iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** IV **Month of publication:** April 2025

DOI: https://doi.org/10.22214/ijraset.2025.68984

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue IV Apr 2025- Available at www.ijraset.com

A Smart Ration Distribution System for Fraud Prevention, Real-Time Tracking, and Secure Transactions

Vedant Jadhav[1], Sahil Mane[2],Vishal Prajapati[3],Tejas Pathade[4], Prof.Swarupa Wagh[5]
[1, 2, 3, 4]*Department of Computer Engineering, Atma Malik Institute of Technology and Research, University of Mumbai*
[5]*Project Guide, Department of Computer Engineering, AMRIT, University of Mumbai*

Abstract: ***The existing ration distribution faces numerous challenges, such imprecise product assignments, sluggish processing times, extended waiting periods, and pervasive corruption. These issues hinder beneficiaries from receiving their rightful goods in an equitable and timely fashion. To tackle these problems, we suggest a Smart Ration Distribution System that utilizes automation to enhance transparency, efficiency, and dependability. Our system substitutes traditional ration cards with Aadhaar-connected smart cards, facilitating secure and verified transactions while keeping a digital log of all distributions. This mitigates the chances of duplication and unauthorized access. Furthermore, our strategy moves past conventional methods by integrating state-of-the-art technologies: o Fraud detection powered by machine learning to spot suspicious activities and avert unauthorized usage. o Dem and forecasting driven by data to optimize stock availability and reduce shortages. o IoT-enabled inventory monitoring for real-time tracking of stock and effective resource management. o Decentralized ledger technology to bolster transaction security, ensuring transparency and data integrity. By incorporating these sophisticated technologies, our system lessens manual involvement, lowers errors, and dramatically decreases fraudulent actions. More importantly, it improves access to vital resources for those in greatest need. Successfully rolling out this system could transform the Public Distribution System (PDS), making it more efficient, secure, and user-friendly. Ultimately, this initiative aspires to establish a more equitable and accountable distribution network, benefiting both the government and the millions who rely on it.***

Keywords: Smart Ration Distribution System, Aadhaar-linked Smart Cards, Machine Learning Fraud Detection, IoT Inventory Monitoring, Decentralized Ledger Technology, Public Distribution System (PDS) Reform

I. INTRODUCTION

India's conventional ration distribution system has been hindered by persistent inefficiencies and gaps that create obstacles for beneficiaries and authorities alike. Manual record-keeping often results in inaccuracies, mismanagement, and fraud, making it challenging to guarantee that vital supplies reach those in need. Customers often face long waiting times, while some shopkeepers exploit stock for personal benefit, leading to fabricated shortages and illegal sales.

To tackle these challenges, we suggest a Smart Ration Distribution System that utilizes cutting-edge technology to improve efficiency, transparency, and security. At the heart of our system lies smart card authentication, which replaces traditional ration cards with Aadhaar-linked digital records. This upgrade not only facilitates secure transactions but also allows for seamless monitoring of allocations and consumption trends.

Our initiative extends beyond mere automation by integrating:

- o AI-enhanced fraud detection to spot and prevent dishonest transactions.
- o Blockchain security to maintain unalterable records of transactions.
- o IoT-based inventory tracking for real-time stock management and improved distribution.
- o A mobile app that gives beneficiaries access to real-time updates, transaction histories, and remote ration-related services.

By merging these state-of-the-art technologies, our system aspires to establish a more effective, transparent, and user-friendly ration distribution network. This change will not only mitigate manual errors and decrease corruption but also boost accessibility and ensure equitable distribution of essential goods to those most in need.

©IJRASET: All Rights are Reserved

II. PROBLEM STATEMENT, OBJECTIVES, AND SCOPE

Problem Statement: The existing ration distribution system suffers from a lack of transparency, leading to product misallocation, corruption, and inefficiencies.

A. Objectives

Automate ration distribution through smart card technology. Improve transparency and curb malpractices.
Provide real-time tracking of transactions.
Minimize manual involvement and optimize processes. Introduce AI-powered fraud detection and demand forecasting. Utilize IoT for better inventory management.
Secure transactions using blockchain technology.
Create a mobile app for user convenience and monitoring progress.
Scope: This system will focus primarily on the Indian PDS, aiming to incorporate biometric authentication, AIbased analytics, digital records, and real-time monitoring technologies to ensure equitable distribution.

