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WASTE FOOD MANAGEMENT AND DONATION SYSTEM

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Abstract: Food donation to people in need is made easier with the help of the Waste Food Management and Donation System (WFMD), which attempts to solve the serious problem of food waste. Food contributors, including eateries, supermarkets, and private citizens, can connect with food banks and nonprofit organisations through this system's user-friendly website. In order to expedite food donation and minimise food waste, the WFMD system integrates a number of essential functions. Contributors of surplus food can enter information into the system regarding the kind, quantity, and expiration date of the food they would like to contribute. A user-friendly interface then makes this data available to food banks and recognised charitable organisations.

Index Terms **- Food Waste Reduction, food donation, surplus food redistribution, zero waste, food donation programs.**

I. INTRODUCTION

Food waste is a major worldwide problem with serious negative effects on the environment, the economy, and society. Food insecurity is still a serious issue, though, particularly for vulnerable groups like homeless people and orphanages. In order to effectively manage food surplus and guarantee its allocation to those in need, creative solutions are needed to address these interconnected difficulties. With an emphasis on supplying food to street orphanages, a waste food management and donation system has been created to close the gap between food waste and food insecurity. By establishing a connection between food givers, such as grocery stores, restaurants, and houses, and beneficiaries in street orphanages, this approach makes sure that excess food is given to those who really need it.

II. SOURCE MINIMIZATION

Enforcing methods to avoid food wastage from the beginning, like enhancing inventory control and utilizing food more effectively in households and businesses.

III. FOOD REDISTRIBUTION AND CHARITY

Sending excess food to groups and non-profits that can deliver it to people experiencing food insecurity.

IV. REPURPOSING AND COMPOSING

Transforming food waste into beneficial products such as compost, which can enhance soil quality and aid in agriculture.

3.1 Objectives

1. The Waste food management and donation system put policies in place to reduce food waste from production to consumption at every stage of the supply chain.
2. The system promotes and assist the donation of extra food to food banks and humanitarian organizations and it easier for people and businesses to safely and effectively contribute food by streamlining the procedure.
3. The Donation system create procedures to guarantee that food given satisfies all health and safety requirements and to avoid infection, teach donors how to handle and store food properly.
4. Increased availability of wholesome food for marginalized and susceptible groups that boost collaborations with neighborhood groups, shelters, and charity to efficiently distribute food donations.
5. It encourages the composting and recycling of food that is no longer edible to lessen the negative effects of food waste on the environment and improved waste management techniques can reduce greenhouse gas emissions linked to food waste.

3.2 Data and Sources of Data

A third of all food produced is lost or discarded, making up around 1.3 billion tonnes of food loss yearly, making food waste a serious global problem. Reducing food waste's negative effects on the environment, the economy, and society requires efficient administration and donation programmes.

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It involves the avoidance, recovery, and recycling of food waste are just a few of the solutions discussed in current research. According to Aschemann-Witzel et al. (2017), prevention aims to cut waste at its source by enhancing supply chain efficiency, educating consumers, and using better farming techniques. Food banks and donation programmes are used in recovery to provide extra food to individuals in need. This practice is encouraged by laws like as the Good Samaritan Food Donation Act in the United States.

By examining various sources such as research articles, journals, and books, a literature survey can provide valuable insights into the current landscape of Waste food management and Donation system and guide future research and development in this field. By conducting a thorough literature survey, we can gain a better understanding of the current landscape and pave the way for future research and development of effective and user-friendly Waste food management and Donation system.

3.3 Theoretical framework

Initially, a thorough study of the literature was done, which included academic papers, reports from global agencies like the FAO and UNEP, and pertinent official publications. The goal of this review was to give readers a comprehensive grasp of the extent of food waste worldwide, its effects on the environment and the economy, and the different approaches to managing it.

Second, case studies from multiple nations were examined to pinpoint effective methods and typical difficulties in the administration of food waste and donation schemes. Because these case studies were chosen to reflect a range of socioeconomic backgrounds and geographic locations, it is possible to compare various strategies and results.

Thirdly, these sources were the source of quantitative data that was gathered to evaluate the effects of different initiatives on reducing food waste. Analysing food production, waste, donation, and the ensuing economic and

environmental benefits of methods put into practice were among the statistics that were examined.

Lastly, in order to determine best practices and create policy recommendations, the gathered information and insights were combined. This required analysing the results of case studies, quantitative data, qualitative interviews, and literature reviews in order to get thorough conclusions regarding practical food waste management and donation techniques.

