

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Sustainable Management Of Food Waste Using Web Applications

Prof. Nilesh Tambat ¹, Prathmesh Tale², Balaji Hemke ³, Suraj Wakte⁴, Rushikesh Ghuge ⁵

Computer Science & Engineering Dept, Mauli Group of Institution's Collage of Engineering & Technology, Shegaon

ABSTRACT :

Food waste has become a major worldwide concern that exacerbates social inequity, economic loss, and environmental degradation. At the same time, millions of disadvantaged people still experience food insecurity. In order to close this gap, this study suggests a web-based solution that makes it easier for donors to donate extra food to nonprofits like food banks and orphanages. Donors can sign up, log in, and upload information regarding excess food, such as its location, type, and quantity, using the suggested procedure. After that, registered charities can see these posts, get in touch with contributors, and plan effective food delivery and collection. The platform facilitates prompt food donations and facilitates efficient operational administration for food organizations. This approach offers a scalable model for reducing food waste while optimizing social effect by combining the concepts of food sustainability and trash classification. It also encourages a circular food supply chain. Through technology-driven solutions, the effort seeks to improve food access for populations who are at risk and promote a culture of responsible consumption.

Introduction

Food waste has become one of the most important issues facing the world today, impacting social justice, economic stability, and environmental sustainability. Nearly one-third of the food produced worldwide is lost or wasted, according to reports from international organizations like the FAO. This seriously jeopardizes attempts to guarantee food security. In places like the Kingdom of Saudi Arabia, where cultural customs, scarce agricultural resources, and a strong reliance on imports make matters worse, this situation is made much more complex. More than simply awareness is needed to address this complex issue; cutting-edge technological solutions and sustainable operational frameworks must be included. In food charity organizations, traditional processes that frequently rely on manual paperwork are becoming more and more ineffective, resulting in delays, information loss, and inadequate resource management. On the other hand, digital transformation presents a viable substitute for expediting food donation procedures, enhancing correspondence between donors and nonprofit organizations, and guaranteeing prompt assistance for individuals in need.

Moreover, reducing food waste isn't the only aspect of waste management. A comprehensive strategy must also prioritize environmentally responsible alternatives to hazardous landfilling for the sustainable management of inevitable trash. Organizations can rank sustainable actions according to their impact on the environment, economy, and society by using frameworks such as the food waste hierarchy and decision trees for classification and treatment. In order to streamline food donation procedures and lessen operational inefficiencies in food charity ecosystems, this project investigates the creation and deployment of a web-based platform. Additionally, it highlights how crucial data-driven technologies are for controlling food supply chains, evaluating food insecurity, and advancing circular economy principles. The study intends to close the gap between the availability of excess food and hunger by fusing digital innovation with environmental objectives, ultimately resulting in a more robust and just food system.

The increasing strain that urbanization, climate change, and population expansion are placing on the world's food systems has made addressing food waste more urgent in recent years. The gap between food plenty and access is largely caused by consumer behavior and distribution inefficiencies, even when world output is frequently enough to feed the population. The inability of many industrialized and developing countries to

balance scarcity and surplus in their food supply networks leads to significant nutritional and economic losses. Technological advancements have created new opportunities to enhance food waste management decision- making, traceability, and transparency, especially in the areas of information systems and data analytics. From

production and processing to consumption and disposal, these technologies can assist in identifying

inefficiencies at every stage of the food lifecycle, enabling prompt interventions and well-informed policy planning. Furthermore, real-time monitoring and forecasting capabilities provided by contemporary data platforms and intelligent apps can greatly improve donor-beneficiary matching, logistics planning, and resource allocation. The idea of a circular economy has gained traction in the fight against food waste, encouraging a change from the conventional "take-make-dispose" paradigm to a regenerative system in which resources are reused and waste is reduced. By converting organic waste into valuable goods like compost, bioenergy, and animal feed, circular economy concepts can be included into food systems to lessen their negative effects on the environment and generate revenue. Giving local communities, NGOs, and governmental organizations access to digital tools can promote more accountability and engagement on a societal level. Additionally, these tools can support educational initiatives aimed at changing consumer behavior, promoting sustainable consumption habits, and strengthening food systems' resilience.

