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Smart Lottery Ticket System using Blockchain Technology

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ABSTRACT

A smart lottery ticket based on genesis block is created for increasing transparency and to reduce frauds in the lottery industry. Once the genesis block is created and deployed by the administrator,there will be a minimum contribution amount for players to register in the game and a price pool will be maintained by the Genesis block. The winning process will be structured in a way such thatonly the administrator's wallet will be authorized to initiate the process to randomly pick an addressand the genesis block will be defined to transfer the prize money to the winner. The block once deployed on blockchain cannot be changed by the administrator to maintain transparency and fairness. The emerging blockchain technology shows a glimpse of solutions to fairness andtransparency issues faced by lottery industries are adapted to the blockchain technology and the cryptograph blockchain model, to design the blockchain-based lottery system. Fairness,transparency, and privacy are the major advantage of the proposed blockchain-based lottery system.

Keywords: Genesis Block, Lottery, Fairness, Transparency, Privacy and secure, Cryptography, Ether, Decentralization

INTRODUCTION

In the rapidly evolving landscape of technological advancements, blockchain technology stands outas a transformative force with the potential to revolutionize various industries. The system addresses longstanding challenges faced by the lottery industry, primarily focusing on enhancing transparencyand mitigating fraudulent activities. By leveraging the Genesis block capabilities, the Smart LotteryTicket System aims to instill trust and fairness in lottery processes, ensuring a secure and equitable experience for participants. The core features of the system involve the use of Genesis block by an administrator or seller. This block orchestrates a decentralized lottery ecosystem where participantsregister by contributing a minimum amount, forming a prize pool dynamically managed by the Genesis block. The key element of the winning process is designed to be initiated exclusively by the administrator's wallet, ensuring a controlled and secure mechanism for randomly selecting a winnerfrom the pool of participants. The emergence of blockchain technology offers a longstanding fairnessand transparency issues prevalent in the lottery industry.

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LITERATURE SURVEY

- **A. Antonopoulos, "Deciphering Blockchain," 2020:**
  This paper explores the decentralized architecture of blockchain, highlighting its key features suchas transparency, immutability, and security. It also delves into the transaction processing mechanism, explaining how transactions are verified and added to the blockchain through consensus algorithms. Additionally, it also discusses the mining process, which is essential for maintaining theintegrity of the blockchain. Furthermore, Antonopoulos explores potential applications of blockchain beyond cryptocurrencies, emphasizing its role in enabling trusted decentralized systems.
- **P. Kuacharoen, "Design and Implementation of A Secure Online Lottery System," IAIT, 2022, pp.94-105:**
  Kuacharoen's work focuses on the design and implementation of a secure online lottery system, aiming to address the security and transparency issues prevalent in traditional lottery systems. The study likely provides insights into how security measures can be integrated into the lottery system to ensure fairness and prevent fraud.
- **S. Grumbach and R. Riemann, "Distributed Random Process for A Large-scale Peer-to-Peer Lottery," 2022:**
  Grumbach and Riemann proposed a distributed random process for conducting large-scale peer-to-peer lotteries. They likely discuss how this process can enhance scalability and interoperability, enabling the lottery system to handle a large number of participants and transactions efficiently. This finding aligns with the objective of the project to design a scalable and efficient lottery system using blockchain technology.

EXISTING METHOD

The existing system uses smart contract where the seller is the administrator of the smart contract who deploys and manages the lottery. Only the seller can pick the winner and close the lottery. Players participate in the lottery by purchasing tickets. The smart contract is deployed on the blockchain and contains the logic for the lottery, including managing players, selecting a winner, and distributing the prize. Players can purchase tickets by sending a minimum contribution amountof Ether to the smart contract. The contribution amount is used to fund the prize pool. The winner is selected randomly from the list of players once the lottery is completed. And most importantly there will be high probability of winning of the customer who purchase more number of tickets.

