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Skill Verification System using Ethereum

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Abstract: ***Verifying skills is one of the major challenges in hiring new personnel. Companies and academia occasionally struggle to identify a candidate's talents because the credentials abilities that a candidate claims are not immediately verifiable and expensive for examine. For tamper-proof data storage, Blockchains have been proposed in the literature and decentralized talent verification. However, the majority of these schemes center on storing credentials are issued through regular universities for the blockchain. From several solutions that take system of certification itself into consideration, issues like numerous times, issues like (a) scaling with a small staff, (b) homogeneity of scores across numerous evaluators, or (c) extracting sincere effort from the evaluators are unaddressed. We suggest SkillVio, a blockchain-based platform that takes into account the above listed problems. and provide a number of enticing traits. As payment from platform users, such as test takers and employers, the network rewards graders with tokens.***

Keywords: Skill verification, blockchain, Verification

I. INTRODUCTION

A blockchain-based method for competence verification could expedite the process .Verification of skills and competency while also encouraging more trust in the organization's management of competencies and skills. A worker can have their skills documented using blockchain. On a network that is available, vetted by their previous bosses, and approved employers. A skill chain built on the blockchain enables us to have complete faith in a worker's skills, experience, learning objective progress, and level of proficiency. We can also view openly who has given the employee's abilities a recommendation. Massive open online courses (MOOC), the driving force behind the rapid development of online education, have, however, experienced unheard-of growth.In order to succeed, it needed a number of the traits shared by the blockchain, most noticed is (i) absence of the central authority and (ii) verifiable certificates. Need-based skills must be certified in order to meet today's skill certification criteria, which might be difficult to learn in the normal university system.

The requirement for blockchains in education has grown in order to close this gap and provide skill certification on demand. This need is also emphasised in the policy report from the European Commission, which notes that open blockchain implementations are till now in the early development stages and calls on the EU to collaborate with Member States to consider creating and promoting a designation for "open" academic records that adheres to the values of recipient ownership, vendor independence, and decentralised verification. The majority of the research on using blockchains in education is focused on managing certifications that are given by recognised organisations. Alammary et alstudy 's found that about 41% of the papers that were carefully surveyed covered this subject. Finding the ideal instructor and evaluators who can certify candidates' skills, however, is a crucial barrier to skill certification. This proves to be a challenging endeavour because it hasn't been much research on the quality of certifications or the effectiveness of assessors in this area. In this study, we investigate what assurances about certification quality might be provided to the various actors in the education blockchain network using an incentive-based strategy.

Universities now grant academic degrees in a variety of subjects. In this respect, a credential is a certified document issued by the university in lieu of the graduate successfully and satisfactorily completing the requirements of an educational programme, earning the graduate the degree or diploma. Therefore, the candidate is qualified and these credentials are produced as evidence of their graduation wherever it is required for the majority of fields.

II. LITERATURE REVIEW

Blockchain-based Decentralization of Credential Verification System Students obtain their course credits in the form of a certificate from the relevant university after successfully finishing their study. A student must show their documents to the hiring manager or the necessary authorities when looking for a job or further study. As a result of the system's current centralization, all of the data is kept on a server that is susceptible to hacking and could lose data in the event that the system fails.

However, because human resources are involved in validating the candidate's information from their university, confirming a certificate by authorities is a time-consuming process.

Today, credentials and certificates are commonly falsified because of technological improvements and the mass distribution of efficient software. Since there were no anti-tampering measures in place, situations where phoney degrees were commonly found occurred. Furthermore, if certificates are lost, it takes a long time to find duplicates and have them issued by the institution. The adoption of blockchain technology in this process will decentralise the system because every node in the network has access to the entire chain and the blocks are cryptographically related. As a result, the proposed decentralised system uses blockchain technology and includes every element required to build a DAPP. The majority of the research on the use of blockchains in education focuses on the management of certifications issued by recognised organisations. According to a survey by Alammary et al., this topic was covered in nearly 41% of the papers that were rigorously surveyed. Nevertheless, finding the appropriate trainer and assessors who can vouch for candidates' abilities is a significant barrier to skill certification. This is a difficult endeavour because there hasn't been much research done in this area on the effectiveness of assessors or the calibre of certificates. In this research, we study what assurances may be provided regarding the quality of certifications using a system of rewards for the different participants in the education blockchain network.

A brief overview of how blockchain technology might be used to address various difficulties in education was offered by the authors of this paper. A number of industries, notably the banking sector and digital currencies like Bitcoin, Ethereum, and Zcash (Zerocash), are currently using blockchain technology.MThe first blockchain-based peer-to-peer electronic cash network is Bitcoin.