LITERATURE SURVEY

"Foodernity: A Mobile and Web Application for Food Sharing" by John Amiel R. Morilla et al. (2021) presents a platform that facilitates food sharing through a mobile and web application. The study emphasizes user- friendly interfaces for donors and beneficiaries, aiming to reduce food wastage and

hunger. It highlights the effectiveness of using technology in addressing food surplus distribution but points out the challenge of real- time tracking and ensuring food safety.[1]

"Alleviating Poverty in the Philippines Through" by Cudia et al. (2019) analyzes various strategies to mitigate poverty, including food sharing and redistribution. The study supports food donation systems as part of broader social and economic development policies, although it notes limitations in infrastructure and awareness that can hinder effectiveness.[2]

The Encyclopedia Britannica entry on "Food" (2020) and Davies' book Urban Food Sharing (2019) provide foundational knowledge on the cultural, biological, and societal roles of food. Davies' work further explores how urban communities are adapting through technology-enabled food sharing networks, underlining the need for policy support and organizational coordination to ensure sustainable impact-[3]

"A. R. Davies Urban Food Sharing: Rules, Tools and Networks" (2019) delves deeper into the governance structures and digital platforms facilitating food sharing. It emphasizes the importance of rules and trust in peer-to-peer networks and highlights how mobile technology can act as a bridge between surplus and need, particularly in urban settings.[4]

"SeVa, a smart living food donation app" by Varghese, Pathak, and Varde (2021). The system leverages real- time data and user preferences to optimize donations. While effective, the authors note a need for better integration with government programs to scale the solution.[12]

"Design of a mobile application specifically for reducing food wastage" by Abhijit Ashok Patil (2021) presents. The study incorporates user-friendly UI, geolocation, and real-time alerts. It demonstrates practical benefits in local food redistribution but identifies challenges in app adoption and consistent user engagement. [13]

RESEARCH METHODOLOGY

The study uses a descriptive methodology since it explains the types of food sharing and donation as well as the degree of awareness of food waste. This study also looks at the suggested system's usability, effectiveness, dependability, functionality, and portability after it is put into use. The development technique was also adopted because the main objective of this study is to create a web and mobile application that is tailored for donors and beneficiaries. The entire process of creating the online and mobile applications, in particular, adhered to the logical and formal procedures of the Agile Model. The methods that the researchers employed to create the project is shown in Fig. Agile development is divided into six stages. System design, requirements analysis, project development, testing and integration, system deployment, review, and maintenance. Each of these levels has substages. Agile software development is an approach that works well for adjusting to ongoing modifications and changes for the betterment of the system. Gathering and analyzing data for the system's implementation are the tasks required for requirement analysis. Ishikawa diagrams, use case diagrams, activity diagrams, and the system architecture were initially produced by the researchers for the system design. The tasks involved in project development include creating the prototype of the web and mobile application's system components, implementing features and functionalities, troubleshooting bugs, errors, and issues, and developing system components for the mobile and web applications.



Figure 3.1 : Agile Development Method

System Development: Device connectivity is being developed and tested in the operational system. Additionally, the system is being implemented and made available to users. System testing is required for integration and testing in order to ascertain whether the modules are operating as intended. Additionally, the researchers will be working on debugging, installing system updates, and assessing user comments as part of the Review and Maintenance phase.

Methodology for Software

A prototype, or early approximation of a final system or product, is constructed, tested, and then revised as needed until an acceptable prototype is eventually obtained, at which point the whole system or product may be developed. This software process is known as the prototyping model. This approach was chosen because it made sure that all of the system's requirements were progressively recorded during the implementation phase.

Phase of Planning

This stage was crucial in figuring out what was needed to ensure the study's success. It outlined the steps and all the materials required in advance to construct the system successfully.

Requirements Elicitation

A feasibility study is an assessment of the practicability of a proposed plan, method or a solution. It was done through reviews of relevant literature on existing systems related to food wastage. The study was performed to analyse and evaluate the impending solution of the proposed system.

Methods of System Analysis and Design

The researcher's understanding of what is required to process, store, and evaluate data flow in a systematic manner, as well as to provide information relevant to the study, was aided by system analysis and design approaches .The modeling language that was employed was the Unified Modelling Language (UML). This helped to clarify the user requirements and support modeling analysis and design diagrams. System functionality was modeled using use case descriptions and diagrams. The system flow was modeled by the system sequence

diagram, which showed data moving between the system's primary elements. Class diagrams were used to model a variety of things with matching characteristics and implementation strategies. The database displaying tables, properties, and relationships was modeled using the Entity Relationship Diagram. The table structure with fields, data types, and descriptions was modeled by the database schema.

