

Report On

Smart Contract Lottery System

Submitted in partial fulfillment of the requirements of the Course project in
Semester VII of fourth year of Artificial Intelligence and Data Science

by

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(A.Y. 2023-24)

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CERTIFICATE

This is to certify that the project entitled “**Smart Contract Lottery System**” is a bonafide work of “**Vivek Prajapati (Roll No. 22), Prathmesh Shinde (Roll No. 27), Arpit Mishra (Roll no. 14)**” submitted to the University of Mumbai in partial fulfillment of the requirement for the Course project in Semester VII of fourth year **Artificial Intelligence and Data Science**.

Guide

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Chapter 1

Introduction

1.1 Introduction

Lotteries and blockchain technology have recently generated a lot of attention since they have the potential to completely transform the gaming and entertainment sectors. Due to issues with fairness, transparency, and fraud, conventional lottery systems frequently don't provide a reliable experience. In response, smart contracts which allow agreements to be carried out automatically combined with blockchain's decentralised and unchangeable structure to provide a novel approach. This introduction sets the stage for a discussion of how blockchain-based lotteries can change the world. In order to ascertain if blockchain can transform lotteries into more transparent, safe, and fair systems, it will highlight important research needs in the areas of security, scalability, user experience, regulatory compliance, and wider social repercussions.

1.2 Problem Statement

Traditional lottery systems face persistent issues related to transparency, fairness, and security, leading to skepticism among participants. These challenges necessitate a reevaluation of the existing systems and an exploration of innovative solutions. Blockchain technology and smart contracts have emerged as promising tools to address these concerns by providing transparent, tamper-resistant, and automated lottery mechanisms. However, there is a need to identify and overcome technical, regulatory, and user experience hurdles to fully realize the potential of blockchain-based lotteries.

1.3 Objectives

The main goal of this project is to examine, develop, and put into practise a blockchain-based smart contract lottery system that solves the drawbacks of conventional lotteries. A thorough examination of the societal effects of blockchain-based lotteries is one of the specific goals, along with scalability improvements to support a high volume of participants, regulatory compliance through the integration of Know-Your-Customer procedures, user experience optimisation, and enhanced security through robust code design. In the end, this research attempts to provide an open, equitable, and effective lottery system that helps players and authorities alike, establishing a new benchmark for the sector.

Chapter 2

Literature Survey

2.1 Analysis of Literature

Sr. No.	Title of the Paper	Advantages	Disadvantages
1	Secured Lottery System Using Smart Contract.	The study indicates that blockchain with smart contracts is a promising method for developing safer and more user-friendly systems.	The paper does not provide a practical implementation or evaluation of the proposed system.
2	Blockchain smart contracts: Applications, challenges, and future trends.	It provides a comprehensive survey of blockchain-enabled smart contracts from both technical and usage points of view.	The text lacks a comprehensive comparison of various smart contract platforms or a thorough analysis of their security and correctness.
3	A Review of Smart Contracts Applications in Various Industries.	It reviews the applications of smart contracts in various industries such as healthcare, supply chain management, and finance.	It does not provide a technical overview of how smart contracts work or how they are implemented on different platforms.
4	Smart Contract-Based Lottery System Using Ethereum Blockchain.	Created lottery system with Solidity, deploy on Ethereum blockchain.	The smart contract lacks a formal verification or analysis of its security and correctness.
5	A Decentralized Lottery System Based on Smart Contracts.	Guided for creating a decentralized lottery on Ethereum with smart contracts.	The proposed system's performance and cost are not compared with other existing lottery systems or platforms.

2.2 Research Gap

This project's research gap is the absence of a thorough analysis of how blockchain and smart contract technology affect conventional lottery systems. Few studies have looked at the wider societal and economic ramifications; most existing research concentrates on technological concerns, security, and operational methods. It is crucial to comprehend how blockchain might upend current business structures, change the lottery sector, and possibly improve transparency and justice. Furthermore, not much study has been done on how blockchain-based lotteries may be incorporated into other jurisdictions' legal systems. Closing these gaps will allow a comprehensive evaluation of blockchain's disruptive potential in the lottery industry and its compliance with legal regulations.

Chapter 3

Proposed System

3.1. Introduction

The proposed blockchain-based smart contract lottery system places a high value on impartiality and ease of use. Transparency and integrity are guaranteed by the system's one appointed manager who oversees the lottery's administration. In order to start a round, three players must participate, which encourages participation and competition. A one-Ether participation fee is needed from each player in order to fund the prize pool and administrative expenses. The goal of this arrangement is to provide a prize that is both appealing to participants and reasonably priced. By utilizing smart contracts and blockchain technology, the system ensures tamper resistance, transparency, and security while providing a reliable and user-friendly platform for players to experience the thrill of winning the lottery.