I. METHODOLOGY

The methodology section outlines the plan and method that how the study is conducted. The development and management of efficient waste food management and donation systems require a comprehensive approach that encompasses planning, collaboration, technology, and ongoing enhancement. This methodology provides a framework for the essential steps and strategies involved in creating and overseeing such systems. The details are as follows;

3.1 Assessment and Planning

Conduct a comprehensive evaluation to identify the origins and categories of food waste, as well as potential beneficiaries for donated food. This entails:

Examining data on food waste generation from households, restaurants, grocery stores, and food manufacturers.
Mapping areas with high levels of food insecurity and identifying local food banks, shelters, and community organizations. Establish precise goals and objectives for the management and donation program of wasted food, such as reducing food waste by a specific percentage, increasing food donations, or enhancing the efficiency of food redistribution.Engage key stakeholders, including government agencies, businesses, non-profits, and community members, in the planning process to ensure their support and collaboration.

3.2 Source reduction

For this study the initiate educational campaigns to raise awareness about food waste and promote practices that minimize waste at its source, such as:

Providing guidance on meal planning, portion control, and proper food storage.Offering training for food service staff on techniques to reduce waste and implement inventory management systems in businesses to monitor food purchases and usage, thereby minimizing excessive stock and spoilage.

3.3 Redistribution and donation

Form partnerships with businesses, farms, and food producers to collect surplus food. Key components include:

Developing agreements with grocery stores, restaurants, and food manufacturers to donate unsold but still safe and edible food.
Coordinating with local farms to rescue surplus produce that would otherwise be wasted.Establish a robust logistics system to collect, store, and distribute donated food.Securing transportation options, such as refrigerated trucks, to maintain the quality and safety of perishable items.Setting up centralized collection points and distribution centers.

The establishment and execution of a thorough waste food management and donation system necessitate meticulous planning, cooperation, and a dedication to ongoing enhancement. Through adherence to this approach, societies can diminish food wastage, aid the less fortunate, and promote environmental sustainability.

3.4 Comparative Analysis of Existing and Proposed Systems

3.4.1 Existing System

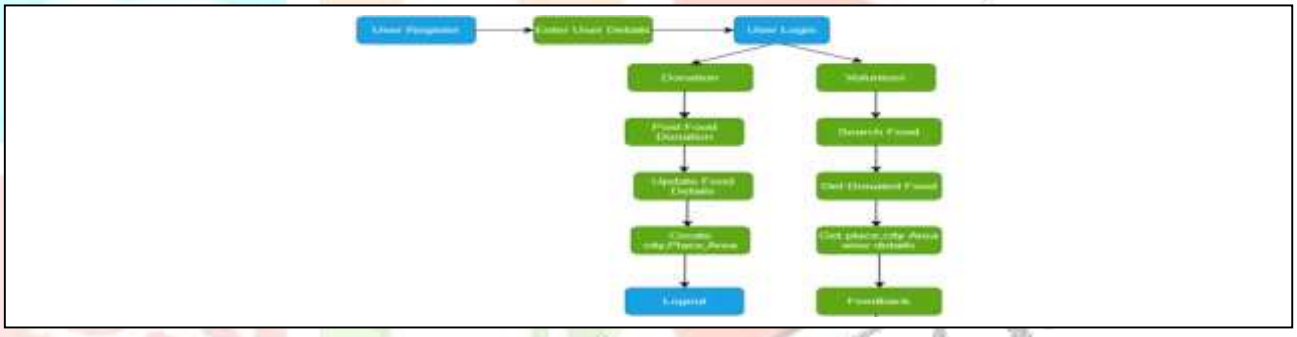
The current Waste food management and Donation system for managing and donating food waste is complex and involves coordinated efforts from several industries. Food banks and nonprofit organizations are essential in rescuing excess food from supermarkets, farms, and eateries and redistributing it to food pantries and shelters for the underprivileged. In order to avoid throwing away excess inventory, a lot of supermarkets and grocery stores take part in donation programs and provide it to charitable organizations. Government initiatives like the Good Samaritan Food Donation Act give food donors legal safeguards, enabling companies to donate excess food without worrying about legal repercussions. Initiatives for consumer education increase knowledge about food waste and offer advice on cutting waste at home. The effective redistribution of surplus is made possible by technological advancements like internet platforms and smartphone apps.

Disadvantages

- It can be difficult and expensive to plan for the gathering, storing, and redistributing of excess food, especially when it comes to perishable goods with limited shelf life.
- Ensuring the food supplied is safe is a big deal because poor handling or storage can cause contamination and foodborne illnesses that could hurt the beneficiaries.
- Inequalities in access continue to exist despite efforts to disperse excess food, with some areas or groups of people not receiving enough assistance, making food insecurity in underprivileged areas worse.
- There may be inefficiencies and gaps in service delivery during times of great need or surplus if the current system is unable to adapt to changes in food surplus and demand.