This article explores the potential benefits of blockchain technology for education, including improved student assessments, better access control, greater accountability and transparency, identity authentication, increased trust, more efficient student record management, support for learners' career decisions, and increased interactivity.

Therefore, the information for experience of research, abilities, online learning experience, and the personal interests, are in the informal learning environment. These data can be properly accessed and safely kept on a blockchain network.

III. PROPOSED METHODOLOGY

It provides information on the development technique used to plan for and finish this project. The methodology is a set of methods used in a particular sector of research activity, and it can be described as a specific procedure or a group of procedures.

A. Models Used

1) Blockchain

According to the research , the digital money known as Bitcoins uses blockchain technology. The Satoshi Nakamoto group created this technology to address the issue of double spending. Data sharing is made possible via blockchain, a decentralised, transparent distributed public ledger. A cryptographic hash of the block before it, a time stamp, and the data it contained make up each block on the blockchain. The data saved in a blockchain are intrinsically resistant to alteration because the cryptographic hash exists. If a data block is changed, all subsequent blocks should be created with fresh hash values. A few characteristics of blockchain technology include decentralisation, immutability, data security, and transparency.

2) ETHEREUM

Ethereum is an open source operating system and blockchain-based computing platform with smart contracts. Ethereum would be the global computer system if the Bitcoin blockchains were thought of as the world's electronic cash system. The three main properties of Ethereum are permanence, security, and incorruptibility.

Decentralised blockchain platform Ethereum establishes a peer-to-peer network to securely execute and validate application code, also referred to as smart contracts. Participants can carry out transactions with one another using smart contracts without the assistance of a trustworthy central authority.

3) SMART CONTRACT

An application that operates on top of a blockchain and has a set of guidelines that the parties to the contract agree to follow while interacting with one another is known as a "smart contract. The programming language Solidity, which is comparable to JavaScript, is used to create smart contracts in the Remix IDE. This enables the contract to be installed using Metamask and Web3.js injection on the blockchain.

Smart contracts allow for trustworthy transactions and agreements to be created between dispersed, anonymous individuals without the requirement for a centralised authority, a legal system, or an external enforcement mechanism.

4) Database Using Mongodb

The open-source database MongoDB makes use of an unstructured query language and a document-oriented data model. One of the most powerful NoSQL databases and systems currently on the market. global aspects of availability. A cloud-based database for contemporary apps called MongoDB Atlas. The use of best-in-class automation and tried-and-true approaches has made it possible to install fully managed MongoDB across AWS, Google Cloud, and Azure. It also ensures scalability, availability, and adherence to the highest standards for data security and privacy. MongoDB Cloud is an integrated data platform with a global cloud database, search, data lake, mobile, and application services.

5) Software Requirement Proprieties

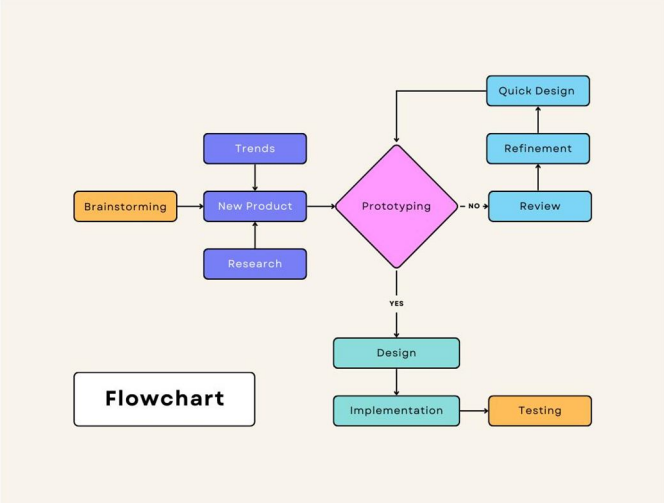
For the web applications outside of the browser of client, there is an open-source, cross-platform runtime environment and library for JavaScript : Node.js.. Its most recent version, number 15.14, was released in April 2021. Ryan Dahl created it in 2009. Node is a programming language utilised by developers. The JavaScript Engine in Google Chrome serves as the foundation for the server-side Node.js platform. v0.10.36 is the most recent version, which was made in 2009 by Ryan Dahl. Open source server-side and networking applications can be created using this cross-platform runtime environment. The Node.js runtime is used to execute JavaScript-written Node.js programmes on Linux, OS X, and Windows systems. Moreover, Node.js comes with a big library of JavaScript modules, which greatly simplifies the process of developing Node.js web apps.

