BLOCKCHAIN BASED GAMING AND DIGITAL ASSETS

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***Abstract*— The rise of blockchain technology has revolutionized digital ownership, giving birth to the concept of decentralized and tamper-proof assets, particularly in the domain of gaming and digital collectibles. This project, titled Blockchain- Based Digital and Game Assets Website, is a front-end web application designed using HTML, CSS, and JavaScript in the Visual Studio Code (VS Code) development environment. The application aims to create an interactive and user-friendly platform that enables users to view, trade, and manage block chain-based digital assets, such as in-game items, skins, avatars, collectibles, and tokens. These assets are typically backed by non- fungible tokens (NFTs), ensuring authenticity, transparency, and verifiable ownership. By integrating blockchain principles with modern web design, this website aspires to be a gateway into the future of decentralized digital gaming economies. The primary focus of this application lies in building a responsive and visually appealing front- end interface that communicates with blockchain APIs and smart contracts, facilitating real-time interactions without the need for intermediaries. The front-end is built using semantic HTML5 for structured content, CSS3 for stylish and adaptive layouts, and JavaScript for dynamic content rendering, user interactions, and API integrations. The VS Code environment was selected due to its rich ecosystem of extensions, debugging capabilities, Git integration, and real-time collaboration tools, all of which greatly enhanced development efficiency. Furthermore, the application is optimized for both desktop and mobile platforms to ensure accessibility for all users.**

Keywords_

html, css, javascript, python, ganache, metamask, solidity, visual studio

INTRODUCTION

In recent years, the gaming industry has significantly evolved, propelled by advancements in technology and an ever-increasing demand for innovative experiences. Central to this transformation is the emergence of **blockchain technology**, which is gradually reshaping how digital assets are created, owned, and traded within virtual environments. This shift marks a pivotal moment not only in gaming but also in broader discussions surrounding digital asset ownership, indicating a potential transition away from traditional gaming frameworks that have long dominated the scene.

Blockchain can facilitate fair and player-centric transactions with its transparency and proof. Players can participate in the open market to trade their NFTs, whose values are determined by supply and demand. This encourages players and allows community members to understand the virtual world of the game. Through the Decentralized Autonomous Organization (DAO), players can collectively manage the development of the game,shape the future of the game through voting, and allocate resources. This leads to better collaboration and cooperation not only for the consumer, but also for the players who contribute to the creation of the games they love. It is still in its infancy. But the potential benefits are undeniable. By solving long-standing issues of ownership, security and governance, blockchain has the potential to revolutionize online gaming, creating safer, more transparent and ultimately better games for players.

I. LITERATURE REVIEW

Paper 1: Tian Min, Hanyi Wang, Yaoze Guo and Wei Cai. Blockchain Games: A Survey

The future of video games could be written on blockchain ledgers, as the research paper explores the potential and drawbacks of this phenomenon. Blockchain games are a new type of games that use blockchain technology and are expected to revolutionize how players interact with the virtual world. This study highlights the benefits and challenges of this new approach. Unlike traditional games, where main players rent virtual items, blockchain makes them the owners of assets such as weapons or characters in the game. This opens the door for independent players to trade these items with others via a secure and transparent blockchain network.Imagine selling your hard-earned swords to other players; This is all possible thanks to tamper- proof data records stored on the blockchain. Additionally, this technology has the potential to transform the business process by making it transparent and fair. All transactions and ownership of products are immutably recorded on a public ledger, reducing the risk of fraud or manipulation. This can lead to more enjoyable gameplay and a sense of security for players who invest time and resources into the game. The main problem is the lack of proper construction and participation in the game right now. Although this technology is undeniably innovative, it is still in its infancy. Developers are working hard to create games that not only leverage the power of blockchain but also provide players with fun and engaging experiences. Moreover, the technology itself faces problems in making large-scale products that can become the centerpiece of popular games played by big players. Imagine being stuck in the middle of a boss battle due to the blockchain network being overloaded! Vulnerabilities are also a concern because they can be used to steal valuable in- game assets,damaging the player's trust and investment. Chain games have great potential. They can transform the industry by giving real ownership to players, promoting equitable technology, and enabling new business models. Players can feel connected to the gameworld, and transparency can reduce cheating and create more entertaining games.

