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RESEARCH ARTICLE

Inside the decentralised casino: A longitudinal study of actual cryptocurrency gambling transactions

Oliver J. Scholten*, David Zendle, James A. Walker

Department of Computer Science, University of York, York, Yorkshire, United Kingdom

* ojs524@york.ac.uk

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Abstract

Decentralised gambling applications are a new way for people to gamble online. Decentralised gambling applications are distinguished from traditional online casinos in that players use cryptocurrency as a stake. Also, rather than being stored on a single centralised server, decentralised gambling applications are stored on a cryptocurrency's blockchain. Previous work in the player behaviour tracking literature has examined the spending profiles of gamblers on traditional online casinos. However, similar work has not taken place in the decentralised gambling domain. The profile of gamblers on decentralised gambling applications are therefore unknown. This paper explores 2,232,741 transactions from 24,234 unique addresses to three such applications operating atop the Ethereum cryptocurrency network over 583 days. We present spending profiles across these applications, providing the first detailed summary of spending behaviours in this technologically advanced domain. We find that the typical player spends approximately $110 equivalent across a median of 6 bets in a single day, although heavily involved bettors spend approximately $100,000 equivalent over a median of 644 bets across 35 days. Our findings suggest that the average decentralised gambling application player spends less than in other online casinos overall, but that the most heavily involved players in this new domain spend substantially more. This study also demonstrates the use of these applications as a research platform, specifically for large scale longitudinal in-vivo data analysis.

Introduction

Decentralised gambling applications are a new form of online gambling which use cryptocurrency technology to process payments and calculate game outcomes [1]. These applications vary in terms of the games they provide, and the cryptocurrencies they use. This work focuses on simple casino type games of chance, like dice rolls and coin flips, available through several applications operating atop the Ethereum cryptocurrency network. The Ethereum network is the oldest and most popular by market capitalisation of cryptocurrency networks which explicitly support smart contracts (see https://www.coinbase.com/, accessed 12/11/2019). These contracts, which are computer programs, are the core technology enabling these applications [2].

Blockchain for Gambling

... A Revolution in Betting and Gaming

Name : Aarya Lotke
Class/Div : D17C/30

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Introduction

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Decentralised gambling applications are a new form of online gambling which use cryptocurrency technology to process payments and calculate game outcomes.

02

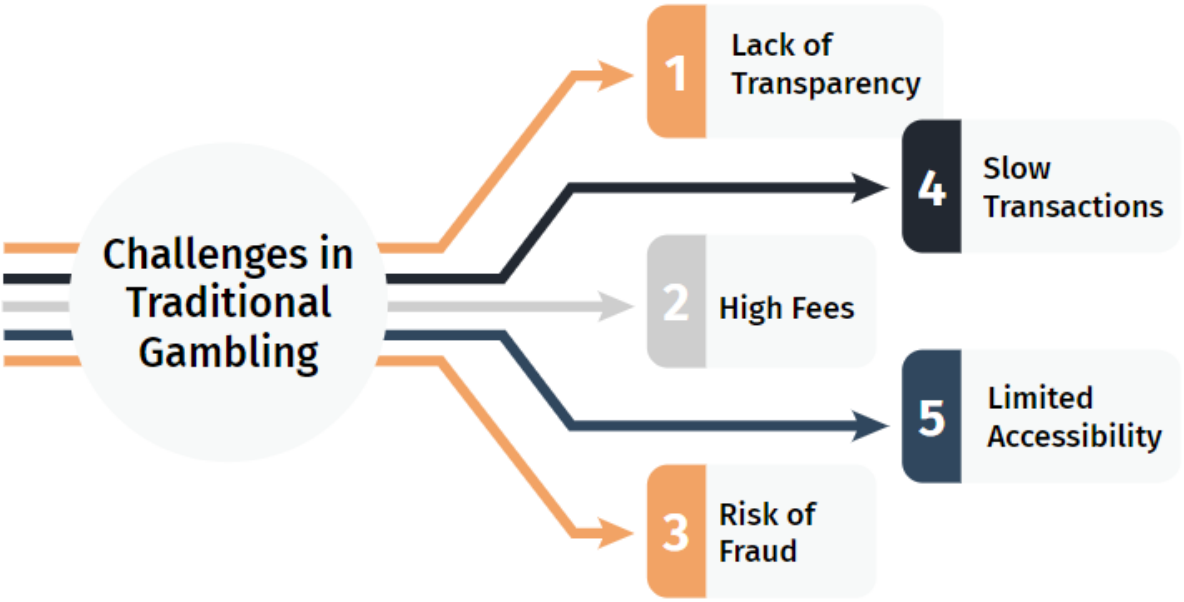
Online gambling is the most rapidly growing mode of gambling; however, players are subject to fraud and cheating by other players and reliant on third-parties to ensure that games and monetary transactions are fair.