The free open-source text editor Visual Studio Code, also referred to as VS Code, was built by Microsoft. VS Code works with Windows, Linux, and macOS platforms. VS Code has recently risen to the top of the list of preferred development environment tools, despite the editor's relatively light weight and inclusion of a few advanced features.Java, C++, Python, Go, CSS, and Dockerfile are just a few of the programming languages that VS Code supports. You may also add additional VS Code extensions, such debuggers, code linting tools, and support for cloud and web development. The VS Code user interface encourages a great deal more participation as compared to other text editors.

Truffle is a top-notch programming environment, testing framework, and asset pipeline for blockchains operating on the Ethereum Virtual Machine (EVM) with the aim of streamlining the work of developers. Throughout the entire lifecycle of their projects, Truffle empowers developers regardless of whether they decide to build on Ethereum, Hyperledger, Quorum, or one of the continuously growing list of additional supported platforms. When paired with Ganache, a personal blockchain, and Drizzle, a front-end dApp development kit, the complete Truffle toolkit seeks to become an end-to-end dApp development platform.

The software wallet MetaMask allows users to communicate with the Ethereum blockchain. By providing users with access to their Ethereum wallet through a browser extension or mobile application, it enables them to engage with decentralised applications. MetaMask was developed by ConsenSys Software Inc., a blockchain software business that specialises in Ethereum-based infrastructure and tools. Through a suitable web browser or the built-in browser of the mobile app, users of MetaMask can securely connect to decentralised applications, broadcast transactions, send and receive Ethereum-based money and tokens, and save and manage account keys.

6) Flow Chart



IV. RESULT ANALYSIS

Online test and management system powered by blockchain The existing online test service just prioritised ease and did not provide a way to guarantee dependability. Current online test services, which use centralised server administration and storage solutions, won't be able to keep up with such systems in the event of physical or SoF (Single-point of Failure) difficulties. This study uses the CPABE (Ciphertext-Policy AttributeDependent Encryption) method to build an online test and management system. Depending on the user attribute, CPABE creates a "Access tree" to encrypt the data.

The system management, examiners, and examinees are represented by the nodes that make up the private blockchain network, each of which has a different level of power.presenting a reliable blockchain method to protect and validate graduation credentials In some ways, education is the engine that propels the development of the entire civilization. Sincere degree applicants will use their abilities and expertise to benefit society. However, the issue of false credentials is unsettling and worrisome. It has been common in a variety of formats, including replicas supported by database manipulation and paper-based fake certificates, and its frequency has increased in the modern digital era. In this case, it is advised to use a blockchain-based overlay system to store legitimate certificates digitally and instantaneously verify them as needed.

In addition to giving the current certification system a tamper-proof cover, the suggested approach assures that online certifications are available in a permanent format for future use.reference after they have been confirmed. To prove the validity of the suggested strategy in the Ethereum test network, a prototype of a blockchain-based credential security and verification system has been created. It is a secure and useful alternative to the current online credential management system, according to the implementation and test results.

The work's main objective is to draw attention to issues such as fake degrees, duplication in document verification procedures, a lack of certificate authentication in the current education sector, and a lack of a single authorised identity for students and find solutions using blockchain features such as decentralisation, immutability, traceability, and consensus mechanisms. Because of its distributed structure, blockchain eliminates the need for middlemen between educational institutions, businesses, and students. Only authorised data will be uploaded to the chain thanks to the consensus process, which also gets rid of the bogus certifications that frequently end up piling up on the employer's desk. The goal is to create a prototype to see if blockchain technology can be used to solve the aforementioned issues.

A few of the significant benefits that blockchain technology could bring to education include high security, low cost, improved student assessments, better access control, increased accountability and transparency, identity authentication, increased trust, more effective student record management, support for workers' career decisions, and improved learner interaction.

Additionally, the whole transcript can be produced using blockchain technology. This relates to learning goals and outcomes, as well as student achievements and academic credentials in the context of formal education. As a result, the informal learning framework incorporates data on research experience, skills, online learning experience, and personal interests. On a blockchain network, these data can be safely stored and appropriately accessible.