Paper 2: Yiming Lai, Sizheng Fan, and Wei Cai. Quantitative Analysis of Play-to-Earn Blockchain Games: A Case Study of Axie Infinity

The growth in Play-to-Earn (P2E) blockchain gaming is comparable to real money (RMT) in traditional gaming. Both systems allow players to convert in-game virtual assets into real-world currency. However, P2E runs on blockchain technology, a feature that is often restricted by traditional game developers due to concerns about loss of money and gaming inequity in RMT. This research paper uses Axie Infinity as an example to examine P2E games from the perspective of player behavior. Researchers were able to create player matching by analyzing large datasets of more than 200 million transactions from approximately 9.4 million unique players.Research results show that the majority of players (about 70%) joined Axie Infinity at the initial stage, and the main motivation is to earn in-game tokens. This shows that “making money playing” is a key driver for player engagement. Interestingly, this study found that time spent playing the game was a strong indicator of a player's level of knowledge in the game, as was how active they were in trading. The research revealed a worrying trend: A small number of high-profile employees control a significant portion of the gaming industry. In the long run, this perception of power can impact the overall health of the P2E ecosystem. Overall, this article provides insight into player behavior and potential issues in the changing landscape of P2E blockchain games.

Paper 3: Igor Ershov. Blockchain gaming: An analysis of the use of blockchain technology in the video gaming industry

n the rapidly evolving landscape of video games, blockchain

technology into large-scale gaming environments, hindering its potential to revolutionize the industry.

Nevertheless, despite these challenges, the research concludes that the true value of blockchain lies in its ability to enhance existing video games, particularly those with well-established internal economies. Rather than serving as the central defining aspect of the game, blockchain technology can be leveraged as a valuable and complementary tool. By offering features such as true ownership, enhanced security, and deeper player engagement, blockchain has the potential to significantly enrich the overall gaming experience for players and developers alike.

II. DETAILS OF TECHNOLOGY

1. Blockchain Technology- An Overview:

Blockchain technology has emerged as a revolutionary force, fundamentally changing how we record and share information. At its core, blockchain is a distributed digital ledger that enables secure, transparent, and tamper-proof recording of transactions across a network of computers. This eliminates the need for a central authority, fostering trust and collaboration in environments where traditional intermediaries may be inefficient or unreliable.

Although blockchain is often associated with cryptocurrencies such as Bitcoin, its potential extends far beyond finance. Its special properties(immutability, transparency and security) make it a solution for many applications. This research paper delves into the inner workings of blockchain technology, exploring its core concepts and consensus processes. We will examine the historical development of blockchain and trace its emergence as a concept in the late 1980s and early 1990s to its first use in the Bitcoin network in 2009. Potential applications show its development in supply chain management, voting, and similar areas. self regulation. This article aims to better understand this disruptive technology and its potential to transform the future by examining the opportunities and challenges presented by blockchain.

Key characteristics of blockchain technology:

- **Ledger:** Blockchain uses an append-only ledger to provide a full transaction history. Transactions and values in a blockchain are not overridden,i.e, they are immutable, ensuring a complete and verifiable record.
- **Security:** Blockchains are cryptographically secure, employing strong encryption techniques, such as hashing and asymmetric encryption, to guarantee the data's integrity and prevent frauds.
- **Shared:** The ledger is shared amongst multiple participants within the network, promoting transparency and enabling all authorized users to view the history of transactions.
- **Distributed:** The blockchain can be distributed across a network of computers, enhancing its tolerance to attacks and system failures. By increasing the number of nodes or computers on the network, the potential for a single hacker to manipulate the system is highly reduced.