03

Online gambling platforms that exclusively operate with forms of cryptocurrencies, such as Bitcoin and Ethereum, are colloquially referred to, by online users, as "crypto casinos."

04

The blockchain system fulfills the ultimate dream of many game players, the items they owned in the virtual world are non-fungible, exchangeable, inheritable, and independent to the game service provider.



Blockchain Advantages in Gambling

01 Transparency and Fairness

Blockchain's transparency ensures that all transactions and game outcomes are visible and verifiable. It eliminates doubts about the fairness of games.

02 Security and Anonymity

Users are identified by their wallet addresses rather than personal information, providing a level of anonymity not always found in traditional gambling.

03 Global Accessibility

Blockchain enables anyone with an internet connection to participate in gambling, eliminating geographical barriers.

04 Cross-Platform Compatibility

Cryptocurrencies used in blockchain gambling are often compatible across various platforms and can be easily transferred between different gambling sites or casinos.

Smart Contracts in Gambling

Smart contracts in gambling are self-executing contracts with predefined rules and conditions encoded on a blockchain. These contracts automatically execute and enforce the terms of bets or wagers, eliminating the need for intermediaries and ensuring transparency and fairness.

Let's take an example of Dice Roll game :

Step 1: Game initialization
- The casino has a smart contract template for the dice roll game, which includes the rules of the game, the available bets, and the odds.

Step 2: Placing a bet
- User A places a bet by interacting with the corresponding smart contract.
- The smart contract deducts the bet amount from User A's cryptocurrency wallet and records the transaction on the blockchain.

Step 3: Random Number Generation
- The smart contract generates a random number that corresponds to the result of rolling a six-sided die.

Step 4: Determining the Outcome
- The outcome is recorded on the blockchain.

Step 5: Payout or Detection

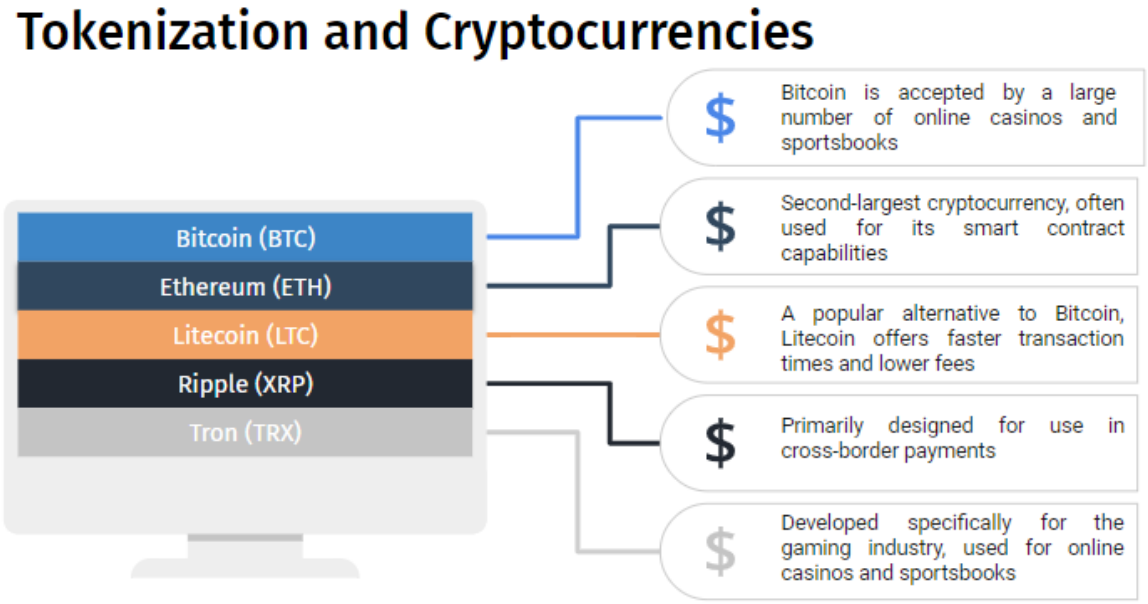
- If User A wins the dice roll game, the smart contract automatically calculates the winnings based on the predefined odds and transfers the winnings to User A's wallet.
- If User A loses, the smart contract deducts the bet amount from their wallet.

