Revolutionizing Academic Credential Verification and Job Matching with Blockchain and AI: A Case Study

Apoorva Bajaj[1] and **Shivani Mehrotra**[2]
Eduprovince Technologies Private Limited (Edubuk),
I-Block, Flat 702, Oranje Castle, Emaar Gomti Greens, Sector-7, Gomti Nagar Extentions, Lucknow 226002 UP India
[1]bajaj.apoorva@gmail.com, [2] shivani@edubuck.com

Abstract **-- This research paper explores the innovative application of blockchain technology and artificial intelligence (AI) in transforming academic credential verification and job matching processes, with a focus on Edubuk, a decentralized application (dApp). Edubuk offers eSealing, hashing, and time stamping of certificates and documents on the blockchain, facilitating transparent verification by universities, third-party verification companies and educational institutions across the globe. By providing a scalable platform for recording comprehensive candidate profiles, Edubuk streamlines the recruitment process through AI-driven job matching algorithms, ensuring alignment between candidates' skills and job requirements. This paper examines the technical architecture, features, and potential impact of Edubuk, analyzing its early traction in the Indian and US markets. Furthermore, it discusses the implications of AI-driven transcript and CV recording protocols on the blockchain for academia, industry, and society at large. Through a comprehensive review of literature, case studies, and industry insights, we highlight the transformative potential of Edubuk in revolutionizing education and employment landscapes worldwide.**

Keywords: Blockchain, Artificial Intelligence, Academic Credentials, Job Matching, Edubuk, Decentralized Application, Transparency, Verification Protocol

I. INTRODUCTION

IN an increasingly digitized world, the processes of academic credential verification and job matching have faced numerous challenges, including inefficiencies, lack of transparency, and susceptibility to fraud. Traditional methods rely heavily on manual verification processes, leading to delays, errors, and increased administrative burdens for universities, employers, and candidates alike. However, recent advancements in blockchain technology and artificial intelligence offer a promising solution to address these challenges, providing a secure, transparent, and decentralized platform for recording and verifying academic credentials and facilitating job matching processes. This paper examines the role of Edubuk, a decentralized application (dApp), in leveraging block-chain technology and AI to revolutionize academic credential verification and job matching processes. The early adoption of Edubuk by universities, study abroad agencies, and transcript verification companies underscores the growing recognition of blockchain technology as a viable solution to the challenges plaguing the education and employment sectors.

II. BACKGROUND

The convergence of blockchain technology and artificial intelligence paved the way for innovative solutions to longstanding challenges in academic credential verification and job matching. Edubuk emerges as a frontrunner in this space, offering a comprehensive platform for recording, verifying, and matching academic credentials and job opportunities. By harnessing the immutable nature of blockchain and the power of artificial intelligence, Edubuk aims to streamline processes, enhance transparency, and facilitate efficient matching between candidates and job openings.

III. PROBLEM STATEMENT

In 2022, more than five million fake certificates and degrees were sold in India, and over 10 million globally, posing a significant challenge to the education and employment ecosystem. This phenomenon not only affects individuals but also undermines the credibility of educational institutions, employers, and regulatory bodies. The proliferation of fake credentials creates issues for genuine students, universities, employers, visa officers, and the broader education ecosystem. Recognizing the severity of this problem, Edubuk seeks to address it by providing a secure, transparent, and decentralized platform for recording and verifying academic credentials on the blockchain. By leveraging blockchain technology and AI-driven algorithms, Edubuk aims to ensure the integrity and authenticity of academic credentials while streamlining the job matching process for candidates and employers.

IV. IMPLICATIONS OF AI-DRIVEN TRANSCRIPT AND CV RECORDING

The integration of artificial intelligence and natural language processing algorithms into Edubuk's transcript and CV recording process has far-reaching implications for academia, industry, and society at large. By automating and optimizing the matching process between candidates and job openings,

Edubuk enhances efficiency, reduces bias, and improves outcomes for both employers and job seekers. Moreover, AI-driven algorithms enable personalized recommendations based on candidates' skills, experiences, and preferences, facilitating better alignment between candidates and job opportunities. However, this also raises important considerations regarding data privacy, algorithmic fairness, and the future of work.

