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Streamlining Credential Verification For Hiring Process With Blockchain Technology

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ABSTRACT

In the current landscape, both companies and educational institutions rely heavily on manual processes to validate student academic credentials, which can be susceptible to fraudulent verification through bribery or manipulation by employees. Some universities have attempted to address this issue by maintaining student credentials in centralized servers. However, these centralized systems are not foolproof, as internal database administrators can manipulate data, leading to potential security breaches and service disruptions.

To overcome these challenges, we propose a Blockchain-based student credential verification system. Blockchain inherently supports data verification, encryption, and distributed data storage. By storing data in a decentralized manner across multiple nodes, the system ensures resilience in case of node failures, providing uninterrupted services.

Index Terms— Blockchain Technology, Smart contracts, Ethereum, Python, Django.

I. INTRODUCTION

The process of credential verification has long been a crucial step in hiring, but it remains fraught with inefficiencies, delays, and the potential for fraud. Traditionally, employers rely on third-party verification services, which can take time, cost resources, and sometimes provide inaccurate or outdated information. With the increasing complexity of global hiring, the need for more reliable and efficient solutions has never been greater. This is where blockchain technology enters the picture. By leveraging its decentralized and immutable nature, blockchain offers a transformative approach to credential verification, ensuring that educational qualifications, certifications, work experience, and other credentials are secure, transparent, and easily verifiable in real time.

Blockchain's ability to create tamper-proof records makes it a perfect fit for verifying professional credentials. Each credential is stored as a digital record in a blockchain, which can be accessed by authorized parties in a secure manner, with all transactions being recorded in a transparent and immutable ledger. This eliminates the need for intermediaries, reducing costs and time spent on manual checks.

Furthermore, the decentralized nature of blockchain means that records cannot be altered or falsified without detection, offering a much higher level of trust compared to traditional systems. Employers can instantly access verified credentials from trusted sources, creating a smoother, faster, and more reliable hiring process. As a result, blockchain technology has the potential to revolutionize credential verification, offering greater accuracy, efficiency, and security in the recruitment process.

II. LITERATURE REVIEW

Streamlining Hiring Processes with Blockchain: A Case Study of Credential Verification in Recruitment.

This paper.

explores the application of blockchain technology in streamlining credential verification for hiring processes. It discusses the inefficiencies and security vulnerabilities of traditional verification systems, highlighting how blockchain can address these challenges. The study provides a detailed explanation on blockchain-based systems, showing that blockchain offers faster, more secure, and cost-effective solutions for verifying academic qualifications and professional certifications. The paper also discusses the potential benefits for employers, candidates, and educational institutions in adopting blockchain for credential verification.

III. METHODOLOGY

Our methodology for developing the blockchain-based academic credential verification system is designed to thoroughly assess its efficiency, reliability, and user experience. We utilize a quantitative approach, complemented by extensive system design documentation, including detailed architectural diagrams.



Fig. 1. GUI of the Streamlining Credential Verification for Hiring Process.