These characteristics position blockchain technology as a transformative force in various sectors such as:

- **Supply chain management:** Blockchain can track the movement of goods and materials through a supply chain with greater efficiency and transparency, improving traceability and reducing the risk of counterfeiting.
- **Voting systems:** Blockchain can create secure and transparent voting systems, reducing the potential for fraud and manipulation while increasing voter confidence.
- **Identity management:** Blockchain can securely store and manage identity information, minimizing the risk of identity theft and streamlining processes that rely on verifiable identification.
- **Healthcare:** Blockchain can be used to store and share medical records securely, improving patient care and reducing costs associated with data management.

Reviewing all the basic principles, development history and potential applications of blockchain technology, this research paper aims to provide valuableresources to understand this impact and its potential to change the way we interact with information in the future.

2. Blockchain for Gaming:

The video game industry, a global giant valued at about 152 billion dollars, faces discontent from both users/players and developers. Players express unhappiness with monetization practices like microtransactions and loot boxes, which can feel predatory and stifle innovation. Small developers, on the other hand, struggle to compete with industry leaders who cast long shadows with their financial backing and marketing resources.

Blockchain technology emerges as a potential solution. By securely recording transactions across a decentralized network, blockchain offers one of a kind advantages for both players and developers.

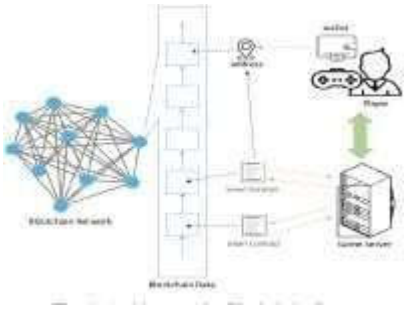

Fig 1. Architecture Diagram

A key feature of blockchain-based games is the ability for players to own in-game assets as non-fungible tokens (NFTs). These unique digital tokens stored on the blockchain grant players verifiable ownership of virtual items like weapons, armor, or even virtual land. This ownership extends beyond the confines of a particular video game, allowing players to freely trade their NFTs on marketplaces, thus growing a novel in-game economy.

Blockchain technology can also significantly benefit game developers. By leveraging decentralized networks, developers can potentially eliminate the need for expensive server maintenance, reducing development and upkeep costs. Additionally, the ownership model fostered by NFTs incentivizes user engagement. When players have a stake in the game's success through ownership of NFTs, they are more likely to promote the game and contribute to its longevity through content creation.

The standardization of digital assets through protocols such as ERC-721 has had a huge impact on business applications or dApps. A key feature is interoperability, which allows assets to operate seamlessly across different platforms. Assets that were previously limited to a single application can now be used by any dApp programmed to recognize their unique identifiers. For example, a user who receives a digital artwork as an in-game reward can place it in the museum dApp without any additional problems. By removing barriers to entry for new users, the overall income of the real estate market is improved. This allows developers to integrate work

directly into game tools. This programmability opens up

many possibilities for developers to create unique features and functions for different NFTs. It is not surprising that the most important points are represented. These unique symbols are often represented on items the player purchases or other assets in the game world. This universe consists of many games that share the same function. Thisallows players to use their assets in one game to progress in another. go down. These games work using coins that can only be earned in other available games. For example, the first "second" game was created using CryptoKitties tokens by third-party developers with no connection to the original CryptoKitties team. Players can participate in a variety of games using digital cats they raise in the main CryptoKitties app. Surprisingly, the original CryptoKitties developers realized

of the growing gaming ecosystem by committing money to help the official "Kittyverse". Estimated at $4 billion, it is another target of blockchain disruption. Blockchain-based gambling platforms promise to increase security and transparency compared to traditional online casinos. However, the widespread use of blockchain gambling faces significant challenges as online gambling is heavily regulated or banned in many regions. By empowering gamers and creating a more collaborative environment for developers, blockchain can usher in a new era of innovation and user satisfaction. However, issues such as the management of online gambling need to be resolved. As the video game industry continues to evolve, it will be interesting to see how blockchain could become the ultimate force that changes the way we play games.