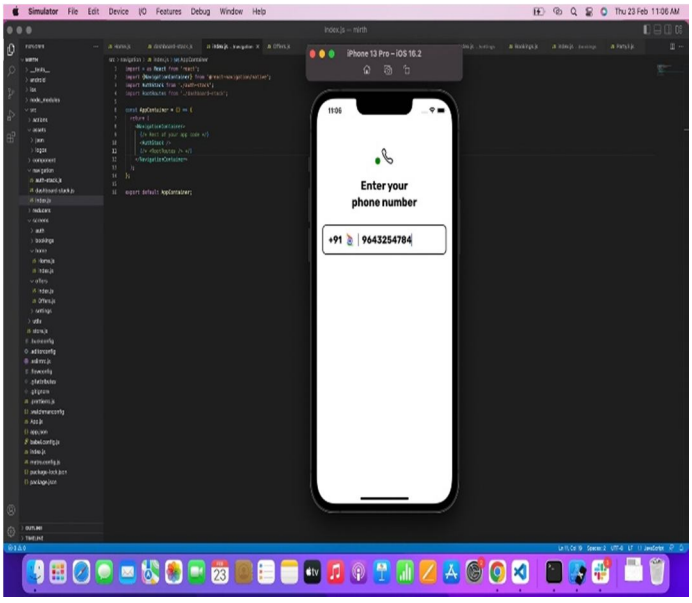


Fig: 4.1

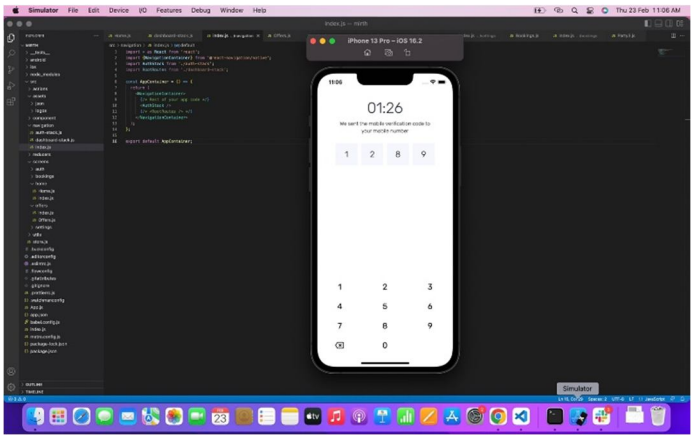


Fig: 4.2

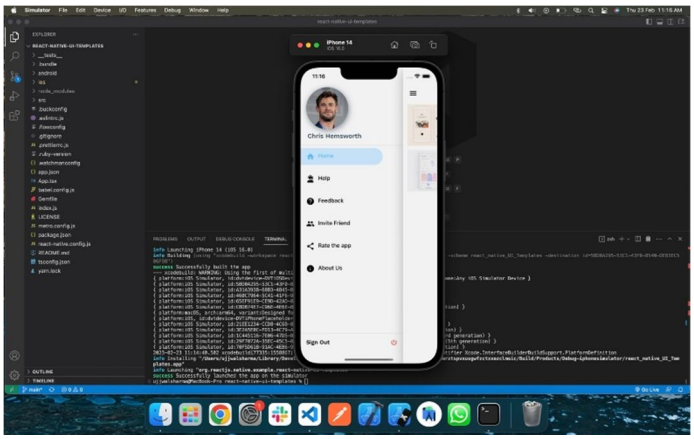


Fig: 4.3

V. FUTURE SCOPE

This network has the potential to be a component of a fully functional, blockchain-based universal identity system. The system can be viewed as a module that provides information on a person's education and can be expanded to incorporate that person's personal records and information. This network can serve as the foundation around which numerous applications are built. This network can be used to build educational social platforms that take full advantage of the system's advantages. This network can support a variety of these vertical applications. The following capabilities could be added to this platform to improve it: Integration of an all-in-one recruitment platform, skill proficiency tests, skill rating systems, and AI-based HR systems as well as on individual level job suggestions to individuals who are open to employment (Anonymous company review system for employees to give the company an understanding of the flaws in their departments)

VI. CONCLUSION

Documents proving applicants' educational qualifications for employment that attest to their academic accomplishments in the past are increasingly vulnerable to deception Official documents attesting to educational credentials are frequently falsified because many universities still provide these documents on paper. Furthermore, demands for authenticity certification are time-consuming because the university archive must be contacted. Furthermore, there is no assurance that dishonest staff won't falsify documents. In light of the higher education system's digitization and automation of management tasks, universities are consequently paying more attention to the integrity of data as well as its security and authenticity.

We suggest a state-of-the-art approach based on blockchain technology that enables higher education institutions to certify the veracity of documents and completely disclose academic results to interested parties. The proposed approach employs a single Progress smart contract and is built on the Ethereum blockchain consortium architecture to ensure that only universities with the appropriate access levels on the platform can record events relevant to their students.

