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Blockchain for Food Industry Opportunities Requirements Case Studies and Research Challenges

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Abstract: ***The Blockchain-Enabled Food Waste Management and Redistribution project seeks to revolutionize local food systems by addressing the pressing issues of food waste and community food insecurity. Through strategic collaborations with businesses, restaurants, households, and community organizations, the initiative aims to establish a comprehensive system for efficiently collecting, sorting, and redistributing surplus edible food. By creating partnerships with local food banks, charities, and community organizations, the project seeks to redirect surplus edible food from businesses, restaurants, and households to those in need. Key aspect of this system is the integration of Blockchain Technology, ensuring transparency, traceability, and security throughout the food redistribution process. Here develop a simplified version of the blockchain network to test the feasibility of using blockchain for tracking and recording food redistribution transactions. This includes creating and validating blockchain nodes with hashing. This application provides a robust system for collecting, sorting, and managing surplus edible food. This will predict the user's location that will be matched with donor's location and send the notification automatically. Leveraging the transparency and traceability features of Blockchain, the system enables users to submit requests for food assistance, specifying their particular needs. The requests are then reviewed by potential donors who can accept or reject them based on the available surplus and the alignment with the user's needs. Upon acceptance, user details are communicated to the donors, who, in turn, provide a final acceptance based on the quantity of food available and the quantity needed by the user. Users whose requests are rejected receive timely notifications, ensuring transparency and managing expectations in the redistribution process***

Keywords: Blockchain implementation, sharing intimation, request processing.

I. INTRODUCTION

The Blockchain-Powered Food Supply Chain Management System is an innovative solution designed to enhance transparency, traceability, and efficiency in the food supply chain. Leveraging blockchain technology, the system creates an immutable and transparent record of food transactions from farm to fork, enabling stakeholders to track the journey of food products in real-time. By improving visibility and accountability, the system aims to mitigate risks such as food fraud, contamination, and supply chain disruptions, ultimately ensuring the safety and quality of food products for consumers. The system utilizes a distributed ledger powered by blockchain technology to record and store transactions related to food production, processing, distribution, and retail. Each transaction is cryptographically secured and time stamped, creating an immutable audit trail that cannot be altered or tampered with. Through the blockchain ledger, stakeholders can trace the origin and journey of food products at every stage of the supply chain. This includes information about the farm of origin, production methods, transportation routes, storage conditions, and handling procedures. By scanning a QR code or using a mobile app, consumers can access detailed information about the food they are purchasing, fostering trust and transparency. Stakeholders have access to a dashboard or user interface that provides real-time visibility into the status and location of food products throughout the supply chain. This enables proactive management of inventory, logistics, and distribution, minimizing the risk of food spoilage, waste, and stock outs. The system collects and analyzes data from the blockchain ledger to generate actionable insights and performance metrics. By leveraging data analytics, stakeholders can identify trends, patterns, and opportunities for optimization within the supply chain, leading to cost savings, process improvements, and strategic decision-making.

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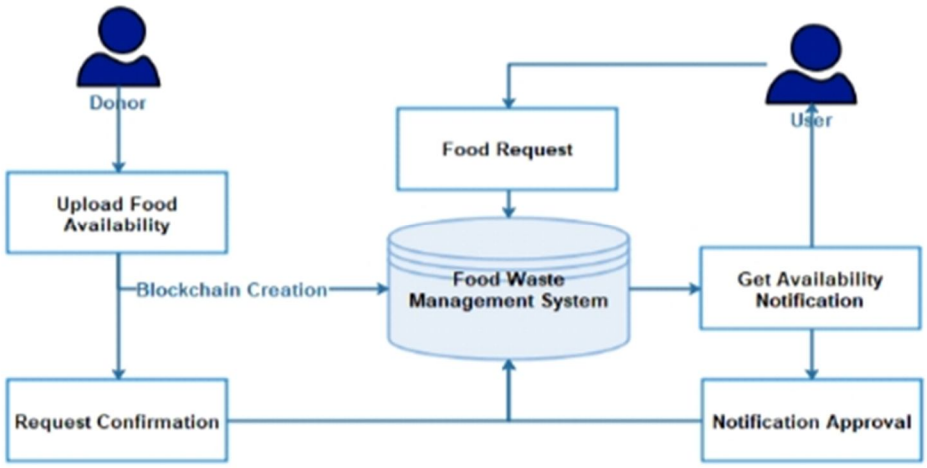
II. PROPOSED SYSTEM

