Design And Develop Certificate Validation System Using Smart Contract

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Abstract:

Blockchain is an emerging technology that has the potential to revolutionize the global industry and create a trusted relationship in a multi-party business network. Block-chain is one of the most stable open ledgers that preserves transaction information, and is difficult to forge. Since the information stored in block-chain is not related to personally identifiable information, it has the characteristics of anonymity. There are a number of practical use cases where blockchain has been applied. Throughout the educational course students receives various kind of performance certificates,score transcripits ,marksheets etc which can become an extremely important attribute for having admissions to new schools or new works. Due to anti-forge mechanism,its easy to make fake documents. To solve the problem of fraudulent certificates, the digital certificate system based on blockchain technology would be proposed. By the unmodifiable property of blockchain , the digital certificate with anti-counterfeit and verification could be made. Through the unmodifiable properties of the blockchain, the system not only enhances the credibility of various paper-based certificates , but also electronically reduces the loss risks of various types of certificates.

Keywords - Blockchain,Digital certificate,QR code, Hashing.

1.Introduction

Data Mining is the process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems. Data mining is an interdisciplinary subfield of computer science with an overall goal to extract information (with intelligent method) from a data set and transform the information into a comprehensible structure for further use. Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD. Aside from the raw analysis step, it also involves database and data management aspects, data pre-processing , model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization , and online updating. The term "data mining" is in fact a misnomer, because the goal is the extraction of patterns and knowledge from large amounts of data, not the extraction (mining) of data itself. It also is a buzzword and is frequently applied to any form of large-scale data or information processing (collection , extraction, warehousing , analysis , and statistics) as well as any application of computer decision support system , including artificial intelligence (e.g., machine learning) and business intelligence. The book Data mining: Practical machine learning tools and techniques with Java (which covers mostly machine learning material) was originally to be named just Practical machine learning, and the term data mining was only added for marketing reasons. Often the more general terms (large scale) data analysis and analytics or, when referring to actual methods, artificial intelligence and machine learning are more appropriate. Advances in

information technology, the wide availability of the Internet, and common usage of mobile devices have changed the lifestyle of human beings. Virtual currency, digital coins originally designed for use online, has begun to be extensively adopted in real life. Because of the convenience of the Internet, various virtual currencies are thriving, including the most popular—Bit coin, Ether, and Ripple the value of which has surged recently. People are beginning to pay attention to blockchain, the backbone technology of these revolutionary currencies. Block chain features a decentralized and incorruptible database that has high potential for a diverse range of uses. A blockchain is a growing list of records, called blocks, that are linked using cryptography.Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Block chain is a distributed database that is widely used for recording distinct transactions. Once a consensus is reached among different nodes, the transaction is added to a block thatalready holds records of several transactions. Each block contains the hash value of its last counterpart for connection. All the blocks are connected and together they form a blockchain. Data are distributed among various nodes (the distributed data storage) and are thus decentralized. Consequently, the nodes maintain the database together. Under blockchain, a block becomes validated only once it has been verified by multiple parties. Furthermore, the data in blocks cannot be modified arbitrarily. A blockchain-based smart contract, for example, creates a reliable system because it dispels doubts about information's veracity. Because information technology has developed rapidly in recent years, data protection is more necessary than ever. Graduates, whether they choose to continue studying or start job hunting, require various certificates for interviews. However, they often find that they have lost their educational and commendation certificates. Reapplying for hard copies can be time-consuming because certificates are granted by different organizations and in-person application may be necessary. By contrast, applying for an e-copy can save paper and time.