Step 6: Verification and Transparency

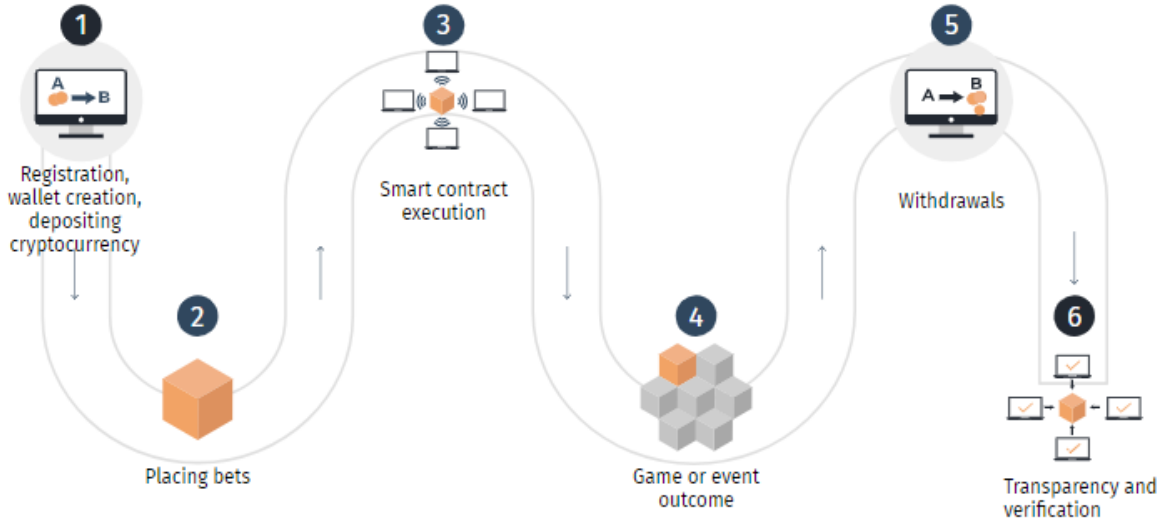
- All actions related to the dice roll game, including random number generation, outcome determination, and transaction recording, are transparently recorded on the blockchain.
- Players can independently verify the fairness of the game.

Step 7: Autonomy and Trustlessness

- The entire dice roll game operates autonomously based on the rules encoded in the smart contract.
- Users do not need to trust the casino, as the smart contract enforces the game rules and payout conditions transparently.



Real-World Use Case



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EXP 6

CONTRACT 1:

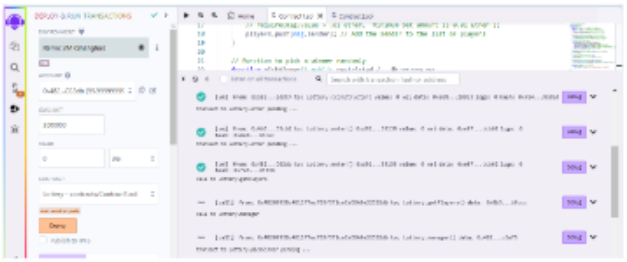
```
contract Lottery {
    address public manager;   // The manager of the lottery
    address public winner;    // The address of the current winner
    address[] public players; // List of players who entered the lottery

    constructor() {
        manager = msg.sender; // Set the contract deployer as the manager
    }

    // Function to enter the lottery by sending a certain amount of Ether
    function enter() public payable {
        // require(msg.value > .01 ether, "Minimum bet amount is 0.01 Ether");
        players.push(msg.sender); // Add the sender
    }

    // Function to pick a winner randomly
    function pickWinner() public restricted {
        require(players.length > 0, "No players in the lottery");
        uint winnerIndex = random() % players.length; // Generate a random index
        winner = players[winnerIndex]; // Set the winner's address
        address payable winnerPayable = payable(winner); // Convert to payable address
        winnerPayable.transfer(address(this).balance); // Transfer the contract's balance to
the winner
        players = new address[](0); // Reset the list of players
    }

    // Function to get the list of players
    function getPlayers() public view returns (address[] memory) {
        return players;
    }
```

CONTRACT 2:

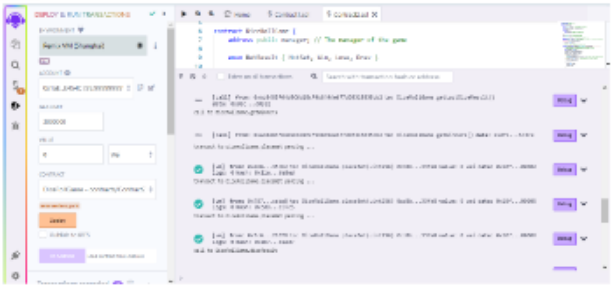
```
contract DiceRollGame {
    address public manager; // The manager of the game

    enum BetResult { NotSet, Win, Lose, Draw }

    struct Bet {
        address player;
        uint betValue; // Chosen bet value (1-6)
        BetResult result;
    }

    Bet[] public bets; // List of bets placed
    uint public diceResult; // The result of the dice roll

    mapping(address => uint) public playerBets; // Map players to their chosen bet values
    address[] public winners; // List of winners

    constructor() {
        manager = msg.sender;
    }

    // Function to place a bet on a dice roll (1-6)
    function placeBet(uint _betValue) public payable {
        require(_betValue >= 1 && _betValue <= 6, "Invalid bet value (must be 1-6)");
        // require(msg.value > 0, "Bet amount must be greater than 0");

        uint playerBet = msg.value;

        diceResult = generateRandomDiceRoll();
```