This project proposes an innovative and sustainable solution to tackle the pressing issues surrounding food waste by harnessing the power of blockchain technology. By implementing blockchain, a transparent and secure system is established to trace surplus edible food from businesses, restaurants, and households, ensuring efficient utilization and redistribution. Collaborations with local food banks, charities, and community organizations serve as the backbone of this initiative, facilitating the effective redirection of surplus food to individuals and families in need. The process begins with businesses, restaurants, and households registering their surplus food offerings on the blockchain platform. This information is securely stored and made accessible to relevant stakeholders, including local food banks and community organizations. Users in need of assistance can then browse the available surplus food listings and submit requests based on their requirements. Upon receiving a request, the blockchain system automatically communicates the user's details to the respective donors. Donors can review the request and determine the quantity of food available, as well as the quantity needed by the user. This transparent exchange ensures that surplus food is distributed equitably and efficiently, maximizing its impact on alleviating food insecurity within the community. By using blockchain technology, this system enhances transparency, accountability, and trust throughout the food redistribution process. Furthermore, it fosters greater collaboration and coordination among stakeholders, ultimately contributing to a more sustainable and resilient food system. Through the seamless integration of technology and community engagement, this project presents a promising approach to addressing the critical issues of food waste and hunger.

A. Advantage

- The system effectively reduces food waste by redirecting surplus edible food to those in need.
- Integration of blockchain technology ensures transparency and traceability in the entire food supply chain.
- This application provides a robust system for collecting, sorting, and managing surplus edible food.
- Easier for food banks and charities to coordinate pickups and deliveries in a timely manner.

B. System Architecture



1) Application Design: This module encompasses the overall design of the application, including its user interface (UI) and application processing. It focuses on creating an intuitive and user-friendly interface for both donors and users requesting food assistance. Key components include designing screens for donor enrollment, food request submission, surplus food details display, and notifications

2) Donor Enrolment: This module handles the process of enrolling donors into the system.It includes functionalities such as registration, prof le creation, and verification of donor credentials.. Donors provide information such as their location, types of surplus food they can donate, and availability.

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3) Surplus Food Details: This module is responsible for managing and displaying details about surplus food available for donation.It includes functionalities to input and update information about surplus food items, such as type, quantity, expiry date, and quality.. Donors can use this module to list their surplus food items and make them available for redistribution.

4) Blockchain Implementation: . This module integrates blockchain technology into the system to ensure transparency and traceability of food redistribution transactions. It includes functionalities for creating, maintaining, and querying blockchain records related to food donations, requests, and transactions. Blockchain ensures the immutability of records, enhancing trust and accountability in the system.

5) Share Intimation: This module handles the automatic notification system for matching surplus food with users in need. It predicts user locations and matches them with nearby donors, triggering notifications to inform donors about potential recipients. Notif cations can be sent via SMS through the application itself to ensure timely communication.

6) Request Processing: This module manages the processing of user requests for food assistance. It includes functionalities to submit, review, and process user requests based on donor availability and surplus food details. Users receive notifications about the status of their requests, including whether they have been accepted or rejected, ensuring transparency and managing expectations

III. CONCLUSION

This project tackle the critical issue of surplus edible food management and redistribution by leveraging blockchain technology. It managing surplus food while ensuring efficient redistribution to those in need. By predicting user locations and matching them with nearby donors, the system optimizes the redistribution process, minimizing transportation costs. The integration of blockchain technology adds transparency and traceability, enhancing trust among users and stakeholders..

IV. ACKNOWLEDGEMENTS

Let me take this opportunity to thank everyone that aided and guided me while working on my project “Block chain for food industry opportunities requirements case studies and research challenges” I wish to thank Mrs.S.Abirami especially for their insight and encouragement which made this idea possible. I appreciate the rest of my peers, friends, and family for their support and motivation.As AI technology matures and becomes increasingly accessible, powering it with the right technology will ensure trust and transparency in medical fundraising. I hope that my contribution will effectively augment the fight against fraud.

