

Block chain-Powered Crypto Arcade: Revolutionizing Cloud Gaming with Token Economy

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ABSTRACT_ Cloud gaming is a novel service provisioning technology that offloads parts of game software from terminals to powerful cloud infrastructures. However, the commercial charging model for cloud gaming is still in its infancy. In this paper, we reveal the deficiencies of existing cloud gaming pricing models and propose **CryptoArcade**, a token-based cloud gaming system that adopts cryptocurrency as a payment method. Using cryptocurrency, CryptoArcade provides a transparent and resource-aware pricing method, enabling a time-irrelevant silent payment on the floating price to protect players' interests, which avoids the Quality of Experience (QoE) degradation caused by traditional dynamic models. While CryptoArcade can solve the problem of pricing strategies, players still face decision headaches caused by commission overhead and pre-deposit amounts on blockchains. To better understand players' trading behaviors in

this decision-making process, we consider a marketplace where players trade tokens through smart contracts before gaming sessions. Considering the uncertainty of future token consumption, we use **Prospect Theory (PT)** in modeling and obtain the optimal solution in closed form. When compared with the benchmark **Expected Utility Theory (EUT)**, we show that, under the same external factors, EUT players are more likely to buy tokens than PT ones.

1.INTRODUCTION

CLOUD gaming, benefits that offload the game projects from the customary control center to the cloud, executes the center game rationale and game runtime on the cloud and passes the game substance on to the players by means of video transfer, which lessens the equipment asset necessity in the slender clients. We are presently getting a more strong variant of the cloud gaming future scene from the new declaration of a few major organizations.

During the Game Engineers Meeting (GDC) 2019 gathering, Google offered Stadia, a cross stage cloud gaming stage, intending to give cloud gaming administration through the program. In the mean time, Tencent Cloud delivered its cloud gaming arrangement at ChinaJoy 2019. As of late, Oppo gave a cloud gaming experience over 5G at Portable World Congress (MWC) 2019, while Microsoft will likewise test the xCloud game web-based feature in Korea over the 5G soon. Spurned World, the new hugely multiplayer online pretending game (MMORPG) from Wonderful World, likewise sent off a cloud variant on China Telecom's cloud gaming stage in 2020. Overall game and tech firms are investigating cloud gaming as a better approach to convey game administrations, and the beginning of 5G gave answers for the trouble spot of organization issues confronted with cloud gaming in the beyond couple of years, which likewise powered up this field. Widely studies have been led to advance cloud gaming administrations, including graphical delivering [2], edge distribution [3], data transmission assignment [4], server asset the board [5], and dynamic streaming [6]. Interestingly, barely any specialists explored novel cloud gaming valuing procedures, which take on playing time as their estimating models. The current cloud

gaming valuing methodology follows a customary time granularity evaluating in other distributed computing administrations. For instance, PlayStation Now1, the most well known working cloud gaming stage, accuses its clients of a month to month membership strategy. The players need to pay the membership charge ahead of time toward the start of a month to get to their cloud gaming administrations. Notwithstanding, this strategy infers a high prepaid cost, and that implies the players need to play adequate opportunity to make their installment beneficial. Thusly, the players with high help tenacity might profit from the month to month membership, while others might experience the ill effects of over-pay misfortune due to their restricted playing time. Simultaneously, the membership needs asset arrangement for every one of the bought in players on an enormous time scale, which prompts distributed computing asset inactive and squander. One more technique is the spot cost, as unique evaluating is utilized in cloud gaming, settling the past issues pleasantly in numerous irregular figuring administrations, which is fine-grained and reasonable to the market interest. For instance, Parsec2 applies an hourly spot valuing model, where the players pay \$0.5 to \$0.8 each hour as indicated by the host. Nonetheless, new issues arose in cloud

gaming while utilizing the spot cost. Cloud gaming administrations have high prerequisites for the nature of administration experience throughout a long constant time.

