Recruitment BloQs: A Blockchain Academic Record Based Recruitment System

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Abstract— **The recruitment process for tertiary education students and graduates is plagued by academic fraud and inequality. To address these issues, we propose a blockchain-based platform that allows universities and tertiary institutions to post information about individuals' education, and companies to post job openings. The system matches candidates with the appropriate education for the job, ranks them based on academic excellence, and presents them to the employer. The platform is built on blockchain technology, making it reliable and secure. It also provides a fair and equal opportunity for students and graduates to showcase their skills and qualifications while reducing academic fraud. The proposed system offers a reliable, secure, and fair way to recruit tertiary education students and graduates, making the recruitment process more effective and accessible for companies.**

Keywords: blockchain, recruitment, academic fraud, smart contracts, tertiary education.

I. INTRODUCTION

The current recruitment process for tertiary education students and graduates is plagued with various issues such as academic fraud, unequal opportunities, and discrimination. As a result, many students struggle to find suitable employment, and companies struggle to identify the right candidates for the job. To address these issues, this paper proposes a blockchain-based platform that allows universities and other tertiary institutions to post information about individuals' education, and companies to add job opening information. The system then finds candidates with the appropriate education for the job, puts them in order of academic excellence, and shows them to the employer. After that, the system allows the employer to send out interview invitations with links candidates can use to RSVP for the interview. All this information would be stored on a blockchain system, making it verifiable and valid. This paper discusses the proposed system, its features, and the benefits it offers to tertiary education students, graduates, and companies.

The use of blockchain technology in education and employment has been a subject of growing interest in recent years. The concept of using blockchain for education

verification was first proposed by Mougayar in 2016 [1]. Since then, several studies have explored the potential of blockchain in the education sector. For instance, Thakur and Singh [2] proposed a blockchain-based platform for issuing digital degrees and certificates. They argued that the use of blockchain technology can help eliminate fraud and ensure the authenticity of academic records. Similarly, Kshetri [3] proposed a blockchain-based system for tracking and verifying the skills of job candidates. The system uses smart contracts to ensure the accuracy and transparency of the candidate's credentials.

In addition to addressing issues of academic fraud and verification, blockchain-based systems have the potential to promote equality and reduce discrimination in the recruitment process. For instance, Kim et al. [4] proposed a blockchain-based platform that uses smart contracts to ensure that job candidates are evaluated based on their skills and qualifications rather than their personal characteristics such as race, gender, or age. Similarly, Ong et al. [5] proposed a blockchain-based system that allows employers to access a diverse pool of job candidates and track their progress through the recruitment process.

Considering these developments, this paper proposes a blockchain-based platform that provides a reliable and secure way to store and verify the academic records of students and graduates. The platform will bring equality to the recruitment process and reduce the amount of academic fraud, providing a fair and equal opportunity for students and graduates to showcase their skills and qualifications.

II. PROBLEM STATEMENT

The recruitment process for tertiary education students and graduates is often marred by academic fraud and inequality. Past research has highlighted the prevalence of academic fraud in student records and resumes, which can significantly impact the hiring process [6][7]. Additionally, students from less privileged backgrounds may face discrimination and unequal opportunities, even if they possess the necessary qualifications and skills [8]. Students may falsify their academic records or misrepresent their qualifications, making it difficult for companies to identify the right candidates for the job.

Similarly, students from less privileged backgrounds may face discrimination and unequal opportunities, even if they possess the necessary qualifications and skills.

To address these issues, this paper proposes a blockchain-based platform that provides a reliable and secure way to store and verify the academic records of students and graduates. The platform will bring equality to the recruitment process and reduce the amount of academic fraud, providing a fair and equal opportunity for students and graduates to showcase their skills and qualifications.

III. RELATED WORK

QualiChain as described in [9] is a Portuguese blockchain based application that is used to store diplomas issued by Higher Education Institutions (HEIs). It is used to combat counterfeiting and falsification. It provides an interface for hiring companies to check the authenticity of an applicant's credentials. It is an extension of an already existing system called Fenix which is an academic management platform that supports full program and course management, including the issuing of diplomas (essentially PDF documents that are printed, signed, and officially stamped).
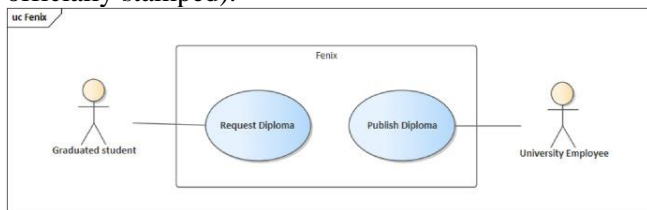