V. HOW THE DECENTRALIZED APPLICATION WORKS

The dApp works in two primary phases: eSealing of the certificate and verification of the certificate.

During the eSealing of the certificate, Edubuk generates a unique file hash and timestamp for each certificate, recording six essential fields on the blockchain:

a.) Who the certificate was issued to (Certificate Beneficiary)
b.) Who is it issued by (Certifying Authority)
c.) What is the certificate about (Details of the Certificate)
d.) Unique file hash (cryptographic hash) of the certificate
e.) Timestamp of the certificate (when the certificate was recorded on the chain, in UTC time)
f.) Who recorded the certificate on the chain (witness': Certifying Authority's wallet address)

During the verification of the certificate, these six fields are retrieved from the blockchain and verified with the previously generated information during sealing (that can be stored off-chain in a database). Once all six fields are completely checked and matching is 100%, the dApp shows this message: "Certificate Verified" with a green color and a right tick mark. On the contrary, if there is any change in the certificate, *i.e.,* it has been tampered with, its hash will change, and the information will not be 100% verified. In this case, or if any certificate was never recorded on the chain using the dApp, the dApp shows this message: "Error! Certificate Not Verified" with a red color and a cross mark.

VI. TECHNICAL ARCHITECTURE

Edubuk operates on a decentralized architecture, utilizing blockchain technology to ensure the integrity, security, and transparency of academic credentials and candidate profiles. The platform consists of two layers: the eSeal Layer and the Verification Layer. The eSeal Layer enables the recording of certificates and transcripts on the blockchain, while the Verification Layer facilitates seamless verification by authorized parties, such as universities, employers, and third-party verification companies.

VII. SALIENT FEATURES

Edubuk offers a wide range of features designed to streamline academic credential verification and job matching processes. These features include eSealing, hashing, and time stamping of certificates and documents, comprehensive candidate profiles recording learning mediums, credits, grades, academic and professional certificates, subjects, courses, projects, interests, hobbies, online education, and skill-based courses completed. Additionally, Edubuk utilizes AI and natural language processing (NLP) algorithms to match candidates' profiles with relevant job openings, ensuring alignment between skills and job requirements. This section provides an overview of Edubuk's key features, highlighting their benefits and potential impact on stakeholders.

One of the key differentiators of Edubuk is its use of artificial intelligence (AI) algorithms to facilitate job matching between candidates and employers. By harnessing the power of AI and natural language processing (NLP), Edubuk analyzes candidate profiles and job descriptions to identify the best possible matches, ensuring alignment between candidate skills and employer requirements. The AI-driven job matching process begins with the creation of comprehensive candidate profiles on the blockchain, containing detailed information about academic credentials, work experience, skills, interests, and preferences. Using advanced NLP algorithms, Edubuk parses these profiles and extracts relevant keywords and attributes, creating a semantic representation of candidate skills and competencies. Simultaneously, Edubuk analyzes job descriptions provided by employers, identifying key requirements, qualifications, and job responsibilities. By comparing candidate profiles with job descriptions, Edubuk generates a compatibility score for each candidate-job pair, indicating the degree of alignment between candidate skills and job requirements. The AI-driven job matching algorithm takes into account various factors, including skills match, educational background, work experience, location preferences, and salary expectations, to recommend the most suitable job opportunities to candidates and employers. By presenting personalized job recommendations based on individual preferences and requirements, Edubuk enhances the efficiency and effectiveness of the recruitment process, reducing time-to-hire and improving candidate-employer fit. Furthermore, Edubuk continually refines its AI algorithms based on user feedback and performance data, ensuring optimal job matching outcomes and enhancing user satisfaction. By leveraging AI for enhanced job matching, Edubuk empowers candidates to find meaningful employment opportunities and helps employers identify top talent more effectively, driving mutual success and growth.

VIII. UNIQUE SELLING PROPOSITION

Edubuk's unique selling proposition lies in its comprehensive ecosystem of partnerships with key stakeholders across the education and employment sectors. The platform collaborates with universities (both private and public), study abroad agencies, third-party transcript verification companies, and employers to create a robust network for academic credential verification and job matching. By forging strategic partnerships

with regulatory bodies and industry leaders, Edubuk establishes itself as a trusted and reliable platform for recording, verifying, and matching academic and work-experience credentials. Additionally, Edubuk's integration with Concordium Blockchain ensures regulatory compliance and data protection, further enhancing its value proposition for stakeholders.