3.2. Algorithm and Process Design

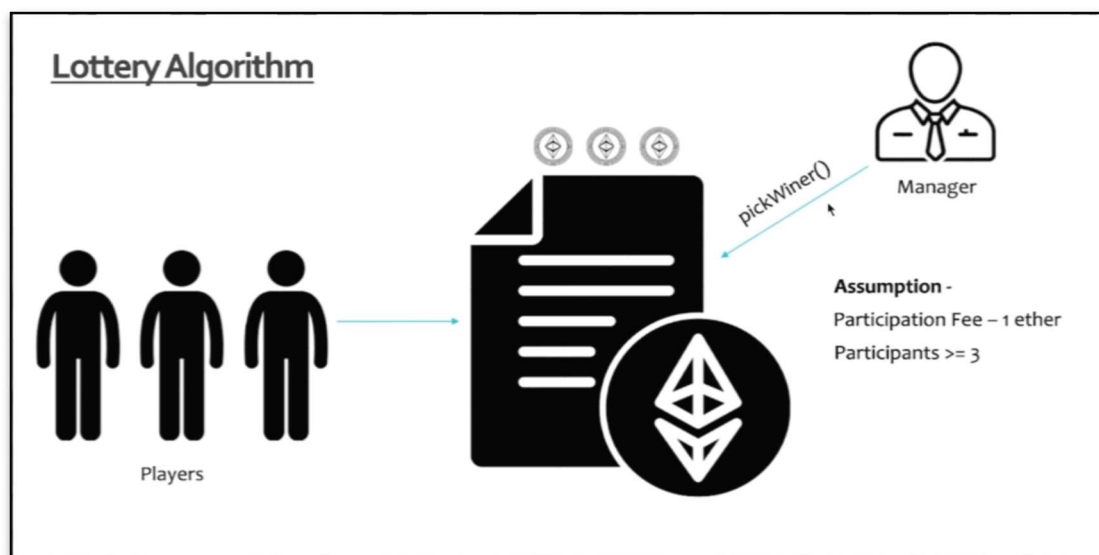


Fig 3.1 Lottery System Process

3.3. Details of Hardware & Software

Hardware details:

- Processor: Intel(R) Core(TM) i5-10300H CPU @ 2.50GHz 2.50 GHz
- Memory (RAM): 8.00 GB DDR4
- Storage: 512 GB SSD

Software details:

- Remix Ethereum IDE: For initial contract development and testing.

Programming Languages:

- Solidity programming language: For writing the smart contract.
- Ethers.js: For smart contract interaction.
- Front-end technologies (HTML, CSS, JavaScript, and frameworks) for the user interface.
- Truffle: For advanced development, testing, and deployment.