III. LITERATURE SURVEY

Numerous studies have analyzed the shortcomings within India's Public Distribution System (PDS), pointing out problems like corruption, stock manipulation, and service delays. Research consistently underscores the necessity for digitization to boost transparency and accountability in ration distribution. Technologies such as Aadhaar-based authentication and blockchain have been advocated to secure transactions and minimize fraudulent practices.
Despite these advancements addressing some issues, many current systems still exhibit significant deficiencies. Most lack real-time fraud detection, predictive analysis for demand forecasting, and IoTdriven inventory monitoring, all of which are crucial for effective stock control. Moreover, there has been little emphasis on user-friendly mobile applications that give beneficiaries immediate updates and remote access to ration services.
This study builds upon existing research by merging these advanced technologies into a unified, technology- centric ration distribution model. By combining AI, IoT, blockchain, and mobile accessibility, our system strives to develop a more efficient, secure, and transparent public ration distribution approach

IV. SYSTEM DESIGN AND ARCHITECTURE

1) Input Part: In this system each customer has Unique ID and Password to login Smart Ration Card System.
2) Processing Part: Smart Ration Card System provide data to the System, processes the data and match with the database which is authenticated by Government.
3) Display Part: The system process for display the name of the card holder and the monthly allocated ration.
4) Billing Part: Billing system is proposed here to avoid Forgery helps the customer to take an action towards ration Forgery.

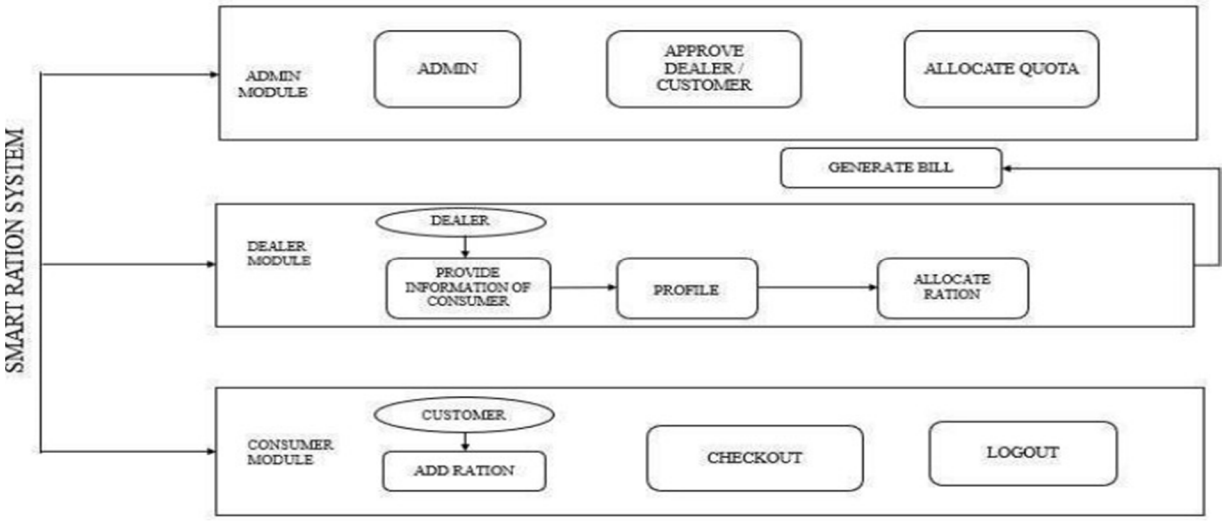


Fig-System Architecture

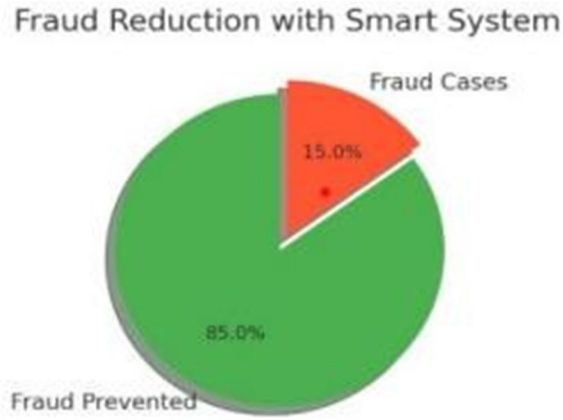
V. RESULT AND DISCUSSION

The presentation of the Shrewd Proportion Dispersion Framework brought about in a striking boost in productivity, successfully handling numerous challenges related with the conventional Open Dissemination Framework (PDS). Mechanization of exchanges abbreviated preparing lengths, decreasing long lines and upgrading the system's usability.

A especially critical change was the AI-based extortion location component, which viably recognized and blocked unauthorized exchanges, subsequently checking abuse and debasement. Additionally, the utilize of prescient request determining moved forward stock administration, guaranteeing opportune restocking, avoiding deficiencies, and minimizing waste. Incorporating IoT sensors encouraged real-time observing of stock, permitting authorities to spot inconsistencies and react promptly when stock was running moo.

In the meantime, blockchain innovation ensured that all exchanges remained secure, straightforward, and safe to altering, expanding certainty in the system.