IV. HOW TO RUN

```

C:\Users\Admin\Desktop\Blockchain\hello-eth\node_modules\.bin\truffle develop
Truffle Develop started at http://127.0.0.1:9545/

> compile
(0) 0x5c5a12b386f7d8107b33b4f6d8194343b33f9
(1) 0x288c3f2f8917977d9a0b2d2c15c513814a48b7
(2) 0x6f12b0b0e0e0d2a272b2a2e329f5e5c5e04f
(3) 0x7e3470918a97910f76021028015de0271b53c
(4) 0x28c50bc4a0f7ee591a8c98e08597105c5f17a09
(5) 0xe080a0d1f0a9f7f4a5f9721cc752bfa8a8b2
(6) 0x14c01ab0a8c10f4d0d10d11f72f0a0d0e9e9ad
(7) 0x3414d87ab1c14f40b0b0e085de07993c27fc
(8) 0x75edc32f4d4f4b071c030b04f8553ff42918b02
(9) 0x26c15a13c42a7f8a0b17f91370258112f67689

Private Keys:
(0) 828b0a7e011346a36f79f08ec15307555ac77b6359a210f7b27e932e86a
(1) 34669b04a4de04b08de05080bced7e143e5fd7d072933c79602115080890
(2) 1c1c8f6d0120307854d0b7a070e3a2205dcfca3006a7f1de64591f3b59
(3) f7f0e03a0c02a3a131f0ec06f4d0b130a2af7fca7f403132000cd
(4) d5067137136908a40ffffcc554e020c2ddabf9e08c4b2f3a5ec36ae0915
(5) c497c7f1108102ef47f0d4aef20977a15c32f6d208112a70b007ad
(6) 75019b03e0d4d50213c3932e05c45c54c18a52b403f3f649301ec2837
(7) 2dcd8ba45a1c300118d50e1b53a07aa283440c1114f94ca7e439515
(8) 1c8a0b3b212e0f9013604750117132748f7047ba2925224a4b0c79d
(9) dae6a41260a19cf045ef8d07a0e02f6e0d443c7fbc7498202f99af928

Mnemonic: announce capital blade pride sunset cannon soap thrive boy satisfy heart ordinary
Important !!! : this mnemonic was created for you by Truffle. It is not secure.
Ensure you do not use it on production blockchains, or else you risk losing funds.

truffle(develop)> migrate

Compiling your contracts...
=====
> Compiling contracts/Student.sol
> Compilation warnings encountered:

Warning: SPDX license identifier not provided in source file. Before publishing, consider adding a comment containing "SPDX-License-Identifier: <SPDX-license>" to each source file. Use "SPDX-License-Identifier: UNLICENSED" for non-open-source code. Please see https://spdx.org for more information.
--> project/contracts/Student.sol

```

```

(Relavent source part starts here and spans across multiple lines).

> Artifacts written to C:\Users\Admin\Desktop\Blockchain\hello-eth\node_modules\.bin\build\contracts
> Compiled successfully using:
  - solc: 0.5.11+commit.d7f03943.emscripten.clang

Starting migrations...
> Network name: 'development'
> Network id: 5772
> Block gas limit: 6721975 (0x6691b7)

> deploy_contracts.js

> Replacing 'Student'
-----
> transaction hash: 0x420b5f6a01834af023ff45f054f4d0930143201a013791ab609a0b091cf04
> Blocks: 0
> Seconds: 0
> Block number: 0
> Contract address: 0xd174c501c61870c6f90507b0085f2b704f00029
> Block timestamp: 16985801361
> account: 0x00c5a12b386f7d8107b33b4f6d8194343b33f9
> balance: 99.99878197
truffle(develop)>
> gas price: 2 gwei
> value sent: 0 ETH
> total cost: 0.00129803 ETH

> Saving artifacts
-----
> Total cost: 0.00129803 ETH

Summary
-----
> Total deployments: 1
> Final cost: 0.00129803 ETH

```

```

C:\Windows\system32\cmd.exe

E:\takeoff\oct23\CredentialVerification>python manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).

You have 15 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s): admin,
auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.
October 28, 2023 - 21:04:58
Django version 2.1.7, using settings 'StudentCredential.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.

```

Fig.2. Execution process.

V. RESEARCH DESIGNER

In order to methodically evaluate the effectiveness and dependability of blockchain technology in academic credential verification, this study takes a quantitative approach. The study assesses user interactions, security resilience, and system performance using quantitative data. The statistical methods that are essential to this strategy provide verifiable, empirical proof to support or refute the study hypotheses. The researcher can ascertain whether the blockchain solution successfully accomplishes its stated goals in practical situations thanks to this methodical approach. The influence of the system is measured using specific performance indicators, which improves the caliber of the research and lays a solid basis for further investigations and real-world applications. The study would incorporate comprehensive system architectural diagrams to guarantee clarity and ease replication.

VI. SYSTEM DEVELOPMENT

6.1 Requirement Analysis

To determine the precise credential verification requirements of businesses and educational institutions, a thorough requirement study is conducted before the development process begins. In order to make sure that the architecture satisfies the varied needs of many stakeholders, this phase is essential in forming the system's features and design. The system can be tailored to effectively manage credentials while giving accuracy, security, and accessibility of the stored data top priority by fully comprehending these requirements.

