IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 7.39 ⁜ Vol. 11, Issue 7, July 2022

DOI: 10.17148/IJARCCE.2022.117117

Decentralized Food Delivery Application using Blockchain

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Abstract: Blockchain can make a massive difference to the decentralized food delivery app development - from improving supply chain and commission distribution to regulating restaurant participation and operations tracking. Adding custom functionalities like crypto wallets, different delivery modes, and optimized route detection, can have a powerful food delivery application. The purpose of the project is to reduce the commission taken by food aggregators by creating a peer-to-peer network among restaurant, customer and delivery person. This enables a convenient and easy to use application for all types of users irrespective of their location. The system is based on the Consensus Blockchain network with smart contract protected identity and functionalities. This research work has a database server supporting hundreds of major urban and suburban areas in India. Above all the proposed model provides a comfortable user experience along with the available best pricing.

Keywords: blockchain, consensus, proof of work, peer-to-peer.

I. INTRODUCTION

How the world eats is constantly changing. A few years ago, restaurant-quality meal delivery was fairly limited. However now, food delivery has become a global market worth more than $150 billion. In India, the food and beverages industry is estimated to be worth 30 lakh crores as of 2019. With the ever increasing need for comfort, a lot of start-ups have flourished in the food and beverages sector by integrating doorstep deliveries for restaurant-quality meals. However, this doesn't come without obstacles.

1. Food aggregators like 'Zomato' and 'Swiggy' decide the price of the food and take 20% to 30% commission for each transaction that goes through their application
2. The food conveyance industry experiences centralization and absence of straightforwardness
3. The conveyance specialists are not getting generously compensated for the work they do
4. Eateries get paid once in a month and are compelled to abide by the limits set by the food aggregators. Cafés and the conveyance specialists face a lot of issues in this situation

Thus, the current spotlight on comfort has encouraged interest in decentralized food conveyance applications.

The origin of ready-to-eat meals can be traced back to the Roman era in the 1800s. But the first food delivery was made in 1889 to King Umberto and Queen Margherita, starting a trend we relish to date. Soldiers and workers have relied on meal delivery services for freshly prepared lunches. Technological advancement in the 1950s brought TV sets to a majority of American homes. Families preferred staying in to watch their favorite shows and order food at home. But, then, it was the rise of fast food delivery and leisure meals. Taking the experience a step ahead, Pizza Hut launched Pizzanet in 1990, the first website for ordering food on the internet, followed by Waiter.com in 1995.The comfort of quickly placing orders over the internet and eating at home made the service mainstream in no time. In 2011, mobile ordering through food delivery applications was started by Domino&rsquo's Pizza to offer a new level of convenience to customers.

II. LITERATURE SURVEY

The authors, Rani, K. Sasikala, and S. Vishali[1] detailed the benefits of using a decentralized model of food conveyance, the most important of which was found to be the reduction in commissions payable to the food aggregators. It is important to know the current progress and trends in blockchain technology. Yli-Huumo, Jesse, et al in [2] conducted a systematic study to determine the current research topics, challenges and future directions of Blockchain technology. The authors Prashar, Deepak, et al. in [3] proposed a Consensus Blockchain based traceability system that could be an important quality control mechanism amidst increasing threats to food security and contamination today. Food supply chains can benefit from the adoption of blockchain technology. The authors Si Chen, Xingchen Liu, Jiaqi Yan, Guangwei