IX. EARLY TRACTION AND MARKET ADOPTION

Since its inception, Edubuk has gained early traction in the market, particularly among universities in India and third-party transcript verification service providers in the US. The platform's innovative approach to academic credential verification and job matching has resonated with stakeholders, leading to increased adoption and interest. This section examines Edubuk's early traction in the Indian and US markets, analyzing the factors contributing to its success and potential challenges in scaling globally. The early traction and market adoption of Edubuk signify a paradigm shift in the traditional methods of academic credential verification and job matching. The platform's success can be attributed to its innovative approach, strategic partnerships, and commitment to addressing the pressing challenges faced by universities, employers, and candidates. In India, where the education system grapples with issues of credential fraud and verification inefficiencies, Edubuk has emerged as a beacon of hope for universities seeking to streamline their credential issuance and verification processes. By partnering with leading Indian universities and study abroad agencies, Edubuk has gained significant traction among students and educational institutions alike. The platform's seamless integration with the Indian education ecosystem has facilitated the recording and verification of academic credentials on the blockchain, paving the way for enhanced transparency and integrity in the verification process. Similarly, in the United States, where third-party transcript verification services play a crucial role in credential evaluation for international students, Edubuk has positioned itself as a trusted partner for transcript verification companies. Through strategic collaborations with industry leaders such as International Education Evaluations (IEE) and DataPoint Interactive, Edubuk has gained access to a vast network of universities and employers, bolstering its credibility and market presence in the US.

X. B2B PARTNERSHIPS

Edubuk has established strategic partnerships with Indian and US universities, study abroad agencies, and transcript verification companies under the National Association of Credential Evaluation Services (NACES). These partnerships provide Edubuk with access to millions of students studying in hundreds of universities worldwide, enabling seamless integration and adoption of the platform. Noteworthy partnerships include collaborations with International Education Evaluations, DataPoint Interactive, TutorABC, EST Global, and EST FAB, among others. These partnerships bolster Edubuk's credibility and market presence, positioning it as a leader in academic credential verification and job matching.

XI. AWARDS AND RECOGNITIONS

Edubuk has received numerous awards and accolades for its innovative approach to academic credential verification and job matching. The platform's patent-published model has been globally recognized by reputed organizations, including the G20 Summit in Indonesia, CNN, Financial Times, MIT University, Harvard University, and the World Economic Forum in Davos. Additionally, Edubuk has been honored by AWS Edstart, IIT Bombay, IIT Kharagpur, IIM Calcutta, Polygon Blockchain, Concordium Blockchain, CNBC, MoneyControl, and various government agencies and industry associations. Edubuk has garnered significant media attention from national and international outlets, including Forbes, CNN, CNBC, Financial Times, The Economic Times, and The Hindu. The platform's innovative approach to education and employment has been featured in various publications, highlighting its impact and potential to transform the industry.

XII. CONCLUSION

Edubuk stands at the forefront of innovation in the field of academic credential verification and job matching, leveraging blockchain technology and artificial intelligence to revolutionize traditional processes. Through its decentralized platform, Edubuk offers a secure, transparent, and efficient solution for recording, verifying, and matching academic credentials and job opportunities. By addressing the pressing challenges faced by universities, employers, and candidates, Edubuk has gained early traction and market adoption, establishing itself as a trusted partner in the education and employment sectors. Through strategic partnerships, product innovation, regulatory compliance, and community engagement, Edubuk is well-positioned for sustained growth and success in the dynamic landscape of blockchain-based credential verification and job matching. As Edubuk continues to expand its reach and impact, it remains committed to its mission of driving positive change in education and employment, empowering individuals and organizations to unlock their full potential in the digital age.

REFERENCES

[1] S. Nakamoto, "Bitcoin: A peer-to-peer electronic cash system", 2008.

[2] D. Tapscott and A. Tapscott, "Blockchain revolution: How the technology behind Bitcoin is changing money, business, and the world", 2016.

[3] V. Buterin, "Ethereum: A next-generation smart contract and decentralized application platform", White Paper, 2013.