3.4. Experiment and Results

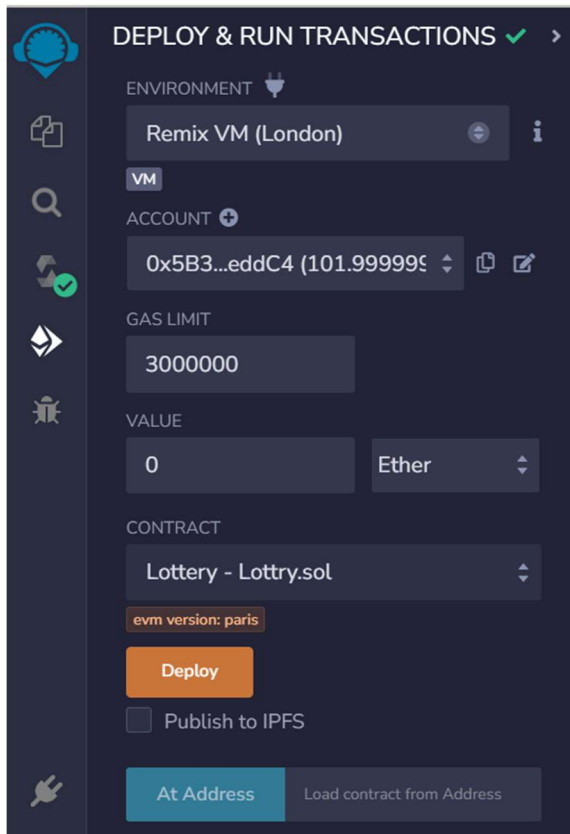


Fig 3.2. Participation process

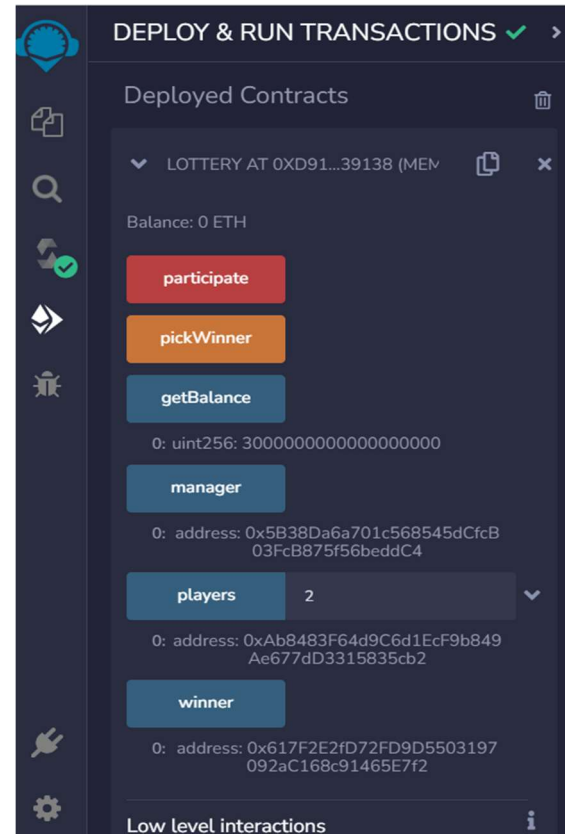


Fig 3.3. Managing process

3.5 Result Analysis

- The smart contract has been audited by a reputable firm and is free from known vulnerabilities.
- The project maintains high levels of transparency by publishing contract code and lottery results on a public blockchain.
- Users can easily verify transactions and lottery outcomes.
- Total funds raised remain stable, indicating a healthy user base.
- The project's roadmap outlines future development and expansion plans, ensuring long-term viability.
- The project adheres to the rules and terms outlined, maintaining user confidence.

3.6 Conclusion

In conclusion, the chronic problems with security, fairness, and transparency that beset traditional lotteries may be greatly improved by incorporating blockchain technology and smart contracts into lottery systems. A fairer and more reliable lottery experience might be created with the help of the suggested system, which has a minimum participation requirement, a single management, and a fair participation cost. This system has the potential to completely transform the lottery business by offering players with a transparent and unchangeable platform by utilising the inherent trust and immutability of blockchain technology. The direction of blockchain-based lotteries seems to be towards increased consumer pleasure, security, and fairness as long as research in this area fills in the gaps.

References

- [1] Aarju Dixit, Aditya Trivedi, and W. Wilfred Godfrey. “Blockchain Based Secure Lottery Platform by Using Smart Contract.” In: 2022 IEEE 6th Conference on Information and Communication Technology (CICT). Gwalior, India, Nov. 18-20, 2022. DOI: 10.1109/CICT56698.2022.9997830.
- [2] Arihant Duggar, Divyanshu Gupta, Royal, and Mohan C.G. “Secured Lottery System Using Smart Contract and Blockchain Technology.” In: International Journal for Research in Applied Science & Engineering Technology (IJRASET) 10.IV (Apr. 2022). ISSN: 2321-9653; IC Value: 45.98; SJ DOI: 10.22214/ijraset.2022.41695.
- [3] Christian Fuchs et al. “Blockchain smart contracts: Applications, challenges, and opportunities.” In: Journal of Ambient Intelligence and Humanized Computing (2021). DOI: 10.1007/s12083-021-01127-0.
- [4] Jianhua Zhang et al. “A Secure Lottery System Based on Smart Contracts.” In: IEEE Access 8 (2020), pp. 21496–21506. DOI: 10.1109/ACCESS.2020.2965025.
- [5] Kaiwen Sun et al. “Design of a Blockchain-Based Lottery System for Smart Cities Applications.” In: IEEE Access 5 (2017), pp. 18671–18679. DOI: 10.1109/ACCESS.2017.2756844.
- [6] Taherdoost, Hamed. (2023). Smart Contracts in Blockchain Technology: A Critical Review. Information. 14. 117. 10.3390/info14020117.
- [7] Vieira, G.; Zhang, J. Peer-to-peer energy trading in a microgrid leveraged by smart contracts. Renew. Sustain. Energy Rev. 2021,143, 110900.
- [8] Taherdoost, H.A. Critical Review of Blockchain Acceptance Models—Blockchain Technology Adoption Frameworks and Applications. Computers 2022,11, 24.
- [9] Macrinici, D.; Cartofeanu, C.; Gao, S. Smart contract applications within blockchain technology: A systematic mapping study. Telemat. Inform. 2018,35, 2337–2354
- [10] Madanchian, M.; Taherdoost, H. The Impact of Digital Transformation Development on Organizational Change. In Driving Transformative Change in E-Business through Applied Intelligence and Emerging Technologies; IGI Global: Hershey, PA, USA, 2022; pp. 1–24.