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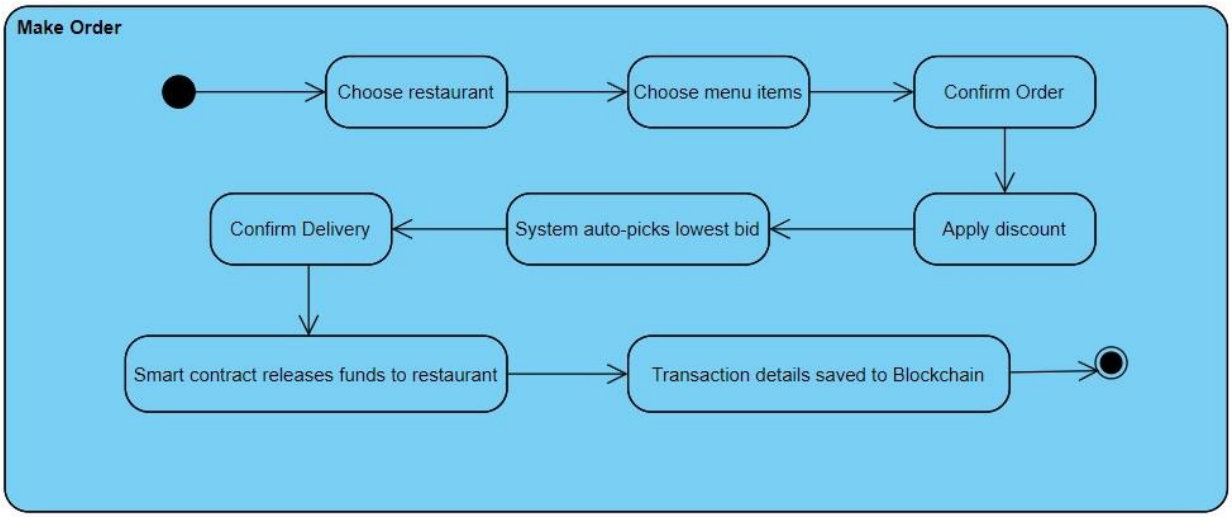
Hu and Yani Shi in [4] proposed a new thematic framework to improve blockchain adoption in food supply chain management.

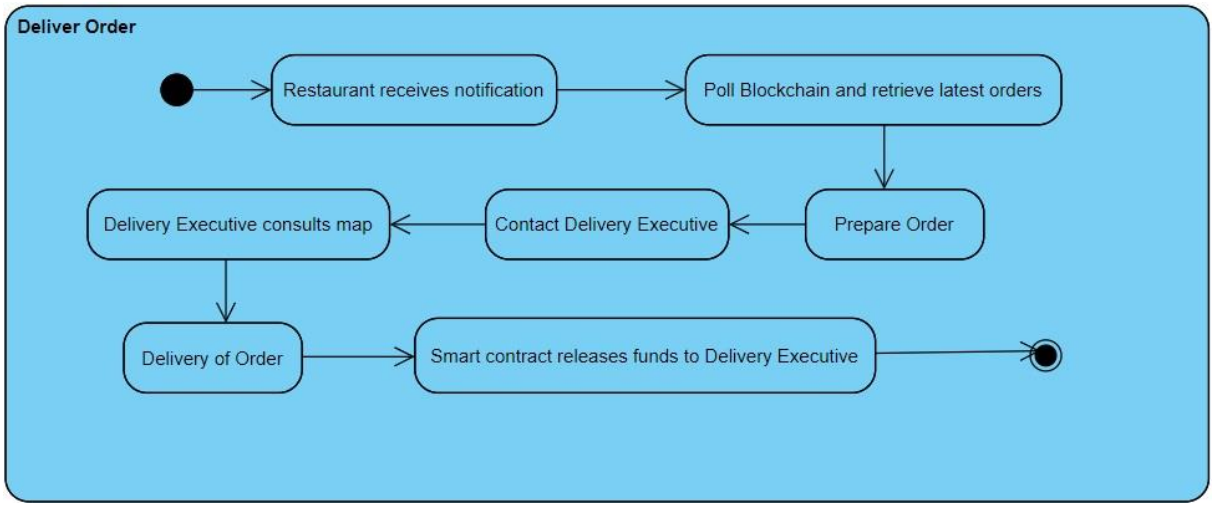
III. METHODOLOGY

The proposed web application will have 3 different views: 'Customer' - with provision to select restaurant and menu items, track orders as they are prepared, track delivery, get notified about funds released, rate food and delivery, 'Restaurant' - with provision to create/update menu, offer discounts(applied on all items), get notified about new orders, see details of pending orders and delivery agent engaged and 'Delivery agent' - Provision to subscribe into the system, get notified when chosen for delivery, track order as it is prepared, locate restaurant and customer on map, get notified about funds received.

There are two main components in the working of the blockchain based system:



The Make Order component corresponds to the Customer view. The customer selects the desired items from the desired restaurant and makes the payment for the order. This results in the write API being called which interacts with the smart contract to save the order details to the blockchain. The smart contract releases the funds to the restaurant account while holding the funds to be sent to the delivery agent. The orderStatusChanged event is emitted and the details can be viewed from the Moralis Dashboard. This confirms the successful submission of the order.



The Deliver Order component corresponds to the Restaurant and Delivery Agent view. The restaurant polls the blockchain to get the order details and prepares the order and dispatches it for delivery. After successful delivery of the order the delivery agent confirms the delivery. This results in the write API being called which interacts with the smart

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contract to save the details of the delivery. The smart contract then releases the funds to the delivery agent account and emits the orderStatusChanged event with the hasBeenDelivered field set to true. The details of the event can be viewed from the Moralis dashboard. This confirms the successful delivery of the order.