PROPOSED METHOD

Our proposed system aims to overcome the limitations of existing system by leveraging advanced technologies such as, Web3, Ganache, hashlib, and MongoDB. The system leverages blockchain technology, specifically the Genesis block, to introduce decentralization. Genesis block automate various aspects of the lottery system, including participant registration with the use of cryptography,prize pool management, and the selection of winners. This automation enhances efficiency and reduces the potential for human errors. Through the use of blockchain, the proposed system ensuresa high level of transparency in every stage of the lottery process. This is made more secure by introducing the concepts of Cryptography, contributions to the prize pool, and the random selection

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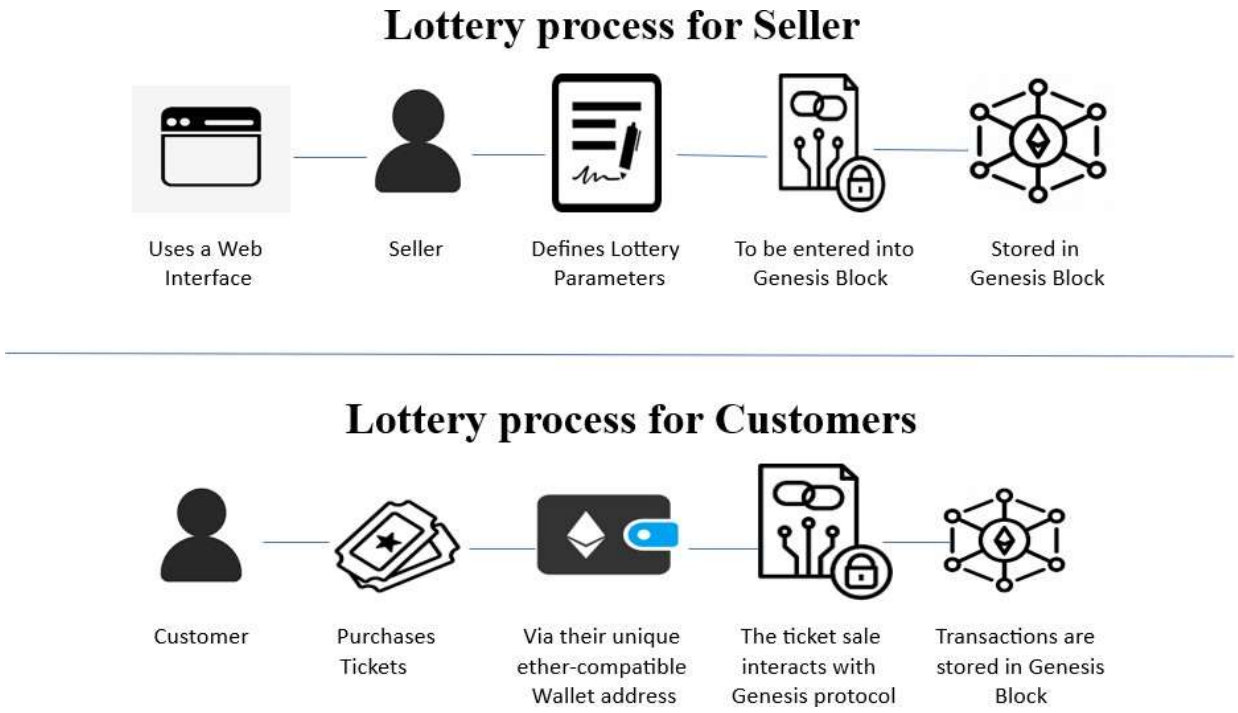
of winners, promoting trust and fairness. The use of cryptographic algorithms in the blockchain enhances privacy protection for participants. Transactions are associated with cryptographic addresses rather than personal information, safeguarding user privacy. This system ensures trust and transparency to the customers throughout the lottery and also displays the winner of the lottery to each and every participant of the lottery. The major advantages of the proposed system lie in its commitment to fairness, scalability and reduction of transaction costs. It ensures fairness where eachand every customer have equal probability of winning by eliminating the unfair preference. It can handle large number of customers and also has low transaction costs by eliminating intermediaries. By addressing these key aspects, the system aims to provide a trustworthy and secure lottery experience for participants.



RESULT ANALYSIS

The result analysis of the system testing of the Flask web application yielded positive results, indicating that the application is fully functional, secure, and scalable. All features, including user authentication, ticket purchasing, and winner selection, performed with accuracy. Integrationbetween the Flask backend, MongoDB database, and Genesis block was seamless. The user interface proved to be intuitive, responsive, and compatible across devices and browsers. Security measures were effective in protecting user data, and the application demonstrated strong performance under varying load conditions.