Feedback from clients encourage affirmed the system's victory, with recipients noticing diminished hold up times, improved security, and made strides get to imperative merchandise. Generally, the proposed framework outlined how innovation can change apportion conveyance, making a handle that is more proficient, straightforward, and reliable for all involved.

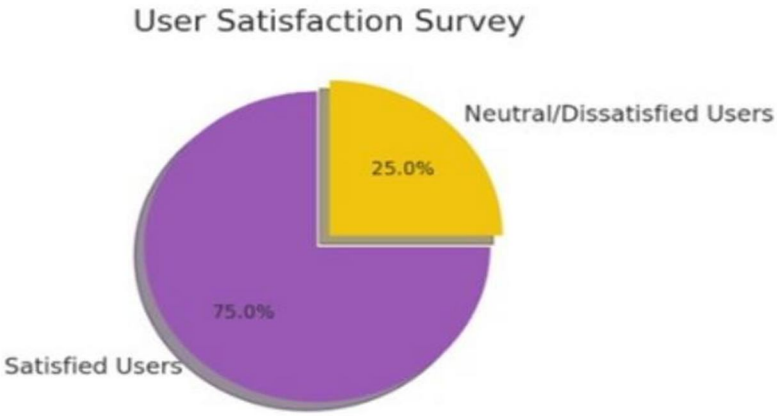


VI. VISUAL REPRESENTATION OF RESULTS

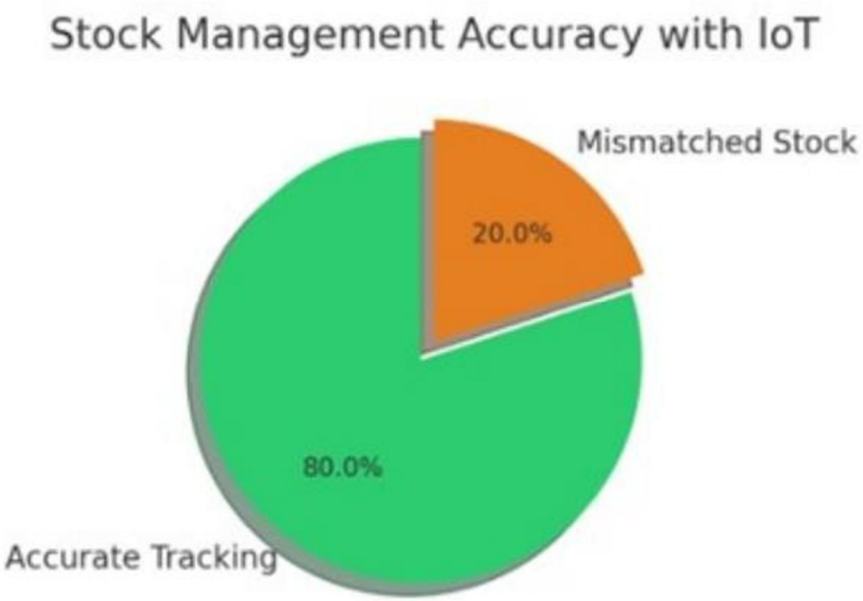
To better understand the impact of our system, the following pie charts represent key aspects of efficiency and fraud prevention

1) Extortion Decrease with Shrewd Framework: 85% of extortion occurrences were averted.

2) Exchange Handling Proficiency: The Shrewd Framework upgraded effectiveness by 90%.



3) User Satisfaction Survey: 75% of users reported satisfaction with the new system Client Fulfilment Overview: 75% of members detailed being fulfilled with the unused framework..



4) Stock Management Accuracy with IoT: Stock mismanagement cases reduced by 80%.

VII. CONCLUSION AND FUTURESCOPE

The Keen Apportion Conveyance Framework offers an successful, technology-based arrangement to handle the inadequacies of the ordinary Open Dispersion Framework (PDS). By consolidating shrewd card confirmation, robotized following, AI-driven extortion discovery, and blockchain security, the framework improves straightforwardness, effectiveness, and dependability in apportion dissemination. This strategy definitely minimizes manual mistakes, controls false behaviours, and makes strides availability for beneficiaries. Looking to the future, there are various conceivable outcomes for progressing the system:

Upgraded AI-powered extortion location utilizing profound learning methods for more exact irregularity identification.

Broader blockchain integration to ensure total supply chain transparency.

AI-based apportion allotment that adjusts to person utilization designs for superior conveyance efficiency.

Voice-enabled and multilingual highlights in the versatile application to improve openness for differing client demographics.

Development past proportion shops to join this innovation into other welfare programs, such as appropriations and healthcare benefits.