2.Literature Survey

"Mining Association Rules Based on Apriori Algorithm and Application"this research paper proposed bySHIWANG Pei-ji1 ,SHI Lin1 ,BAI Jin-niu2 , ZHAO Yu-lin in 2009. Mining association rules is importantindata mining research.Agrawal and R. Srikant in 1994 they submitted Apriorialgorithm.Apriori algorithm is one of the effective algorithm. Aimed at two problems of discovering frequent itemsets in a large database and mining association rules from frequent itemsets, some research on mining common itemsets algorithm based on the apriori algorithm and mining association rules algorithm are make based on enhance measure system. Mining association rules algorithm based on support, confidence and interestingness is enhance, aiming at creating interestingness useless rules and losing useful rules. The rules which are not used are cancelled and create more reasonable association rules. This method is used to mine association rules to the 2002 student score list of computer specialized field in some of university of science and technology.[8]

"Educational Data Mining: A Review of the State of the Art" this research paper proposed by Cristobal Romero, Sebastian Ventura in 2010.Educational data mining (EDM) is an emerging interdisciplinary research area. This area deals with the development of methods. Thos Methods explore data originating in an educational context. Educational data mining uses computational approaches .computational approaches help to analyze educational data in order to study educational questions. In this paper it introduces Educational data mining and describes the different groups of user, types of educational environments, and the data [7] . It then goes on to list the most common tasks in the educational environment that have been resolved through data-mining techniques, and finally, some future lines of research are discussed.

"Electronic Voting Service Using Block-Chain" this research paper proposed byKibinLeeJoshua I. James,Tekachew G. Ejeta,Hyoung J. Kim in 2016, The focus on this paper is the potential availability of block-chain technology of other transactional uses[1]. Block-chain is one of the most stable open ledgers that preserves transaction information, and is difficult to forge. Since the information stored in block-chain is not related to personally identifiable information, it has the characteristics of anonymity. Also, the block-chain allows for transparent transaction verification since all information in the block-chain is open to the public.Strong robustness, anonymity, and transparency these characteristics are the same as the requirements for a voting system In this paper electronic voting system as an application of blockchain, and describe block-chain based voting at a national level through examples.

"Blockchain-Enabled Smart Contracts" this research paper proposed by Shuai Wang , Liwei Ouyang, Yong Yuan , Xiaochun Ni, Xuan Han,and Fei-Yue Wang in 2018. [10]The main aim of this paper is to show an overview of smart contract research, including the operating mechanism, basic framework, application scenarios, challenges, recent progresses, future trends, etc. smart contracts can be defined as the computer protocols that digitally facilitate, verify, and enforce the contracts made between two or more parties on blockchain. As smart contracts are typically deployed on and secured by blockchain, they have some unique characteristics. First, the program code of a smart contract will be recorded and verified on blockchain, thus making the contract tamper-resistant. Second, the execution of a smart contract is enforced among anonymous, trustless individual nodes without centralized control, and coordination of third-party authorities. Third, a smart contract, like an intelligent agent, might have its own crypto currencies or other digital assets, and transfer them when predefined conditions are triggered

"Blockchain-based Real Estate market: one method for applying Blockchain technology in Commercial Real Estate Market" this research paper proposed by Sobhan Latifi, Yunpeng Zhang, Liang-Chieh Cheng in 2019. This paper shows the employment of blockchain in RE market and represent the facilities it can give to the RE market. Is possible to provide liquidity to RE market and remove middlemen– classical issues in RE.[11] For this, blockchain technology helps fulfil this plan by harnessing smart contracts. Also multiple benefits including de-risked asset with a stable price token in RE market is implemented that can be protected against manipulative actions of market bubbles. Other benefits will be process integrity, network reliability and longevity, faster transactions and lower transaction costs. To this matter, the shown system can benefit tenants, owners and investors all in a better way. And also, with an STO-like nature it can assure investors to budget on their future purposes.

"ArtChain: Blockchain-enabled Platform for Art Marketplace" this research paper proposed by Ziyuan Wang, Lin Yang, Qin Wang, Donghai Liu, Zhiyu Xu, Shigang Liu in 2019. The paper represents the ArtChain, which is a platform designed with registration, tracking, protection, and provenance for artworks enabled by blockchain technology. The proposed blockchain implementation and Experimental results shows that the system towards artworks can provide a complete blockchain-based solution with the property of irreversibility, authentication, traceability and transparency. Benefits of a Blockchain-enabled Art Marketplace *is* firstly, the artwork authenticity and traceable data can be simply achieved. Provenance is crucial when it comes to collecting art. Not having a record of the ownership history for a masterpiece often raises suspicion that it could be stolen or fake, hence a distributed ledger can be used to trace the transfer of ownership over a period of time. Secondly, royalty payment from the secondary market for artists can be achieved. Thirdly, Blockchain audit trail helps in detecting tax evasion and money laundering. This helps

primary market valuation, which is more difficult and more speculative than secondary market due to a lack of market history.[12]