3.4.2 Proposed System

Maximising efficiency, equality, and sustainability while addressing the shortcomings of the current system is the goal of the suggested waste food management and donation system. Simplified distribution and logistics systems to make it easier to gather and repurpose excess food are among its many essential elements. The technology in this system will allow for the real-time connection between food donors and beneficiaries, facilitating a more rapid and effective distribution of resources. Examples of this technology include mobile applications and centralised web platforms. To further guarantee the calibre and security of donated food, extensive food safety procedures and educational initiatives will be put in place. Prioritising underprivileged groups and areas with the most need will help ensure equitable distribution. Data-driven methods will be used to identify areas that need more assistance.



3.4.2.1 Volunteer and NGO sign up

Signup is an action to register themselves for a new account that consist of username and password.

3.4.2.2 Volunteer and NGO login

A login generally requires the user to enter to two piece of information first a username and a password.

3.4.2.3 Donating food

The volunteer donates the food and this donation consists of quantity of food, meal type, food name, address.

3.4.2.4 Delivering the food

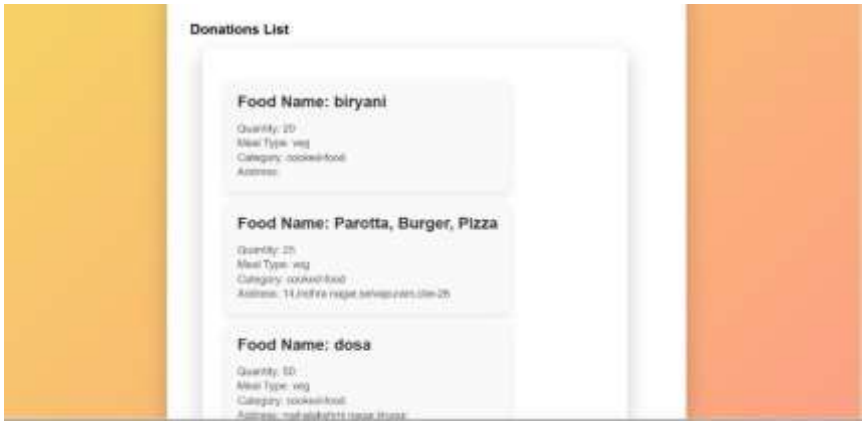
The NGO delivers the food wherever food requires.

SIGNUP PAGE

LOGIN PAGE

DONATING FOOD

DONATED FOOD LIST



IV. RESULTS AND DISCUSSION

4.1 Effectiveness of Source Reduction Strategies:

- The proposed system's focus on education and awareness campaigns is anticipated to be a game-changer in source reduction. By educating households and businesses on better food management practices, the system can tackle food waste at its root, leading to more sustainable long-term outcomes.

4.2 Importance of Technological Integration:

- The introduction of advanced inventory management systems and real-time tracking for food donations is expected to streamline operations and enhance coordination among stakeholders. This technological integration is crucial for reducing waste and improving the efficiency of food redistribution.

4.3 Enhanced Stakeholder Collaboration:

- The success of the proposed system hinges on effective collaboration among all stakeholders, including government agencies, businesses, non-profits, and community organizations. Building strong partnerships and fostering a culture of cooperation are essential for the scalability and sustainability of the system.

4.4 Addressing Logistical Challenges:

- The proposed investment in logistics infrastructure, such as refrigerated transport and centralized distribution centers, addresses one of the critical bottlenecks in the existing system. Ensuring the safe and timely delivery of perishable food items is crucial for maximizing the impact of food donations.

4.5 Long-Term Sustainability:

- By incorporating composting and waste-to-energy initiatives, the proposed system not only addresses food waste but also contributes to broader environmental goals. These initiatives can transform waste into valuable resources, supporting a circular economy and reducing the environmental footprint.

4.6 Monitoring and Continuous Improvement:

- The emphasis on data collection and performance evaluation in the proposed system is essential for continuous improvement. Regular monitoring and feedback loops will help identify areas for enhancement and ensure that the system adapts to changing needs and challenges.

V. ACKNOWLEDGMENT

We are also grateful to local businesses, grocery stores, restaurants, and farms that have generously donated food items and funds. This initiative would not have happened without their dedication to addressing food waste and security. Thank you also to the team of volunteers, and staff who have dedicated hours to sorting, collecting, and distributing food. Their commitment and effort is the reason why our program has been successful.

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