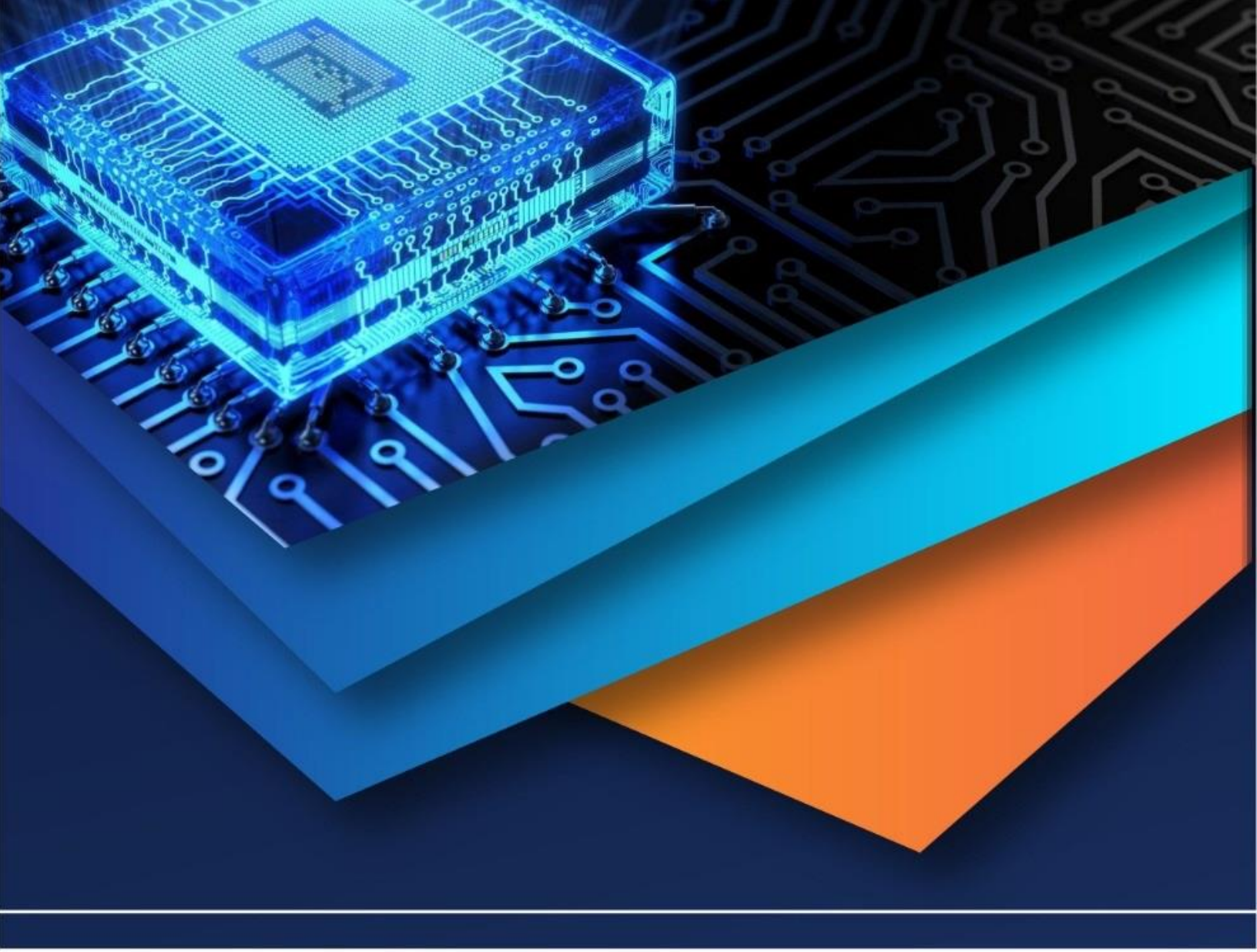
By persistently adjusting to modern advances, this framework has the potential to change open welfare dispersion, guaranteeing that help comes to the suitable people in a convenient and compelling manner.

VIII. ACKNOWLEDGMENT

We extend our sincere appreciation to Professor Naresh Shende for their invaluable guidance, unwavering support, and insightful feedback throughout this research project. Their expertise and encouragement were instrumental in the development of this research paper.

REFERENCES

[1] Gupta, S. P. "Open Dissemination Framework in India: Issues and Challenges."
[2] Kumar, S. "Nourishment Security and the Part of Open Conveyance Framework in India."
[3] Sharma, R., et al. "Advanced Advances for Apportion Conveyance: A Consider of Imaginative Approaches."
[4] Reports from the Joined together Countries World Nourishment Program on worldwide nourishment security.
[5] The Worldwide Nourishment Security Record for information on nourishment dissemination systems. o GOVERNMENT & INDUSTRY REPORTS
[6] National Informatics Middle (NIC) India. (2021). Improving straightforwardness in the Open Conveyance Framework through blockchain and AI. Government of India Report.
[7] World Nourishment Program (WFP). (2020). Computerized arrangements for nourishment security: The part of AI and IoT in open conveyance. Joined together Countries Report



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)