iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** XI **Month of publication:** November 2023

DOI: https://doi.org/10.22214/ijraset.2023.56714

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue XI Nov 2023- Available at www.ijraset.com

Blockchain and Smart Contract System for Digital Certificate

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Abstract: ***An millions of students Graduates per year. A student generates lots of certificates during their education. For further studies or Apply for job at any company requires these certificates. So sometimes student need these certificate on urgent basis. But according to university guidelines generating certificate process takes time. This problem is solved by Digital Certificate System. While recruiting employees in company, company needs to verify their certificate because issue of fake certificate is very common in India. Anyone can get fake certificate very easily. Many companies spend large amount of money on verifying this certificate. To overcome these problem Blockchain technology is used. Blockchain is decentralized distributed ledger. Blockchain is immutable in which no one can easily modify the data.***
Keywords: Digital certificate, Blockchain, Verification.

I. INTRODUCTION

In India, the fundamental shape of a student education system is going like Taking admission in kindergarten, after that taking admission to school For primary, secondary, and higher education studies. Now, after Completing higher studies students, want to get admission into Junior college. For graduation, there is one another time Changing of college. This is the fundamental cycle for student education system for years. Afterwards, a few college students pursue higher Research. So the main problem with this cycle is that a student need to Produce all his certificate for pursuing higher studies. This Poses a hazard of dropping and unfavorable the certificate. And it's might tedious for the validator to authenticate every certificate.

Because of this situation, An unwanted state of problem occurs i.e. Fake certificates issue. There are lots of hidden organization in our country who are selling fake certificates. So the problem of fake certificates occurs on large scale. But nowadays technology is also moved forward. Distinguishing between fake certificate and original certificate is possible. But for these distinguishing time requirement increase. For solving these problem blockchain comes into our life. Blockchain is used because the data in blockchain is immutable. By using blockchain we recognize the changes in seconds. So the system we are developing not only generates the certificate but also validate the certificate. So we are trying to develop the most effective system to solve both problems. As the world is now computerized, system stores the certificate digitally so student not need to worry about dropping or damaging the certificate. This proposed system brings very powerful solution.

II. PROBLEM STATEMENT

In present world, the problem of fake certificates is a very big trouble An thousands and thousands of students Graduates per year. A Student generates masses of certificates during their education. For further studies or apply for job at any company requires these certificates. So from time to time student need these certificates. But colleges also take time to produce these certificates in hard copy format. While recruiting any student in organisation, company needs to verify their certificates because fake certificates are commonly generated or purchased in India.So anyone can get fake certificates very easily. Many companies hires lot of employees or spend large amount of money on verification of these certificates. To solve these problem we have come with solution and i.e. Smart contract system for digital certificate.

A. Objectives

1) The primary objective of the digital certificate system is that to generate the certificate which are required to students for their further studies or working at any workplace.
2) To identify fake certificates very easily.
3) To develop a decentralized application which can generates the certificates which are incorruptible

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III. LITERATURE REVIEW

A literature survey for a smart contract system for digital certificate using blockchain would involve reviewing various research papers, articles, and projects related to smart contract system for digital certificate using blockchain

Rui Xie, Yuhui Wang, Mingzhou Tan, Gwanggil Jeon ,Wei Zhu, Zhongjie Yang, Jiaji Wu have described the various difficulties and prevention techniques which are required for managing certificates digitally[1]. This paper also proposes an idea to develop a decentralized application.

Alkhansaa Abuhashim, Chiu C. Tan have described this paper represents a one use case example to understand the blockchain concept easily. These paper also have the sample snippets of code to understand the concept deeply.[2]

Jiin-Chiou Cheng, Narn-Yih Lee , Yi-Hua Chen, Chien Chi Chen described a real time scenarios in which they described how data protection is important.[3] When any graduate starts the job searching and when he applies for any job verifying their certificate is very important task for any company. Our system easily helps to verify these certificates.

In case if student loss their certificates applying for another hard copy of certificate is very time consuming process. Our proposed E-certificate system can overcome these problem and also saves the time and paper.[3] A certificate uploaded on blockchain can never be stolen or modified by any person. Because these certificates are stored on different nodes so that no one can easily modify it.

Suvitha M, Subha R have proposed the Proposed study on blockchain based smart contract system[4]. Existing education system have traditional certificate generating procedure where it is very time consuming process. This paper presents an basic idea related to smart contract, Ethereum and various blockchain terminologies which helps us to develop our system.