IV. SIMULATION AND EXECUTION

The two main components Make Order and Deliver Order successfully interact with the smart contract to save order and delivery details to the blockchain. These transaction details are transparent and can be accessed by anyone which makes the system truly decentralized. The application makes use of the write API that is responsible for interacting with the smart contract. The smart contract in turn interacts with the blockchain in order to save order details and successfully release funds to the Restaurant and Delivery Agent wallets. The entire transaction history can be viewed in the Moralis Dashboard which interacts with the blockchain to read the entries and index them to allow for efficient access.

V. CONCLUSION

In the existing living environment, the peer-to-peer blockchain food delivery platform can solve a series of problems such as commission, trust, information transparency, and high efficiency, but there are still the following difficulties and challenges in the prod- uction environment:

1. Supervision is difficult: Blockchain technology can optimize the economic structure to a certain extent, but it brings huge challenges to the supervision of the food delivery market. Due to the decentralization and transparency of blockchain technology, some criminals have taken the opportunity to enter the food delivery market. At the same time, due to the application of blockchain technology, it is difficult to effectively supervise the food delivery market, resulting in market chaos;

2. Security issues: When the blockchain food delivery platform transmits data across chains, there is a high risk of data leakage. At the same time, with the rapid develop- ment of science and technology, even encrypted information faces cracking;

3. Efficiency and resource cost issues: With the development of society, data is also growing, blockchain technology has gradually been unable to meet the needs of large-scale data transactions, and the efficiency is relatively low. At the same time, with the continuous improvement of blockchain technology requirements, it is urgent to improve blockchain technology, but the cost of optimizing blockchain technology is very high;

4. No unified technical standard has been formed: At this stage, the blockchain is in the development stage, and there is no unified technical standard for blockchain technology in the world, which will easily lead to confusion and incompatibility in the process of applying blockchain technology.

REFERENCES

[1] K. S. Rani and S. Vishali, "Blockchain driven IoT based Delish2Go Decentralized Food Delivery Application," 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), 2021, pp. 1727-1732\
[2] Yli-Huumo, Jesse & Ko, Deokyoon & Choi, Sujin & Park, Sooyong & Smolander, Kari. (2016). Where Is Current Research on Blockchain Technology?—A Systematic Review. PLOS ONE. 11. 10.1371/journal.pone.0163477.
[3] Prashar, D.; Jha, N.; Jha, S.; Lee, Y.; Joshi, G.P. Blockchain-Based Traceability and Visibility for Agricultural Products: A Decentralized Way of Ensuring Food Safety in India. Sustainability 2020, 12, 3497.
[4] Chen, S., Liu, X., Yan, J. et al. Processes, benefits, and challenges for adoption of blockchain technologies in food supply chains: a thematic analysis. Inf Syst E-Bus Manage 19, 909–935 (2021).
[5] Gupta, G.; Katarya, R. Recommendation analysis on item-based and user-based collaborative filtering. In Proceedings of the 2019
[6] International Conference on Smart Systems and Inventive Technology (ICSSIT), Tirunelveli, India, 27–29 November 2019.
[7] Kwilinski, A.; Volynets, R.; Berdnik, I.; Holovko, M.; Berzin, P. E-Commerce: Concept and Legal Regulation in Modern Economic Conditions. J. Leg. Ethical Regul. Issues 2019, 22, 1–6.
[8] Anandhan, A.; Shuib, L.; Ismail, M.A.; Mujtaba, G. Social media recommender systems: Review and open research issues. IEEE Access 2018, 6, 15608–15628. [CrossRef]
[9] Eirinaki, M.; Gao, J.; Varlamis, I.; Tserpes, K. Recommender systems for large-scale social networks: A review of challenges and solutions. Future Gener. Comput. Syst. 2018, 78, 413–418. [CrossRef]

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[10] Wu, D.; Lu, J.; Zhang, G. A fuzzy tree matching-based personalized e-learning recommender system. IEEE Trans. Fuzzy Syst. 2015, 23, 2412–2426. [CrossRef]
[11] Chen, Y.; Zhou, M.; Zheng, Z.; Chen, D. Time-aware smart object recommendation in social internet of things. IEEE Internet Things J. 2019, 7, 2014–2027. [CrossRef]