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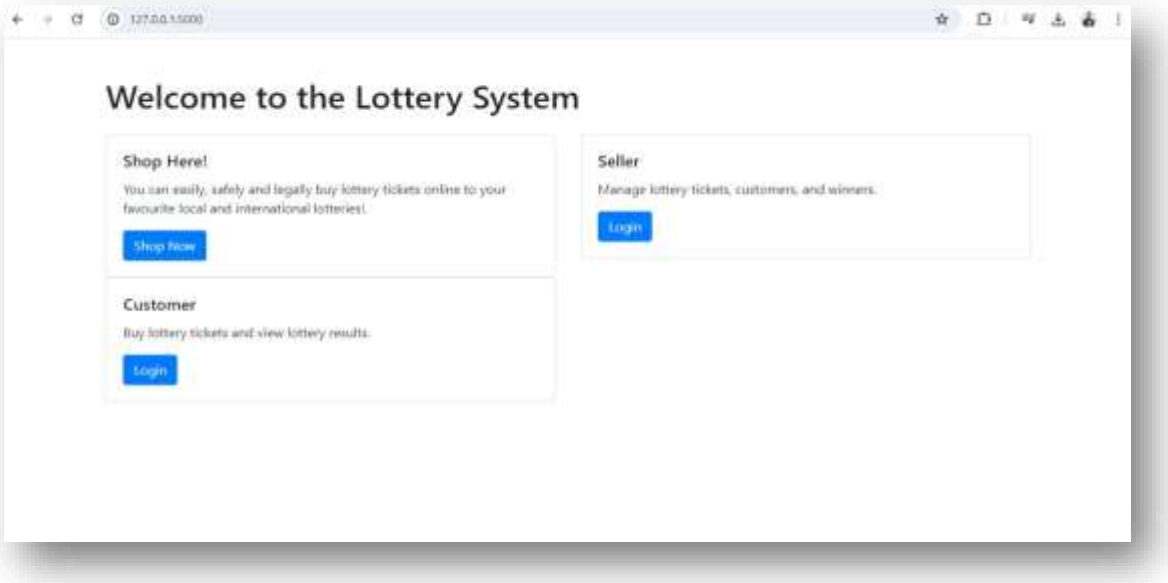