Lin Chen, Zhimin Gao, Lei Xu, Nolan Shah, Yang Lu, Weidong Shi have proposed paper in which the concept of blockchain is explained in detailed manner[5]. Blockchains main feature is decentralization in which data is not stored on single server. In these paper detailed algorithm for blockchain smart contract is explained which helps to understand the concept of smart contract very deeply.

IV. SYSTEM ARCHITECTURE

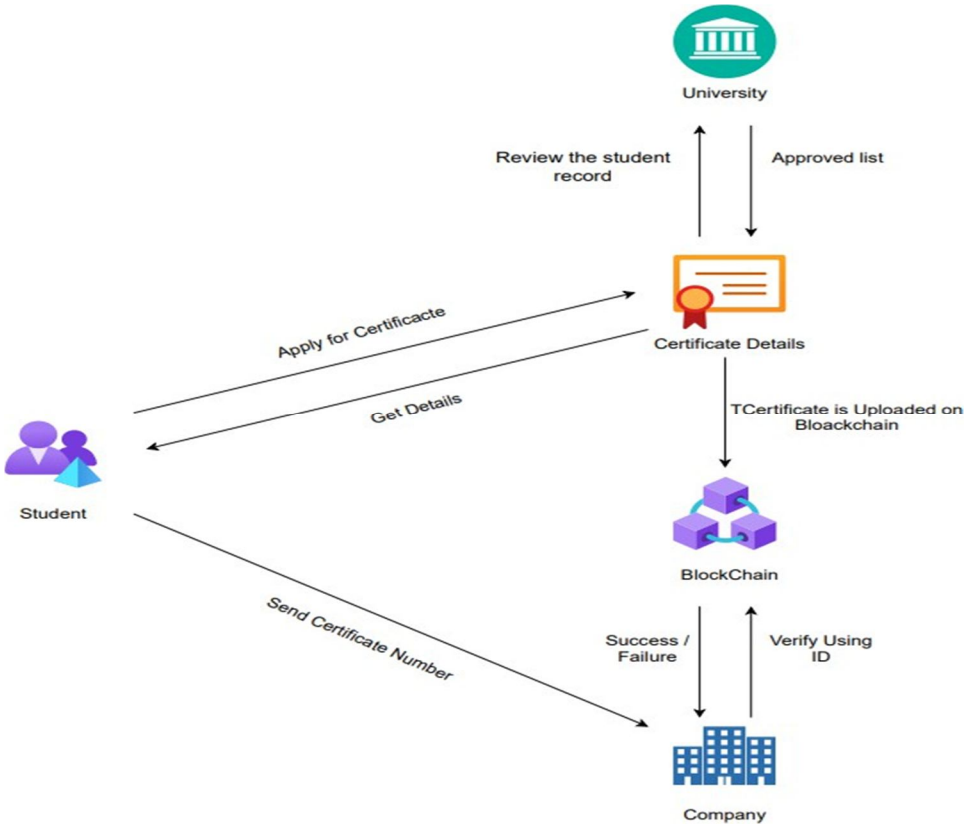

Fig.- Overview of the Proposed Architecture.

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A Blockchain and smart contract system for digital certificate typically consists of several components and follows a specific system architecture. Here's an overview of the key components and their functions:

1) *Student:* The system process starts by login into the system. Student and admin are responsible for login process. After successful login student can be directed to the proposed system.
2) *University/Colleges:* Before generating certificate, student details needs to be verified. These details include the academic details, fee details, Library details etc. After the details get verified by these entity student can be able to apply the certificate successfully.
3) *Certificate Details:* After the verification of student data the university/college generates approved student list. In these list students who fulfills the criteria are included. Afterwards the details for generating the certificate were asked to students.
4) *Blockchain:* Blockchain technology plays an very important role in our system. It is main foundation of our project. Blockchains main feature is decentralization and immutable. Here no one can easily modify the data. So the issues related to certificate verification gets solved.
5) *Ethereum:* It is main part of blockchain which is like operating system. It is used to deal with functionality of smart contract. It is mainly used to develop application related to blockchain.
6) *Ethereum Virtual Machine (EVM):* It used to design smart contract agreement.
7) *Smart Contract:* It is piece of code where instructions are written in fixed formats. It is immutable piece of code which cannot be changed by any outsiders from network. It is deterministic.
8) *Solidity:* A solidity is language which helps you to easily develop and compile smart contracts code.It is high level language used to develop smart contracts.
9) *Company:* These entity verifies the certificate of student which are uploaded on blockchain.