Drifting costs will straightforwardly drive players to change administration requests, which might pulverize players' administration experience. For instance, in the event that a quiet installment strategy is utilized, the players will be charged pay-more only as costs arise with a drifting cost. This will make players worried about their installment during the gaming meeting, as the need might arise to gauge the ongoing help cost and their equilibrium to decide how long they ought to or will play. In the event that utilizing installment demands all things being equal, as the fine-grained evaluating model requires an expense in view of a specific time unit, the continuous installment solicitations will likewise influence the players' gaming experience. One more issue with the spot cost is that the drifting cost in the installment cycle will be non-straightforward, which acquaints cost segregation gambles with the players. As players can have a good guess of the help value, the straightforward issue in installment permits the specialist co-op to control the cost with no security for players'

utility randomly. Thus, none of these valuing techniques is great by and by [7] [8].

2. LITERATURE SURVEY

- **"A Survey on Cloud Gaming: Future of Computer Games" by Shijie Wang, Yuanchun Shi, Feng Yang (2020)**

2 This paper provides an extensive review of cloud gaming technologies, highlighting the benefits and challenges of offloading game computations to cloud servers. It discusses various commercial charging models currently in use, their limitations, and the impact on user experience.

- **"Dynamic Pricing in Cloud Gaming Systems" by Anna L. Zhang, Michael K. Kim (2019)**

3 Zhang and Kim explore dynamic pricing models in cloud gaming, analyzing how price fluctuations affect player engagement and Quality of Experience (QoE). They highlight the need for more stable and predictable pricing methods to enhance user satisfaction.

- **"Blockchain Technology for Secure Cloud Gaming: A Survey" by Sarah M. Ibrahim, Ahmed E. Hassan (2021)**

4 This paper reviews the application of blockchain technology in cloud gaming,

focusing on its potential to enhance security, transparency, and payment systems. The authors discuss various blockchain-based solutions and their implications for the gaming industry.

- **"Behavioral Economics in Digital Games: Prospect Theory vs. Expected Utility Theory" by Jian Wang, Rachel S. Thomas (2018)**

5 Wang and Thomas compare Prospect Theory (PT) and Expected Utility Theory (EUT) in the context of digital gaming. Their research provides insights into player behavior under uncertainty, which is critical for designing effective pricing and reward systems in games.

- **"Token Economies in Blockchain Gaming: A Review" by Emily J. Perez, Lucas N. Foster (2022)**

6 Perez and Foster review various token-based economies in blockchain gaming, discussing how tokens are used for in-game purchases, rewards, and player transactions. They analyze the benefits and challenges of implementing such systems, including issues related to liquidity and player trust.

- **"Smart Contracts for Digital Goods: Applications in Gaming" by Oliver K. Nguyen, Sophia T. Johnson (2019)**

7 This paper explores the use of smart contracts in digital goods transactions, with

a focus on gaming. Nguyen and Johnson discuss how smart contracts can automate and secure player-to-player and player-to-platform transactions, enhancing the overall gaming experience.

3. PROPOSED SYSTEM

The framework proposes and carry out the principal cloud gaming framework named CryptoArcade. In particular, we embrace cryptographic money to take care of the issue of customary time granularity valuing and take on the extraordinary quiet installment strategy

to safeguard players' down experience while using registering assets. What's more, we influence the installment channel to address the presentation issues of the blockchain, giving minimal expense, quicker exchanges among players and the SP. Prospect Hypothesis based player conduct model and examination Because of the vulnerability of future symbolic interest looked by players in CryptoArcade when they trade tokens, we model players' conduct in light of prospect hypothesis considering the impact of token cost and gas expense on both EUT and PT players' procedures. Contrasted and the benchmark EUT, PT players are bound to purchase tokens under similar outer circumstances.

3.1 IMPLEMENTATION

Cloud Server

In this module, the Web Server has to login by using valid user name and password. After login successful he can do some operations such as View End User and Authorize, View Apps Developer and Authorize, Add Fileter, View all uploaded apps with rank and ratings details, View all Apps with review, co review and Recommend details, View all Search Rank Fraud User, View all Malware details for Apps, View all Apps pos and neg behaviors, View Secret key request and response, View App hits in chart (Rank), View App download in chart, View App Rating in chart

Apps Developer

Add App

In this module, the admin can add the applications. If the admin want add the new app, he will enter application name, app description, mobile type, users, file name, application images and click on register. The details will be stored in the database.