Fig.1. Home Page

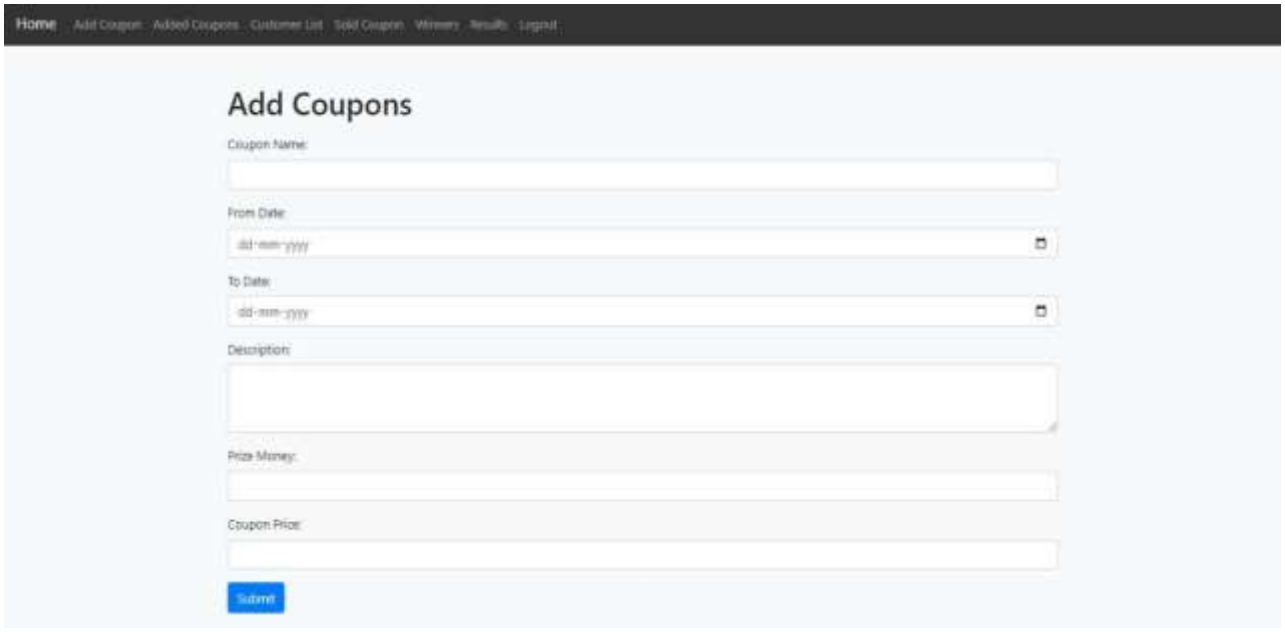

Fig.2. Adding Lottery Coupon

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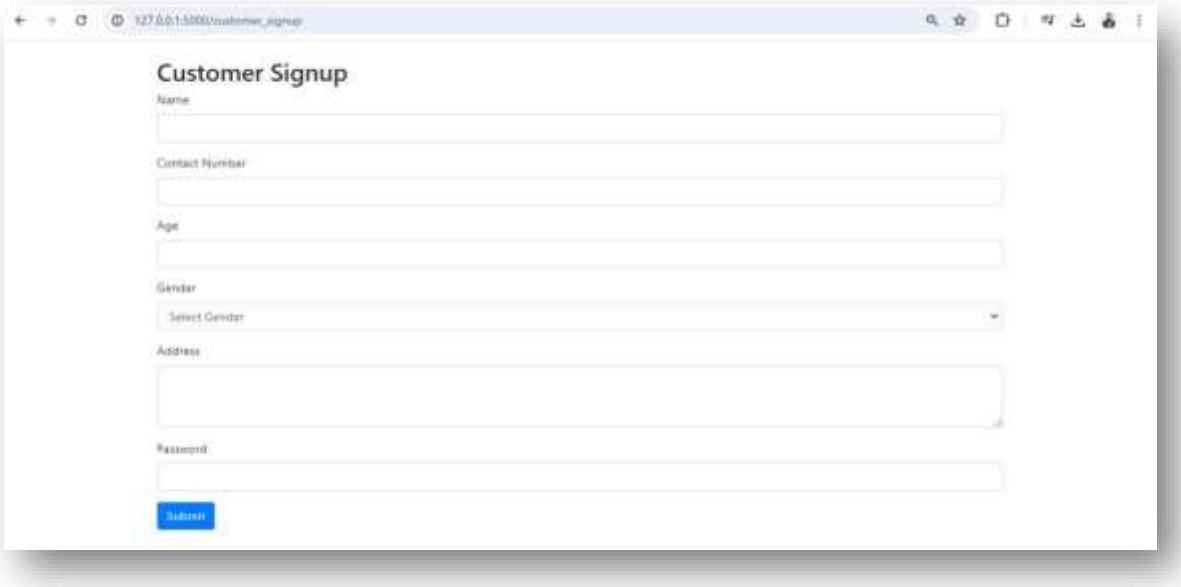