3. Cryptocurrency:

Cryptogames are a new type of video game that uses blockchain technology and cryptocurrency. This lets players own and trade digital assets within the game for real-world money. This raises concerns because it's similar to gambling, but there are currently no regulations or restrictions for cryptogames.

These games are becoming more and more popular, with some generating millions of dollars in sales. The gaming industry is also interested, with major companies investing money in the development of new cryptogames.

Now we delve into the technological components of cryptocurrency and blockchain. Cryptocurrencies, powered by blockchain technology, have fundamentally transformed the financial landscape. This paper explores the core technological underpinnings of cryptocurrencies and the associated security considerations.

Core Technologies

- Finite Supply: Cryptocurrencies have a predetermined issuance limit, preventing inflation and ensuring scarcity.

- Decentralized Control: Unlike traditional currencies

the potential of this app and even showed their understanding

computers geographically dispersed but still able to access and process data consistently.

Cryptocurrency Protocols

Cryptocurrency protocols, often confused with blockchain technology, define the rules governing cryptocurrency operations within a specific ecosystem. These protocols typically encompass:

* **Incentives:** Mechanisms to encourage participation in the cryptocurrency network (e.g., mining rewards).
* **Cryptography:** Techniques for secure communication and transaction validation (e.g., digital signatures).

Consensus Mechanisms: Algorithms for achieving agreement on the state of the distributed ledger (e.g., Proof of Work)

Security Mechanisms

- Asymmetric Encryption: Public and private key cryptography safeguards transactions and user accounts. Public keys verify the authenticity of transactions, while private keys grant access to cryptocurrency holdings.
- Secure Multi-party Computation: This technology has the potential to increase privacy in the cryptocurrency industry by allowing many people to come together to calculate events without revealing their private opinions.

Challenges and Considerations

- Security Vulnerabilities: Despite powerful security mechanisms, cryptocurrencies remain vulnerable to attacks targeting user accounts and exchanges due to a lack of user awareness and potential system vulnerabilities.
- Privacy Concerns: While asymmetric encryption protects data, user privacy can still be compromised through Remote Procedure Call (RPC) interfaces or information leaks.
- Scalability and Stability: The public nature of some blockchains raises scalability concerns, and the reliance on mining can contribute to price volatility, impacting the overall stability of cryptocurrencies.

Table 1: Normal currency vs. Cryptocurrency

Ethereum Crypto-games: Technical Properties

The game runs on the Ethereum cryptocurrency and uses digital wallets with public-private key pairs for authentication and transactions. Players can purchase cryptocurrencies using real money and then use the cryptocurrencies to purchase in-game ems. Unilike traditional in-game currencies, these cryptogame currencies can be exchanged for real money and used outside of the game. All actions in the game must be calculated by the network, verified and paid with cryptocurrency. This fee encourages participation in the game by distributing some or all of the fees to network partners.Players can also trade using non-federated wallets. Some games even include cryptocurrency exchanges to make currency exchange easier.

4. Smart Contracts:

Smart contracts are self-executing programs deployed on blockchain technology designed to facilitate, verify, and enforce the terms of a contract agreement. They eliminate the need for intermediaries by providing a secure and decentralized platform for transaction execution and compliance.

Technical Aspects

- Automated Execution: Smart contracts trigger actions automatically upon fulfillment of predetermined conditions encoded within the program itself .
- Blockchain Integration: Smart contracts reside on a distributed ledger, ensuring immutability and tamper-proof recording of all transactions .
- Cryptographic Tools: Programming languages and cryptography are used to define the contract's logic and outcomes.