6.2 Blockchain Integration

Our solution is based on blockchain technology, and Python was selected because of its robust security features and adaptability. Because the Proof of Stake (PoS) consensus process is scalable and energy efficient, it is a good choice for handling extensive credential verifications. This method reduces the centralization problems associated with Delegated Proof of Stake (DPoS) and does away with the high computing demands of Proof of Work (PoW). As validators in our concept, educational institutions risk their reputations to validate transactions, increasing the process's speed and dependability. Solidity-developed smart contracts are

essential for managing digital credentials on the blockchain. By automating the credentials' issuance, verification, and revocation, these contracts guarantee an open and impenetrable verification procedure.

6.3 Prototype Development

Testing and assessing the system's functionality require the prototype development stage. At this step, we can verify that our theoretical design is implemented in practice and make any adjustments based on feedback and real-world usage. The prototype, which serves as a proof of concept, demonstrates how the system could revolutionize academic credential management and verification.



Fig.3. Enrolled student details.

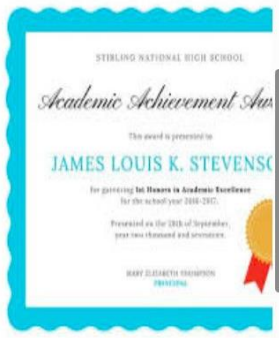
University Name	Certificate ID	Student ID	Certificate Details	Issue Date	File Name	Hashcode	Certificate
Kakatiya University	1	1	MBA Certificate	28-Oct-2022	1.jpg	ca8316bc778aae77eb543484fe2d0539157992d070e90a89a5c6e2ad5464ba8e	
							

Fig.4. Uploading and Viewing of Student details and Certificates.

VII. PROPOSED SYSTEM

With its ability to eliminate trust issues in a decentralized manner, the system takes advantage of the core functionalities of blockchain technology to push credential verification to new levels. Its decentralized, tamper-proof architecture makes blockchain the perfect platform for storing and verifying academic and professional credentials. The system is designed to have three integrated modules for different stakeholders: the University Module; which allows authorized institutions to upload student certificates securely; the Company Module; which enables companies to access verified student credentials quickly; and the Student Module; which allows students to control their data.

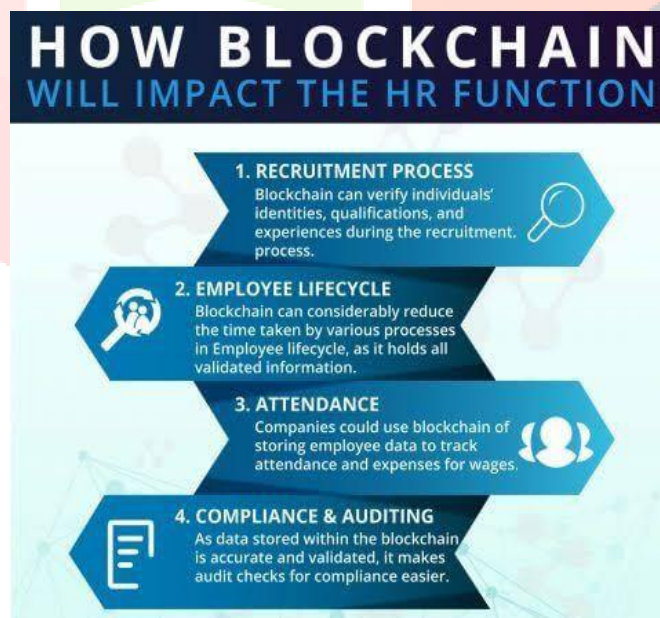


Fig.5. How Blockchain will impact the HR Function

VIII. ADVANTAGES OF PROPOSED SYSTEMS

8.1 Enhanced Security and Fraud Prevention

The intrinsic features of blockchain, such as immutability and decentralization, provide notable security enhancements. Credentials, like degrees or professional certifications, cannot be changed or tampered with once they are stored on the blockchain. Because the blockchain ledger offers a visible and impenetrable

record, it is practically impossible for candidates to provide fake information, such as forged diplomas or fabricated employment histories. By lowering the possibility of fraud and guaranteeing that only eligible applicants are given consideration for jobs, employers can have faith that the credentials they check are legitimate