To complete transactions on the blockchain, the identifiers of this off-chain database, which holds the essential data about the student and their academic success, are used. The strategy's objective is to lower transaction costs. We also offer methods for getting data from the blockchain database. Based on the previous assessment of transaction costs, we project the operational costs of our solution in terms of petrol for the entire higher education system. We can quickly and efficiently identify students and send information about their academic achievement thanks to our solution's quick transaction execution, according to an examination of the requirements for the blockchain system's functioning. The information is also restricted because a separate database was used and it was translated to the JSON format. According to the efficiency analysis, the suggested solution offers a great deal of potential for integrating blockchain technology into the higher education system at a cheap cost and with competitive advantages.

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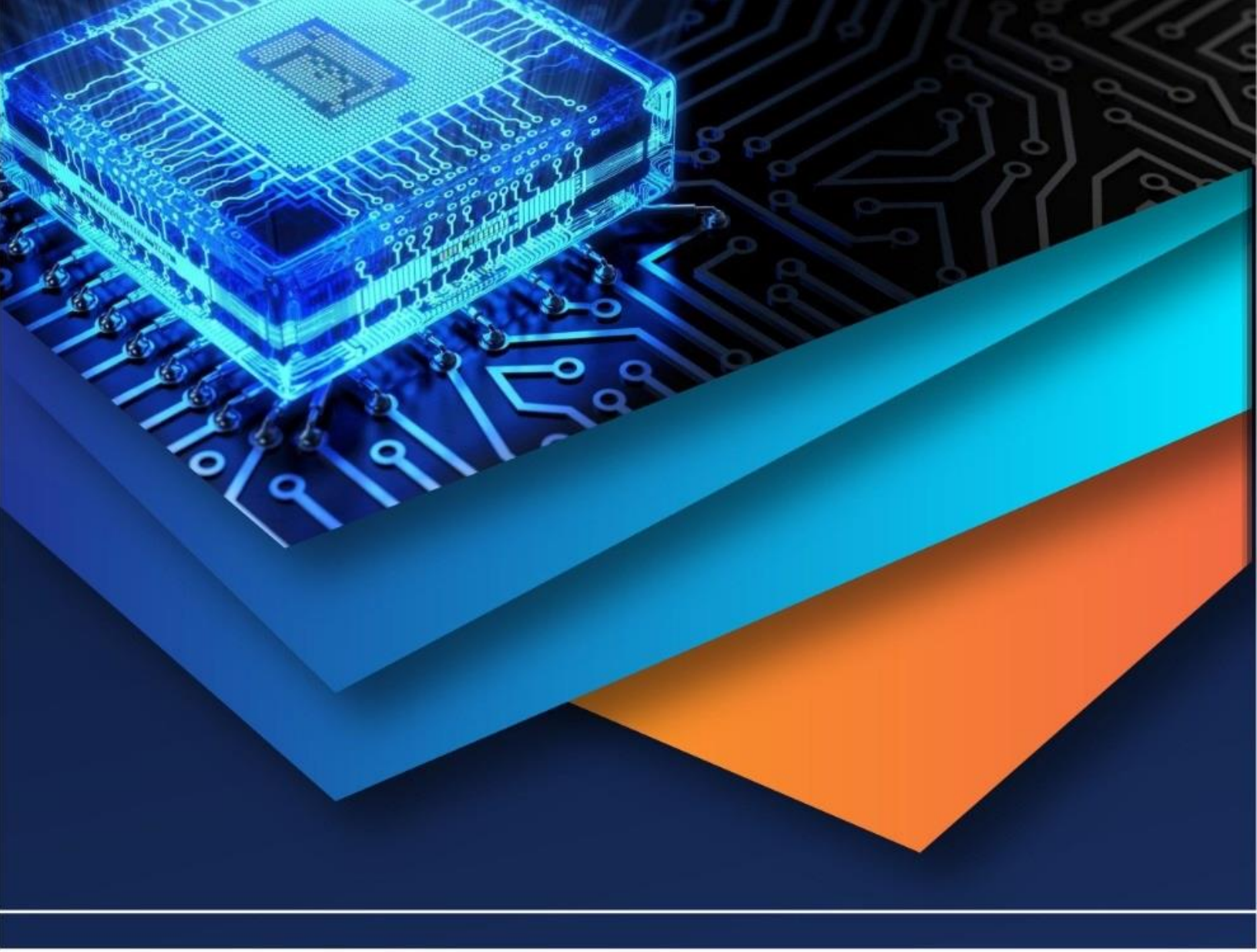

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