[4] World Economic Forum, "Blockchain: a blueprint for digital identity" 2020.

[5] "Alexa Blockchain", https://alexablockchain.com/edubuk-concordium-secure-academic-credentials/

[6] "Metaverse Post", https://mpost.io/edubuk-partners-concordium-to-tackle-fake-credentials-with-blockchain-verification/

[7] Ein Presswire: "International Education Evaluations and Edubuk", https://www.einpresswire.com/article/692558064/international-education-evaluations-and-edubuk-partner-to-eliminate-fake-credentials-with-blockchain-verification
[8] The Hindu, "Award for T-AIM Startups at G20 Summit, Indonesia' https://www.thehindu.com/news/cities/Hyderabad/award-for-t-aim-startups-at-g20-din/article65853769.ece1
[9] "G20: Blockchain Tech Innovation", https://www.linkedin.com/posts/shivani-mehrotra-bajaj_g20indonesia-blockchain-techinnovation-activity-6972210100509839360-g4jM
[10] *Economic Times,* "T-AIM Startups Win Awards at G20", https://government.economictimes.indiatimes.com/news/governance/t-aim-startups-win-awards-at-g20-digital-innovation-network-held-in-indonesia/94018890
[11] "Edubuk on CNN", https://www.youtube.com/watch?v=cXttJZqkSfw&t=145s
[12] Inc. 42: "Top Startups to Watch", https://inc42.com/startups/30-startups-to-watch-the-startups-that-caught-our-eye-in-may-2022/
[13] YourStory, "Reimagining EdTech", https://yourstory.com/2022/04/experts-reimagining-edtech
[14] "Edubuk on CoinDCX", https://twitter.com/CoinDCX/status/1633444957691191297?s=20
[15] *Financial Times,* "Edubuk AI-Driven Decentralized Skilling Ecosystem", https://www.linkedin.com/posts/edubuk-ai-driven-decentralized-skilling-ecosystem-on-blockchain_seedstars-ftxsdgchallenge-activity-6863546274097037312-TLic

Apoorva Bajaj is the co-founder & Chief Technology Officer Edubuk, has excelled academically, achieving top honors in CBSE Class 10 and Class 12, including a perfect score in Mathematics. His academic journey continued with distinction, earning a BTech from IIT (ISM) Dhanbad and a PGDM/MBA from IIM Kozhikode with a Gold Medal. Apoorva is a CFA Charter holder and has cleared all 3 levels of CFA (US) Exam in first attempt.

He worked as Principal Consultant at a global Consulting Firm: The Partnerships Advisory (TPA by Harvard University Alumni) and Lead Financial Analyst at Hedge Funds of Goldman Sachs, DE Shaw, JP Morgan and as Practice Head-Financial Markets at Data Analytics Firm, Global Data. Additionally, he focused on mastering emerging technologies including gaining expertise in AI, Data Analytics and Block-chain. He has trained corporate professionals and senior college students across India, UAE, and Saudi Arabia and acquired certifications from IBM, Google and ISB, Hyderabad.

His entrepreneurial drive led him to identify a gap in skilling students in emerging technologies, resulting in successful & globally award-winning startup venture of Edubuk. He established partnerships in India and the Middle East, receiving accolades from MIT, Harvard, IITs, IIMs, the G20 Conference, NSDC, ONDC, Solana, Concordium, Dubai Expo, among others with media coverage.

Shivani Mehrotra is the Co-Founder & Chief Executive Officer at Edubuk, a globally acclaimed emerging technologies skilling tech startup. In addition to her role at Edubuk, Shivani assists various international universities in partnering with Indian universities and Indian Study Abroad Agencies. She has been honored with the Top 30 Young Indian award by Birla Business Group for her significant contributions in the Training & Education field in India. Currently, she serves as the Vice President of Emerging Technologies at the International Women Forum, WICCI (wicci.in).

Shivani is a qualified UGC NET exams holder and has imparted knowledge to over 10,000 students as a Professor and teacher-facilitator in IB & IGCSE Schools. Holding a diploma in Child Education and Applied Psychology, she has also served as the Business Coach for young entrepreneurs of Delhi schools under the Business Blasters program by the Government of Delhi.