8.2 Speed and Efficiency in Verification

Conventional credential verification techniques can entail drawn-out procedures that can take days or even weeks to finish, such as contacting prior employers, educational institutions, or certification authorities. Blockchain technology streamlines the entire process by enabling instantaneous, real-time credential verification. By removing the delays involved with conventional verification techniques, employers can virtually instantly access a candidate's validated credentials on the blockchain. This speed facilitates the hiring process, allowing businesses to make judgments more quickly and cut down on time-to-hire—a critical factor in highly competitive industries.

8.3 Cost Reduction for Employers

Verification agencies and other third-party services, which charge fees for checking professional and educational records, are frequently needed for traditional credential verification. Employers also have to pay for the time and materials needed to manually confirm applicants' qualifications. Blockchain technology can be used to drastically cut these expenses. Employers no longer have to pay other organizations for verification because credentials are kept and verifiable directly on the blockchain. This lowers operating costs, which makes recruiting more affordable, especially for startups or smaller companies with tighter budgets.

8.4 Global Standardization and Accessibility

A uniform, standardized platform for confirming qualifications is established using a blockchain-based credential verification system. Because blockchain technology is decentralized, organizations, companies, and applicants from all over the world may access and validate credentials in a uniform manner. This is particularly helpful for candidates from other countries, whose credentials could normally be hard to confirm because of varied regional norms and procedures. By offering a worldwide accessible and standardized system for credential verification, blockchain helps remove these obstacles and guarantees that employers can trust qualifications regardless of an applicant's location.

8.5 Increased Trust and Transparency

Blockchain guarantees that all credential verification transactions are transparent to authorized parties and publicly recorded. The blockchain offers an unchangeable audit trail of credential issue and verification, and any updates or additions are transparent and traceable. Employers, applicants, and educational institutions can all independently confirm the legitimacy of credentials without the need for middlemen thanks to this transparency, which increases confidence between them. Accountability is ensured and the possibility of disagreements or miscommunications throughout the hiring process is decreased by the ability to monitor and validate each stage of the credentialing process.

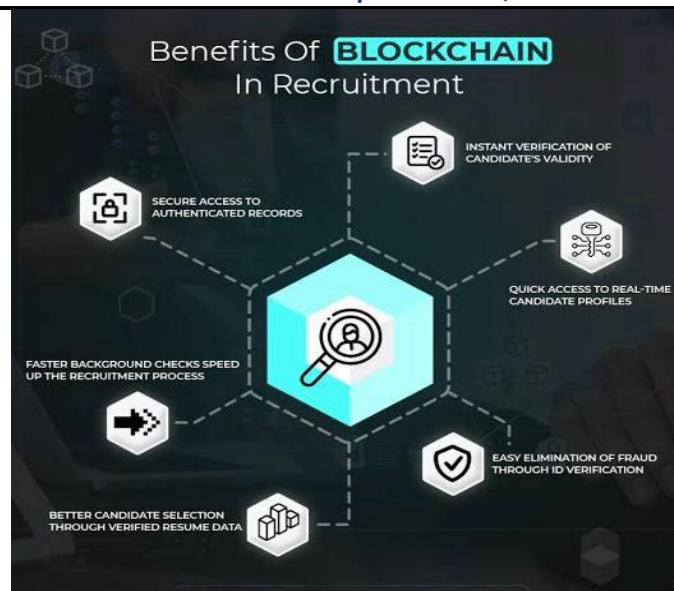


Fig.6. Benefits of Blockchain in Recruitment.

IX. CONCLUSION

A new era of dependability and security in hiring procedures is ushered in by the use of blockchain technology in credential verification. By implementing a decentralized, tamper-proof framework that not only improves the credibility of credentials but also expedites the verification process overall, this project overcomes the shortcomings of current systems. The suggested solution guarantees a smooth, transparent, and effective credential verification process by giving colleges, businesses, and students secure access to authenticated information, thereby fostering a more reliable and robust hiring ecosystem.