Fig.3. Customer Registration

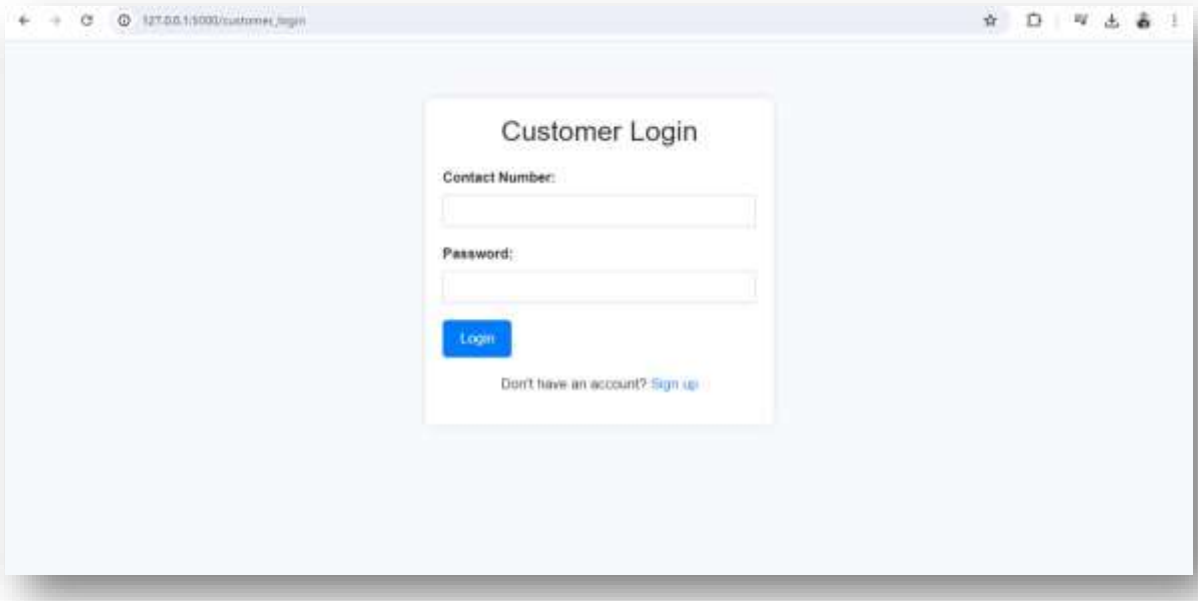

Fig.4. Customer Login

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Fig.5. Customer Home Page

Fig.6. Winner Selection

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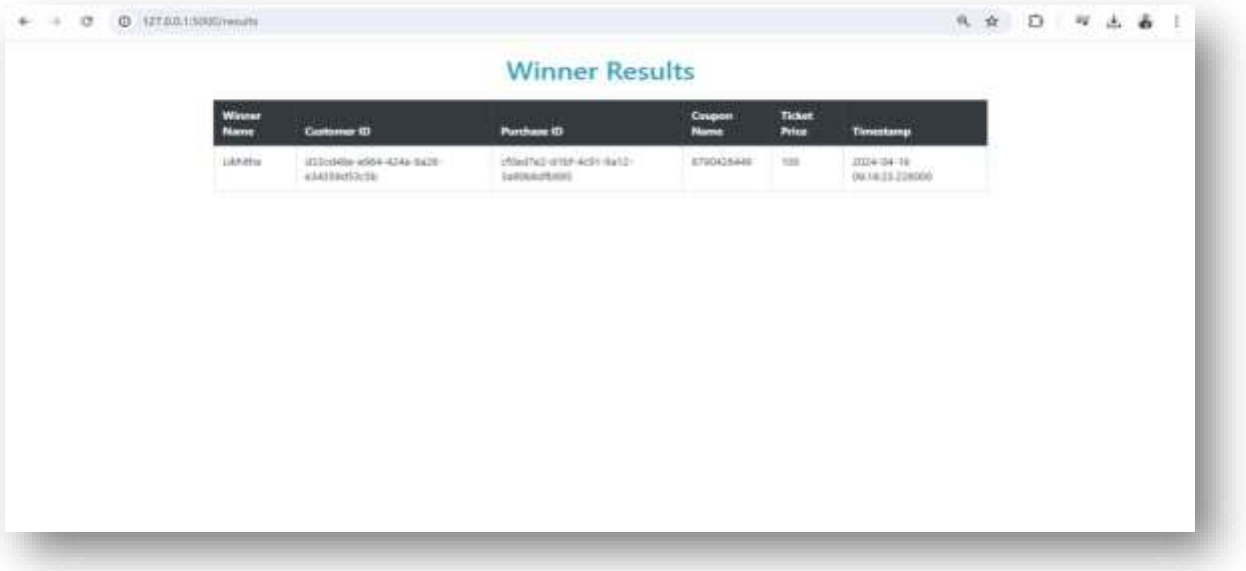

Fig.7. Lottery Winner Result

CONCLUSION

The proposed blockchain-based lottery system offers a promising solution to address transparency and fairness issues prevalent in traditional lottery industries. By leveraging blockchain technology and smart contracts, the system ensures integrity, immutability, and transparency throughout the lottery process. In the registration, prize pool management and selection of winners and transferringthe prize to the winner by identifying their unique wallet address.

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