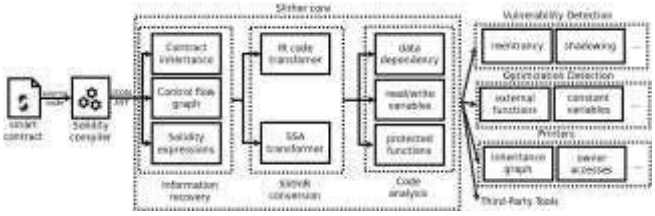

Fig 2: Smart Contracts

Challenges and Opportunities

- Limited Scope: Currently, smart contracts are best suited for agreements where execution can be objectively assessed by the computer program.
- Dispute Resolution: The absence of a legal framework for smart contracts creates uncertainties in dispute resolution, as evidenced by court rulings related to cryptocurrency.

Recent Advancements

Technical Advancements and Categorization

The paper delves into various areas where smart contract technology has seen significant progress. These advancements are categorized into several key domains:

- Cryptography: This area focuses on enhancing cryptographic primitives used in smart contracts to guarantee data integrity, confidentiality, and authenticity during transactions.
- Access Management: This domain explores techniques for implementing robust access control mechanisms using smart contracts. This includes solutions like attribute-based access control (ABAC), federated identity management, and role-based access control (RBAC).
- Social Application: This section investigates the use of smart contracts in social contexts, potentially enabling novel applications and functionalities.
- Smart Contract Structure: This domain explores advancements in the design and development of smart contracts themselves, focusing on improving efficiency, scalability, and security.

Proposed Research Schemes

The document introduces several research proposals aimed at bolstering smart contract security and access management:

- Decentralized Public Key Infrastructure (PKI): This approach leverages the power of blockchain technology to create a more secure and verifiable PKI system for smart contracts.
- Quantum Money Scheme: This scheme utilizes smart contracts to facilitate the verification process of banknotes, potentially mitigating counterfeiting risks in a quantum computing era.

Access Management with Smart Contracts

The paper highlights several access management solutions that can be implemented using smart contracts:

- IoT Access Control: Smart contracts can manage access permissions for Internet of Things (IoT) devices, ensuring secure communication and data exchange.
- Federated Identity Management: By leveraging blockchain technology, smart contracts can enable federated identity management solutions, allowing users to control their digital identities across different platforms.
- Attribute-Based Access Control (ABAC): Integrating ABAC with smart contracts enables fine-grained access control based on user attributes and policies.
- Role-Based Access Control (RBAC): Smart contracts can enforce RBAC policies, granting access based on predefined user roles within a system. This approach can balance user authentication and anonymity with robust security measures.

Future Potential

Despite the challenges, smart contracts offer promising opportunities for streamlining contract execution and fostering trust in digital transactions. As legal frameworks evolve and technical capabilities expand, smart contracts have the potential to revolutionize various aspects of agreement formation and management.

5. Security on Blockchain:
Blockchain Security Properties

This section delves into the fundamental security properties that blockchain technology offers. These properties stem from the cryptographic underpinnings of blockchain and the design choices implemented in Bitcoin, the first successful cryptocurrency.

Consistency

The concept of consistency in blockchain means that all nodes in the network always maintain the same ledger. There is debate about the trueconsensus model adopted by blockchain. Some argue that Bitcoin maintains consistency, a weak form that allows temporary conflicts when updates aremade. Others claim that Bitcoin has a strong consensus model to ensure that all nodes have the same list at the same time. radiate. This can lead to asituation where the node can read stale data. Strong consistency, on the other hand, ensures

that all nodes have the latest information, but can impactperformance due to the additional latency of waiting for updates to be released. balance of standards. A certain amount of confirmations (blocks addedon top of the block containing the transaction) are required for a transaction to be considered final and immutable. This configurable parameter allows fora balance between consistency and usability.

Tamper Resistance

Tamper resistance refers to the blockchain's ability to prevent unauthorized modifications to transaction data. This property is achieved through a combination of cryptographic techniques:

- Secure Hashing: Each transaction is cryptographically hashed using a collision-resistant hash function like SHA-256. Any alteration to the transaction data would result in a completely different hash value, making the tampering evident.
- Digital Signatures: Transactions are signed by the sender using a secure digital signature algorithm (e.g., ECDSA). This ensures only the owner of the associated private key can modify the transaction and that any changes can be easily detected by verifying the signature with the sender's public key.
- Distributed Ledger: Due to the distributed nature of the blockchain, modifying data on a single block would require altering all subsequent blocks as well. The computational infeasibility of achieving this makes tampering highly improbable.