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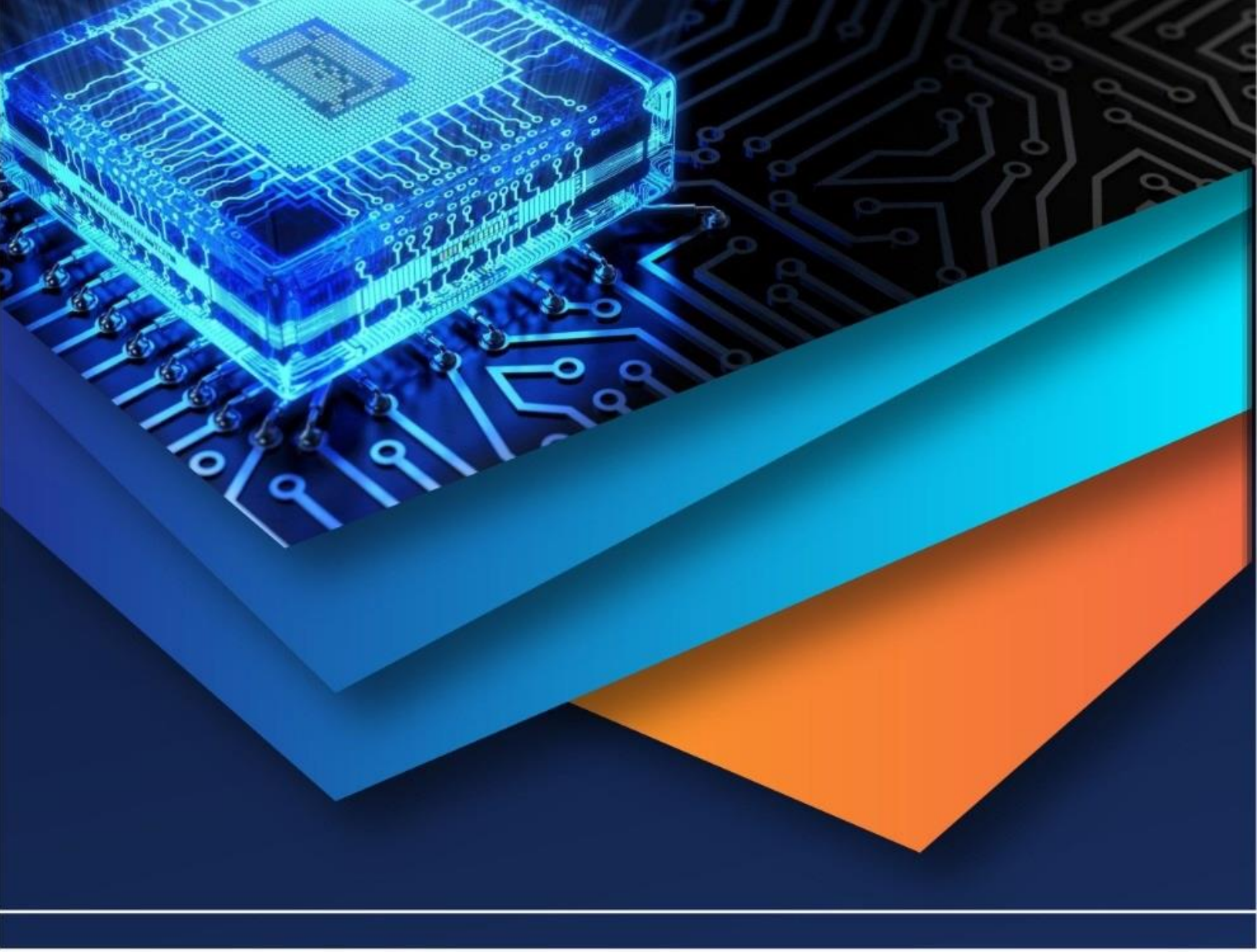

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