Figure 1: Use case definition of the Fenix system involving the Graduated student and the University Employee. The purpose is to specify the use cases of requesting and publishing the diploma.
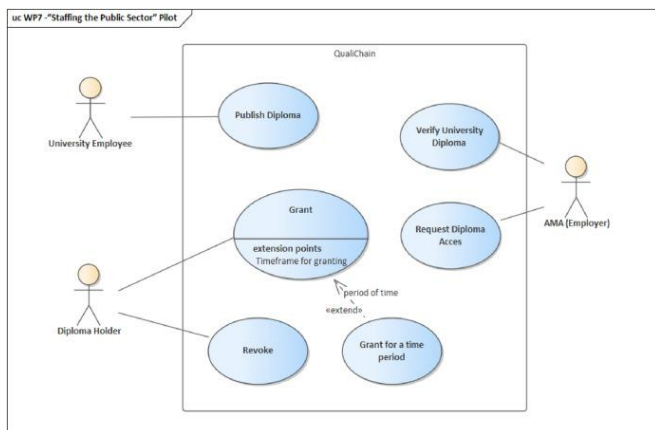

Figure 2: Use case definition of the QualiChain system involving the University employee, the Diploma holder, and AMA. The purpose is to specify the use cases of requesting, verifying, and revoking the diploma.

The blockchain of learning logs (BOLL) as proposed in [10] is a system that connects different institutions of learning and is used to transfer a student's records as they move between institutions. The system is used to keep track of a person's academic results and institutions attended in detail. It also solves the cold-start problem which is described as having a new academic record being created without being connected to the students' previous records.

The following 2 figures show how data is transferred between institutions outside the BOLL and on the BOLL respectively.
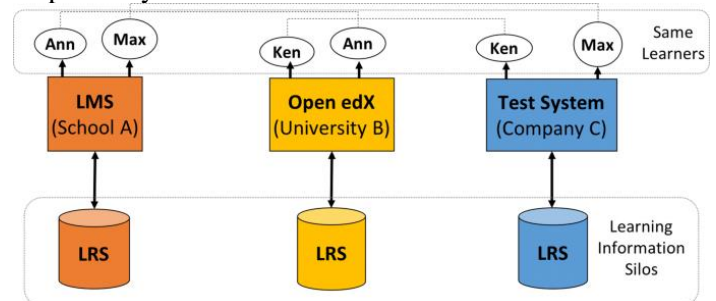

Figure 3: This shows an example of data movement outside the BOLL system. Consequently, user data is largely non-transferable across these learning systems even when the users want to.
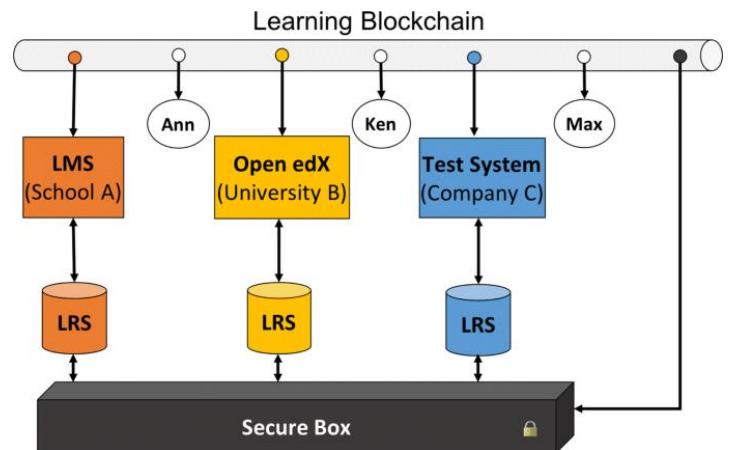

Figure 4: Proposed design of blockchain of learning logs (BOLL) from [10]. Our proposed idea of how learning systems should be designed to enable the ability for learners to manage their lifelong learning logs conveniently and efficiently.

IV. SOLUTION

To eradicate the problems of the current recruitment processes, I aim develop a blockchain based academic record platform for selection in recruitment for use by companies to find employment

eligible university students (current or past) with the following objectives:

- To develop a blockchain system to store relevant tertiary institute academic records and employment history records.
- To develop a system which can be used to verify any information pertaining to the skills and employment history of an individual.
- To develop a web platform for companies to find employment eligible university students (current or past)
- To develop a system that can map a student's proficient areas to an area of specialization for easier display to influence the decision making.