Resistance to DDoS Attacks

Denial-of-service (DoS) attacks aim to disrupt a service by overwhelming it with traffic. Blockchains are resilient against DDoS attacks because of their decentralized nature. Even if a significant portion of the network goes offline, the remaining nodes can continue processing transactions. The larger the blockchain network, the harder it becomes to launch a successful DDoS attack.

Resistance to Double-Spending Attacks

Double-spending refers to the fraudulent act of spending the same digital currency twice. Bitcoin's consensus protocol safeguards against this by ensuring all transactions are included in the tamper-proof blockchain ledger. Every transaction is verified and cryptographically linked to the previous block in the chain, making it impossible to modify past transactions and spend the same coins multiple times.

Resistance to 51% Attacks

The 51% attack is a theoretical threat where a malicious entity controls more than half of the mining power on the network. This could allow them to manipulate transaction history and potentially reverse confirmed transactions. However, the computational resources required to achieve a 51% attack on major blockchains like Bitcoin are immense and economically infeasible for most attackers.

Pseudonymity

Blockchain transactions utilize pseudonymous addresses instead of users' real identities. These addresses are derived from the hash of a user's public key, offering a degree of privacy while still allowing for transaction verification. It's important to note that pseudonymity is not anonymity, and advanced techniques might be used to link pseudonymous addresses to real-world identities.

This paper provides a technical analysis of the core security properties that blockchain technology offers. Understanding these properties is crucial for evaluating the suitability of blockchain for various applications and implementing additional security measures when necessary.

III. EXPERIMENTAL WORK

1. Extracting User Behaviour Patterns in Axie Infinity through On Chain Data Analysis:

This section focuses on the technical aspects of extracting user behavior patterns in Axie Infinity using on-chain data from the Ronin blockchain.

Fig 3: Framework of Value Transfer in Axie Infinity

Data Acquisition and Preprocessing

- Data Source: The primary data source is on-chain data from the Ronin blockchain, encompassing the period from April 28th, 2021, to January 27th, 2022. This timeframe captures the rise and subsequent decline in the game's popularity.
- Data Collection: Covalent API is employed to efficiently retrieve publicly available records of addresses interacting with Axie Infinity's smart contracts.
- Data Processing:
    - Log Event Decoding: Raw data consists of encoded log events for four smart contract addresses مرتبطة (mutabaqiqah - related to)

core gameplay functionalities (e.g., breeding, claiming SLP). These events are decoded to extract meaningful information regarding each player interaction.

- Transaction Record Construction: Decoded log events are grouped and synthesized based on transaction hashes to construct a comprehensive record for each transaction.
- Player-Centric View: Transactions are further regrouped by player wallet addresses, establishing a chronological sequence of each player's activities within the game.
- Feature Engineering: Based on the transaction data, eleven features are extracted to quantify player behavior. These features include:
  - Frequency and volume of SLP claims and transfers
  - Frequency and volume of AXS transfers
  - Breeding activity (frequency)
  - Trading activity (frequency of buying and selling Axies)
  - Duration of player engagement (days)
- Normalization: Zero-mean normalization is applied to the features prior to clustering to mitigate the influence of data type variations and ensure features contribute equally to the distance metric.

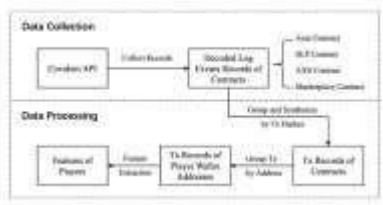

Fig 4: Data Collection and Processing Process

Clustering Methodology

- K-means Clustering: This unsupervised learning algorithm is chosen for player segmentation based on their behavioral patterns. K-means aims to minimize the total distance between data points and their corresponding cluster centers.
- Number of Clusters (k): The optimal number of clusters (k) is determined through experimentation. Manual evaluation based on cluster interpretability and silhouette analysis suggests k=7 as the most suitable choice for this study.