X. REFERENCES

- [1] Protecting the Public in Action, Nov. 2022, [online] Available: <https://pubmed.ncbi.nlm.nih.gov/29758142/>
- [2] S. D. Barnett, "Growing pains of credentialing research: Discussions from the institute of medicine workshop", J. Continuing Educ. Nursing, vol. 46, no. 2, pp. 5355, 2015.
- [3] M. H. Baumann, S. Q. Simpson, M. Stahl, S. Raoof, D. D. Marciniuk and D. D. Guterman, "First do no harm: Less training $\neq$ quality care", Amer. J. Crit. Care, vol. 21, no. 4, 2012.
- [4] S. Chen, T. Luo, W. Liu and J. Song, "A framework for managing access of large-scale distributed resources in a collaborative platform", Data Sci. J., vol. 7, Dec. 2008.
- [5] G. Legotlo and A. Mutezo, "Understanding the types of fraud in claims to south African medical schemes", South Afr. Med. J., vol. 108, no. 4, pp. 299, Mar. 2018.
- [6] M. Hölbl, M. Kompara, A. Kamišalić and L. Nemec Zlatolas, "A systematic review of the use of blockchain in healthcare", Symmetry, vol. 10, no. 10, pp. 470, Oct. 2018.
- [7] T. McGhin, K.-K. R. Choo, C. Z. Liu and D. He, "Blockchain in healthcare applications: Research challenges and opportunities", J. Netw. Comput. Appl., vol. 135, pp. 62-75, Jun. 2019.
- [8] D. J. Skiba, "The potential of blockchain in education and health care", Nursing Educ. Perspect., vol. 38, no. 4, pp. 220-221, Aug. 2017.
- [9] Q. Mamun, "Blockchain technology in the future of healthcare", Smart Health, vol. 23, Mar. 2022.
- [10] M. N. Kamel Boulos, J. T. Wilson and K. A. Clauson, "Geospatial blockchain: Promises challenges and scenarios in health and healthcare", Int. J. Health Geographics, vol. 17, no. 1, pp. 25, Dec. 2018.
- [11] A. Hevner and S. Chatterjee, "Design science research in information systems" in Design Research in Information Systems: Theory and Practice, New York, NY, USA:Springer, pp. 9-22, 2010.
- [12] S. Smith, Top 10 Challenges in Healthcare Credentialing, Tollanis Solutions Inc, Sep. 2022, [online] Available: <https://tollanis.com/credentialing/top-challenges-healthcare-credentialing/>
- [13] R. Arenas and P. Fernandez, "CredenceLedger: A permissioned blockchain for verifiable academic credentials", Proc. IEEE Int. Conf. Eng. Technol. Innov. (ICE/ITMC), pp. 1-6, Jun. 2018.

- [14] L. Zhou, L. Wang and Y. Sun, "MISore: A blockchain-based medical insurance storage system", J. Med. Syst., vol. 42, no. 8, pp. 117, Aug. 2018.
- [15] M. Thenmozhi, R. Dhanalakshmi, S. Geetha and R. Valli, "WITHDRAWN: Implementing blockchain technologies for health insurance claim processing in hospitals", Mater. Today Proc., Mar. 2021.
- [16] M. Raikwar, S. Mazumdar, S. Ruj, S. Sen Gupta, A. Chattopadhyay and K.-Y. Lam, "A blockchain framework for insurance processes", Proc. 9th IFIP Int. Conf. New Technol. Mobility Secur. (NTMS), pp. 1-4, Feb. 2018.
- [17] A. Azaria, A. Ekblaw, T. Vieira and A. Lippman, "MedRec: Using blockchain for medical data access and permission management", Proc. 2nd Int. Conf. Open Big Data (OBD), pp. 25-30, Aug. 2016.
- [18] M. Hader, A. Elmhamed and A. Abouabdellah, "Blockchain technology in supply chain management and loyalty programs: Toward blockchain implementation in retail market", Proc. IEEE 13th Int. Colloq. Logistics Supply Chain Manage. (LOGISTIQUA), pp. 1-6, Dec. 2020.