V. PROPOSED OUTCOMES

The proposed outcomes of a smart contract system for digital certificate using blockchain is summarized as follows:

1) The system should be capable of verifying fake certificates very easily while recruiting students in the company
2) The primary objective of the system is to make decentralized blockchain based application which helps us to generate and verify the certificates within less time.

VI. CONCLUSION

Nowadays data security is main issue in every field. Data is security is one of the essential and most used function of blockchain technology. Blockchain is a distributed ledger where each node participates in transaction and also verifies that transaction. Our proposed system reduce the probability of certificate forgery. These system helps to build digital certificate and saves time and paper. In conclusion our system achieving accuracy and protection and also validating the digital certificate.

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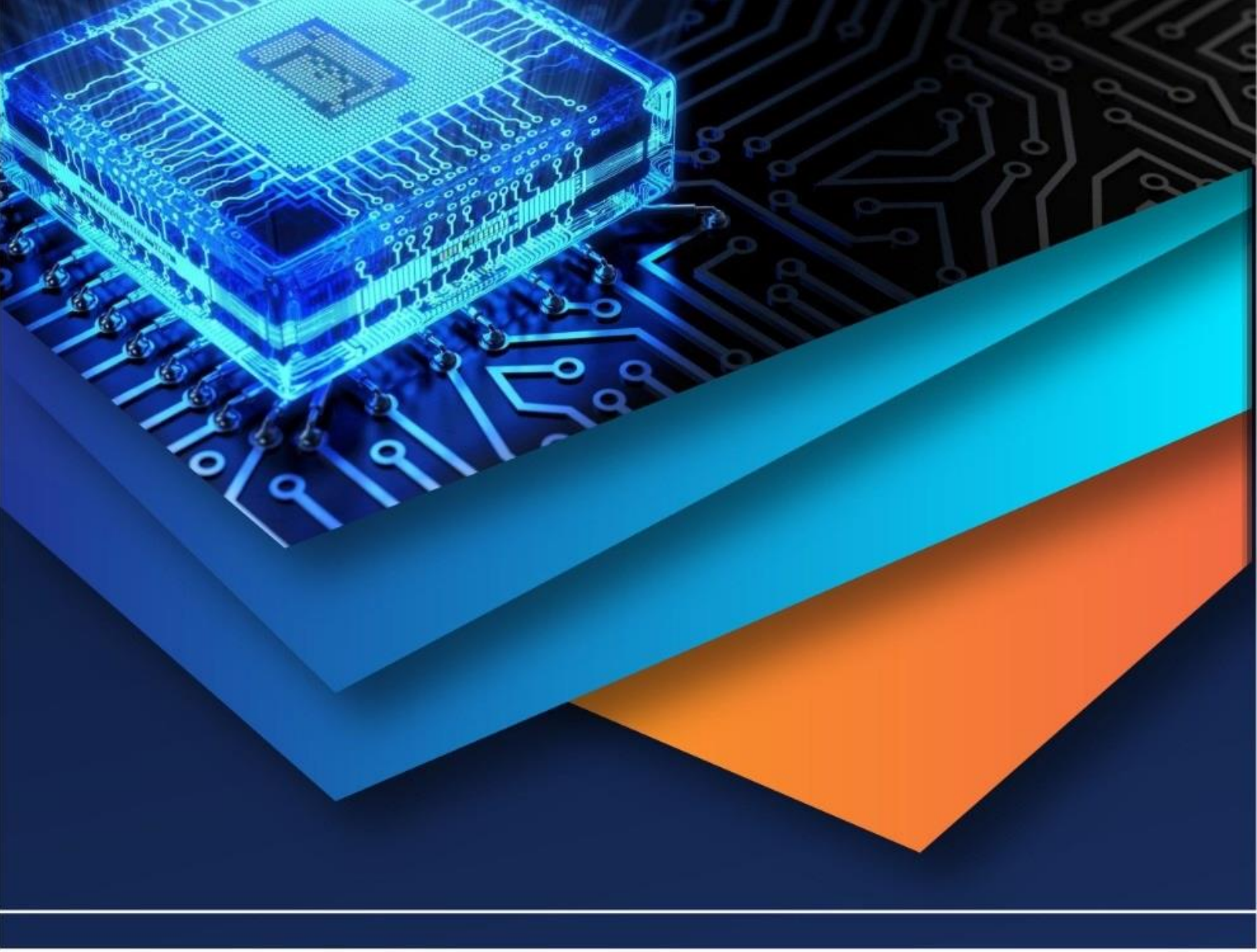

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