IV. RESULTS

Daily Statistics and User Behaviour in Axie Infinity

This section explores the operational status of Axie Infinity through daily statistics and user behavior patterns extracted from on-chain data.

Daily Statistics

The provided figure showcases daily active users (DAU), new players, AXS price fluctuations, Axie floor price variations, and the game's unstacked revenue (marketplace and breeding fees) throughout the study period. Additionally, the figure chronologically presents various gameplay balance adjustments and economic modifications implemented by the developers.

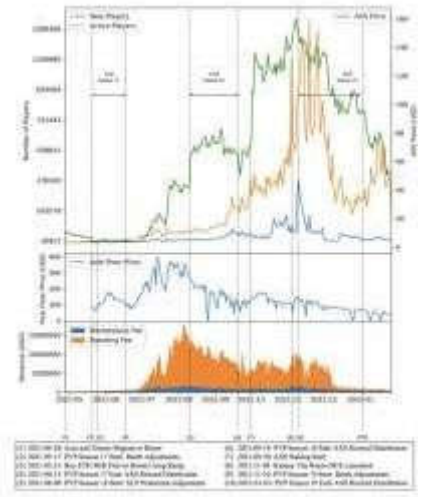

Fig 5. Daily Statistics

Key observations from the daily statistics analysis include:

- Economic adjustments, particularly those enhancing market liquidity, significantly impacted the game's ecosystem compared to battle balance adjustments.
- PVP seasons yielded substantial fluctuations in AXS price, creating opportunities for token speculation.
- Breeding fees constituted the primary revenue source, highlighting the significance of new Axie creation and AXS token value.

These findings suggest that economic incentives heavily influence player behavior within the Axie Infinity ecosystem.

Cluster Results

K-means clustering was employed to categorize player addresses into seven distinct clusters based on their behavioral patterns. Table I summarizes the characteristics of each identified cluster.

- Normal Players: These addresses exhibit balanced participation across various gameplay activities.
- Dabblers: Representing the majority (69.55%), this cluster showcases minimal engagement in all aspects of the game.
- Light SLP Farmers: Primarily focused on SLP farming with limited participation in other activities.
- Heavy SLP Farmers: Similar to light SLP farmers but with more intensive SLP claiming activity and a longer duration of gameplay.
- Ordinary Axie Breeders: Characterized by frequent breeding, selling, and transferring of Axies.
- Crazy Axie Breeders: Exhibit extremely high breeding, selling, and transferring activities.
- Axie Speculators: Engage in the most frequent buying and selling of Axies, suggesting an interest in asset speculation.

V. CONCLUSION

The potential of blockchain technology to revolutionize online multiplayer gaming is undeniable. Blockchain provides a solution to long-term problemsrelated to the ownership, security and management of assets in use by leveraging holistic principles such as decentralization, immutability, smartcontracts and transparency. The emergence of NFTs as a commercial representation of these assets empowers players and contributes to asuccessful, player-driven market economy. Additionally, blockchain's distribution and social interaction increases security and transparency, reducingthe risk of fraud or manipulation. Additionally, the ability to collaborate in blockchain-based online games helps players use their digital assets acrossmultiple platforms, increasing their value and power consumption. Blockchain also offers a new way to develop games through DAO, allowing players toshape the future of games and create a more collaborative and inclusive information environment. But the continued development of blockchaintechnology shows that the game has promise. As the industry continues to evolve, one thing is certain: Blockchain technology has the potential toempower gamers, innovate business, and usher in a new era of gamers' online gaming experience. Future research should delve deeper into specificusage strategies, explore the business implications of blockchain-based in-game marketing, and investigate users in the gaming community. Byanswering these questions, researchers can help understand the development of blockchain in the online gaming industry

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