A. Features of the System

The proposed system will have the following features:

1. Blockchain-based platform: The system will be based on blockchain technology, which will make any information on it verifiable and valid. All academic records of students and graduates will be stored on the blockchain, making it easy for companies to verify their qualifications and skills.
2. Academic record storage: The system will contain academic records of students eligible to be employed as interns or those who have graduated in different fields. These records will be stored on the blockchain, making any information on it verifiable and valid.
3. Company registration: Companies must register with any of the tertiary institutes and browse through viable candidates in the field of the position they want to fill. Initially, companies will have only access to a student's academic results and the skills they possess.
4. Smart contracts: Using smart contracts, students will be able to determine what the recruiters get to see. This feature will allow students to maintain control over their academic records and prevent any sensitive information from being disclosed to recruiters.

B. Benefits of the System

The proposed system offers the following benefits:

1. Fair and equal opportunity: The platform will bring equality to the recruitment process and reduce the amount of academic fraud, providing a fair and equal opportunity for students and graduates to showcase their skills and qualifications.
2. Reliable and secure: The blockchain-based platform provides a reliable and secure way to store and verify the academic records of students and graduates.
3. Easy and effective recruitment process: The system will make the recruitment process easier and more effective for companies, providing them with a pool of professionals to choose from based on their qualifications and academic results.

C. Solution Architecture

The client-side of the web app is implemented using HTML, CSS, and JavaScript. The user interacts with the client-side of the web app using a web browser. The client-side of the web app interacts with the server-side of the web app using HTTP requests.

The server-side of the web app is responsible for interacting with the Ethereum network and smart contracts. It is implemented using a backend Python flask as the backend. The server-side of the web app interacts with the smart contracts deployed on the Ethereum network using a web3.py library.

The web app uses the following architecture:

1. User Interface Layer: The user interface layer is the client-side of the web app. It consists of HTML, CSS, and JavaScript. The user interacts with the web app using a web browser. The user interface layer sends HTTP requests to the server-side of the web app.
2. Application Layer: The application layer is the server-side of the web app. It consists of a web server and an Ethereum client. The web server receives HTTP requests from the user interface layer and processes them. The Ethereum client interacts with the Ethereum network and smart contracts.
3. Smart Contract Layer: The smart contract layer consists of the smart contracts deployed on the Ethereum network. The server-side of the web app interacts with the smart contract layer using the web3.py library.
4. Data Layer: The data layer consists of the data stored on the Ethereum network. The data is stored in a decentralized manner on the Ethereum network.

V. RESULTS AND FUTURE WORKS

A. Results

Figure 5: The interface of an individual's profile

The system performed well in allowing universities and tertiary institutions to post education information, companies to add job opening information, and finding candidates with the appropriate education for the job and the results are summarized in Table I.

TABLE I
OBJECTIVE ACHIEVED

Objectives	Fully achieved	Partially achieved
To develop a blockchain system to store relevant tertiary institute academic records and employment history records	✓	
To develop a system which can be used to verify any information pertaining skills and employment history of an individual	✓	
To develop a web platform for companies to find employment eligible university students (current or past)	✓	
To develop a system that can map a student's proficient areas to an area of specialization for easier display to influence the decision making	✓	
To develop a system which can be used to verify any information pertaining skills and employment history of an individual	✓	
To develop a web platform for companies to find employment eligible university students (current or past)	✓	

B. Future Works

Some potential areas of future work for the system could include:

1. Expanding the system to include additional types of educational institutions, such as vocational schools or certification programs.

2. Integrating with HR software to provide a seamless hiring process for employers.

3. Adding machine learning algorithms to improve the matching process between candidates and job openings.

4. Incorporating more advanced security measures for the blockchain storage system, such as multi-factor authentication and encryption.

VI. CONCLUSION

In conclusion, the proposed blockchain-based platform for the recruitment process of tertiary education students and graduates offers a reliable, secure, and fair way for students and graduates to showcase their skills and qualifications to companies. The platform provides a secure way to store and verify academic records, reducing the amount of academic fraud, and bringing equality to the recruitment process. The proposed system will provide a fair and equal opportunity for students and graduates to showcase their skills and qualifications and make the recruitment process easier and more effective for companies.

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