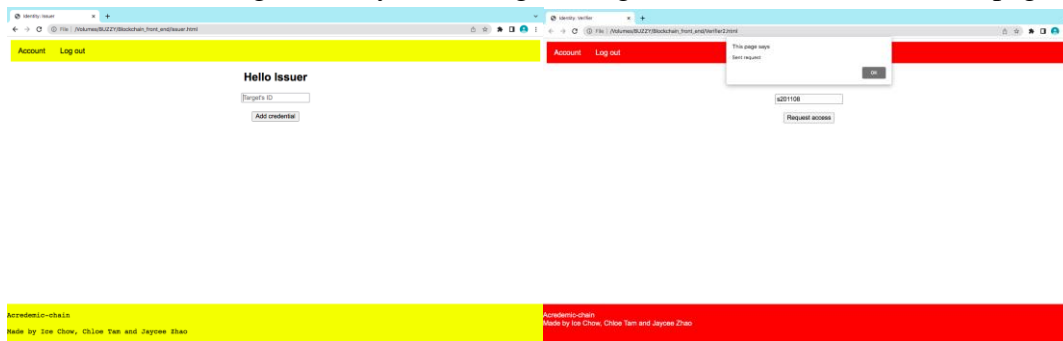
Left: Acredemic-chain issuer page, right: Acredemic-chain verifier page

In the blockchain of the platform, each block includes data including the qualification details, the issuer, the holder, the timestamp, the previous block's hash and the current block's hash. Hashes are calculated by the contents in a block. If data of a block is being tampered with, a new hash will be calculated to replace the old hash. After comparing hashes, it will be considered invalid. This makes blockchains and our platform more trustworthy.

V. Application / Market Need

Acredemic-chain can be used for institutions to issue certificates to holders, and for companies or employers to verify the integrity of job seekers' qualifications. It can help greatly reduce the number of job seekers presenting false qualifications to employers, raising the productivity, quality and integrity of labor in Hong Kong, or even internationally if it is promoted and used overseas. It can even be further used to store other information related to work experience or qualifications, such as certificates in construction or COVID-19 vaccine records.

Blockcerts from the Hong Kong University of Science and Technology is a centralized blockchain system only used for HKUST's own certificate verification and extra steps are needed to do so. Acredemic-chain has a more complete environment for issuing and verifying. Employers can complete all verification processes on the same platform, instead of visiting different organization websites one by one. The decentralization feature of Acredemic-chain makes it more trustworthy.

VI. Conclusion

We invited over 30 people with different careers, identities or from different fields like students, teachers and employers to test out Acredemic-chain. Around 96.7% of these potential users agreed that Acredemic-chain can solve the problem of forged certificates and make the working environment more fair for everyone, which are the main goals of the development of this platform.

Some also suggested further improvements to the platform. For example, a former Visual Arts student suggested adding a function enabling holders to self-issue their personal artworks as part of their profile, as they are part of art-related job selection criteria in the hiring process. A teacher suggested including a batch-issuing option for issuers to issue large quantities of certificates all at once by importing .csv files, as it could highly facilitate institutions' work.

✶ **Our project is developed based on our school's previous project and the enhancement is as below:**