View application

In this module, when the admin clicks on view application, application name, app

description, mobile type, users, file name, application images will be displayed.

User

In this module, there are n numbers of users are present. User should register before doing some operations. After registration successful he has to login by using authorized user name and password. Login successful he will do some operations like, View Profile, Add Mobile name and Os, Select mobile name and OS and Upload apps with Appname, App uses, App desc(enc), App logo image, attach app, Add mobile booklet like Select mobile name and OS, View all uploaded apps with rank and ratings and Mobile Manuals

Search and download mobile apps

In this module user can search the mobile app type and click on search then he will enter application name, application images, view details of mobile app, enters application ID enter the secret key and download the file and send response to user.

Search for top K applications

In this module, user enter the application name and select the top N details then leading app details will be displayed such as application name, app description, mobile type, users, file name, application images and ratings will be displayed.

4.RESULTS AND DISCUSSION

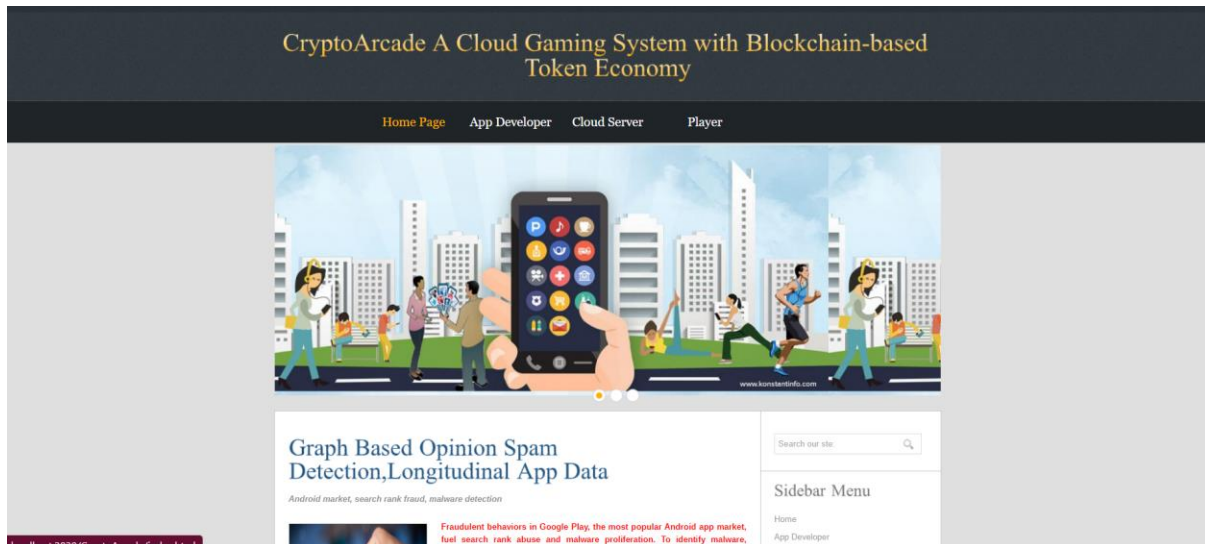


Fig 1: MAIN PAGE



Fig 2: CLOUD MENU

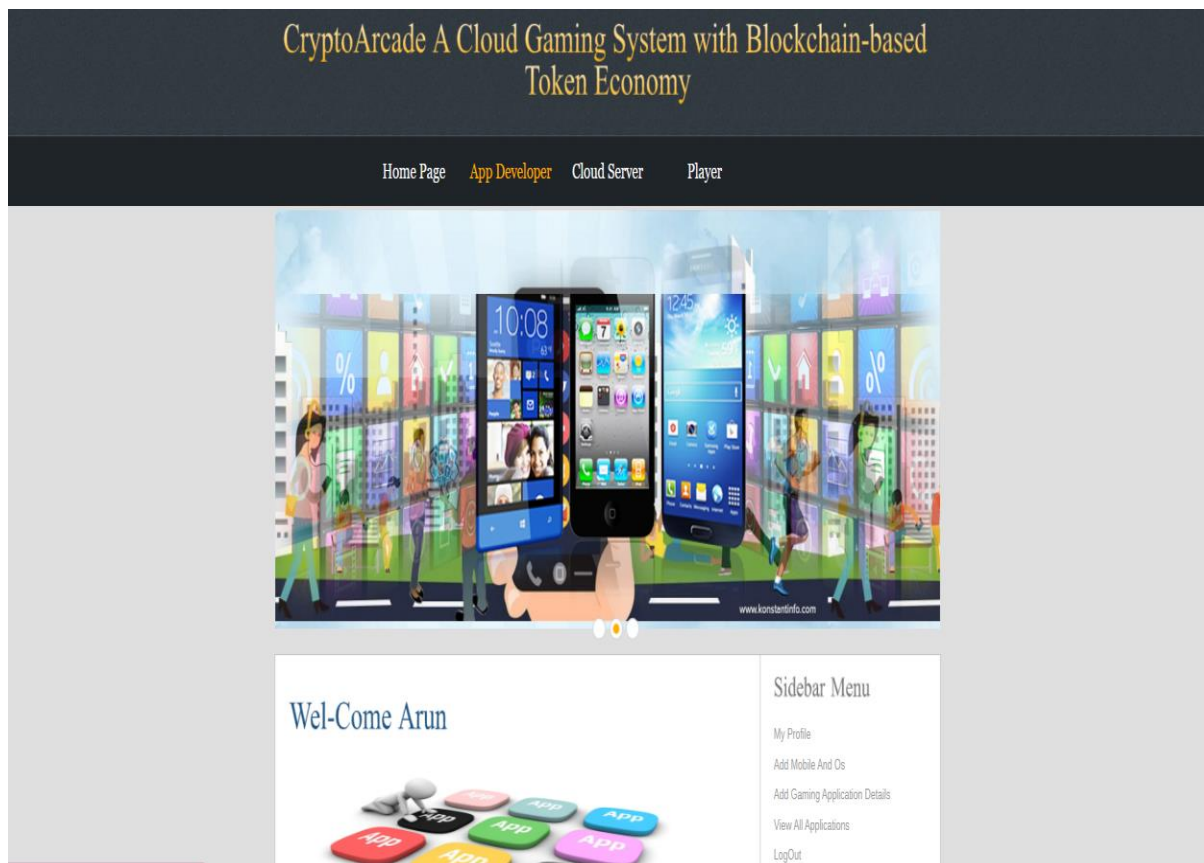


Fig 3:APP DEVELOPER

5.CONCLUSION

We present CryptoArcade, another cloud gaming plan of action in light of the blockchain-engaged token. It gives another scene of the business cloud gaming plan of action, which handles the different issue of the ongoing cloud gaming plan of action and evaluating procedure. The assistance on CryptoArcade is paid by token, whose cost mirrors the market interest. By buying and utilizing tokens, players follow through on the drifting cost in a quiet and time unimportant way, which safeguards the players' utility and administration

experience. Then again, the drifting symbolic cost additionally uses distributed computing assets by means of controlling buyers' ways of behaving. By taking advantage of the shrewd agreement, we additionally guarantee the straightforwardness of the installment cycle. The straightforwardness installment develops players' confidence in the stage, verifiably expanding the quantity of players. Situated at the player's premises, we use PT to figure out the player's choice issues under future symbolic utilization vulnerability to grasp her/his practical

exchanging systems. We have featured a few key bits of knowledge. In particular, we investigate outside elements, for example, token cost and gas expense on a PT player's procedure. In addition, we give mathematical outcomes showing that the EUT players are bound to purchase tokens than no tasks under similar outside factors.

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