3.Proposed System

Throughout the educational course students receives various kind of performance certificates,score transcripits,marksheets etc which can become an extremely important attribute for having admissions to new schools or new works. As schoolsmakevarious awards or diplomas, only the names of the schoolsand the students are input.Due to the lack of effectiveanti-forge mechanism, events that cause the graduation certificate to be forged often get noticed..In order to solve the problem of counterfeiting certificates, the digital certificate system based on block chain technology would be proposed.

4.System Architecture
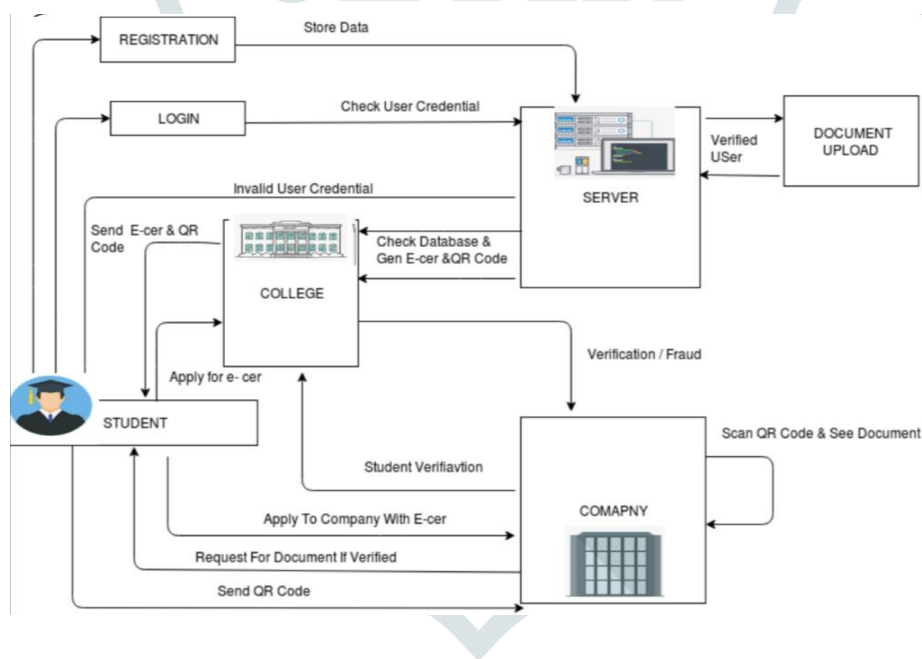
System is based on generation of E-certificate and QR code for students to digitizethe document verification system which will reduce the working time and increase thedigitization in educational field. First the schools grant a degree certificate and enter the student's data into the system. Next, the system automatically records the serial number of the student in a blockchain.

Then the certificate system verifies all the data.After that instead of sending conventional hard copies, schools grant e-certificates containing a quick response (QR) code to the graduates whose data have been successfully verified. Each graduate also receives an inquiry number and electronic file of their certificate. Then when applying for a job, a graduate simply sends the serial number or e-certificate with a QR code to the target companies.Then finally the companies send inquiries to the system and areinformed if the serial numbers are validated. The QR code

enables them to recognize if the certificate has been tampered with or forged.

5.Conclusion

Data security is one of the major features of block chain technology. Block chain is a large and open-access online ledger in which each node saves and verifies the same data. Using the proposed block chain-based system reduces the likelihood of certificate forgery. The process of certificate application and automated certificate granting are open and transparent in the system. Companies or organizations can thus inquire for information on any certificate from the system. In conclusion, the system assures information accuracy and security.

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