EXP 6

CONTRACT 1



CONTRACT 2



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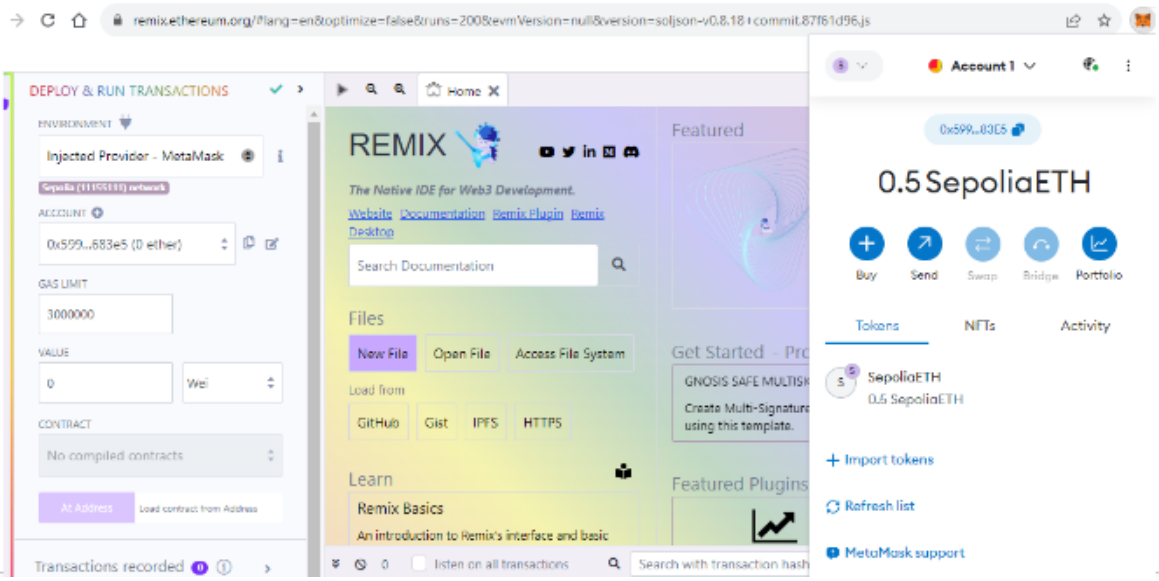
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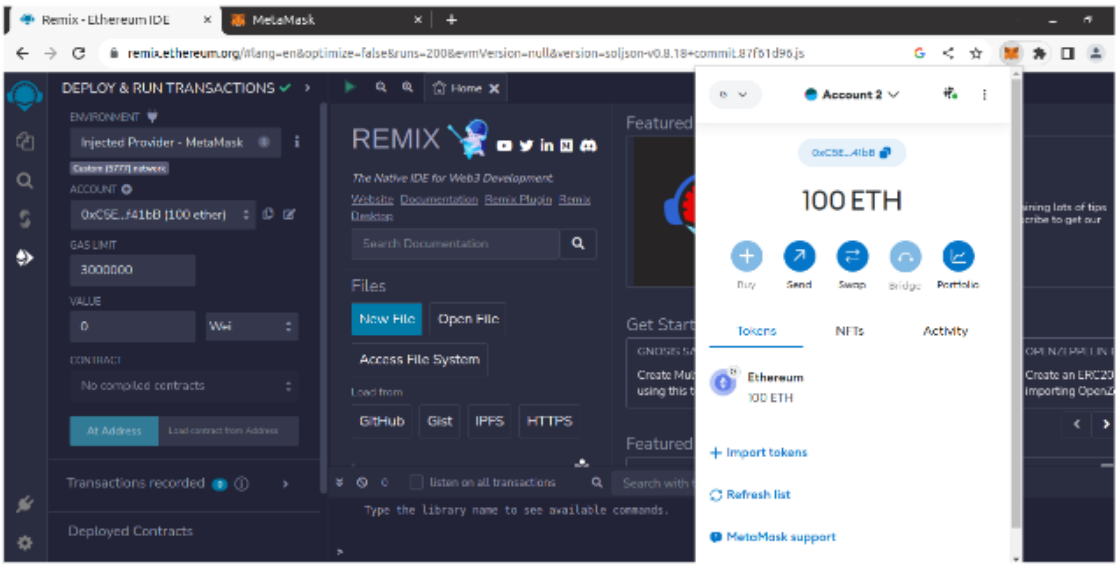
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