Testing of Applications

To determine whether the prototype aligns with the stated objectives of this study, it underwent the following tests:

- Functional Tests: To make sure the application satisfies all requirements, functional and non-functional tests were conducted on the prototype mobile application using an Android device and a web browser.
- 2. Compatibility testing were conducted on several web-based and mobile applications running on various Androidbased platforms and browsers, respectively.
- 3. User Tests: These were conducted on the program to gauge user satisfaction and provide input for improving the prototype. This was accomplished by letting several users using the application and then getting their input.

RESULT AND DISCUSSION

The procedure of matching together donors and beneficiaries has been greatly enhanced with the introduction of the web-based food donation system. The method guarantees prompt collection by certified NGOs and charities by enabling users, including households, businesses, and restaurants, to post excess food online. In order to preserve quality and transparency, administrators are essential in approving donations. By allowing contributors to monitor and control their posts, the platform also promotes consistent engagement, which results in a more steady stream of contributions.

The technology has demonstrated efficacy in mitigating food waste and advancing ecological sustainability. It makes it possible to efficiently classify and track different kinds of food, which helps to minimize spoiling and satisfy the individual demands of recipients. The platform lowers carbon emissions and fuel use through efficient logistics and transportation. Even though the system has a lot of promise, there are still issues with sustaining donor involvement, guaranteeing food safety, and increasing access in places with poor connectivity. The platform may, however, have an even bigger influence on food security and waste reduction with additional enhancements and the incorporation of technologies like artificial intelligence and real-time tracking.

Welcome to Food Donate



CONCLUSION

Managing food waste is essential to improving sustainability and lowering hunger. Redirecting excess food to those in need can lessen the detrimental environmental effects of food disposal by putting in place effective procedures for food donation, classification, and redistribution. In addition to reducing waste, this strategy ensures that resources are used efficiently and helps create a more just and sustainable food system. It is possible to increase the accessibility of food contributions and help communities experiencing food insecurity while encouraging environmental stewardship by utilizing digital platforms and well-organized logistics.

Governments, corporations, non-governmental organizations, and local communities must work together to maximize the impact of food waste management initiatives. Effective and scalable food redistribution depends on standardized processes, well-defined policies, and enhanced technology. Furthermore, raising public awareness and offering rewards to food donors can be crucial in ensuring that extra food is distributed to those in need rather than ending up in landfills.

To increase the effectiveness of managing food waste In the end, minimizing food waste necessitates a multifaceted strategy that incorporates innovation, teamwork, and technology. Society can greatly lessen its environmental impact and solve the urgent problem of hunger by combining these components and continuously improving food recovery systems. In addition to enhancing food security, this cooperative strategy will create a more sustainable future for future generations. Food donation is another essential component in managing food waste. Millions of people go hungry every day while enormous amounts of food

are wasted. Through efficient donation mechanisms, extra food can be given to people in need rather than being thrown away

REFERENCES

- John Amiel R. Morilla, Fhillip Carl Bagsic, Mark Kenneth Dela Cruz, Carl Daniel A. Patio, Emeliza R. Yabut, "Foodernity: A Mobile and Web Application for Food Sharing", National University, 2021 1st International Conference in Information and Computing Research (iCORE).
- 2. C. P. Cudia, J. P. R. Rivera and T. S. Tullao, Jr., "Alleviating Poverty in the Philippines Through," DLSU Business & Economics Review, pp. 121-130, 2019.
- 3. T. E. o. E. Britannica, "Food," Encyclopedia Britannica, 24 March 2020. [Online]. Available: https://www.britannica.com/topic/food. A. R. Davies, Urban Food Sharing: Rules, Tools and Networks, Chicago: Bristol University Press, Policy Press, 2019.
- 4. A. R. Davies, Urban Food Sharing: Rules, Tools and Networks, Chicago: Bristol University Press, Policy Press, 2019.'
- 5. F. Edwards and A. Davies, "Food sharing with a 2 Istcentury twist and world leader," The Conversation, 30 May 2018.
- 6. Malindog-Uy, "More Filipinos Starving Amid the Pandemic," The Asean Post, 25 October 2020.
- 7. J. Bloom, "Three smart ways innovation is helping reduce food loss and waste," Food and Agriculture Organization of the United Nations, 28 September 2020.
 - A. Anzer, H. Tabaza, W. Ahmed and H. Hajjdiab, "A Food Wastage Reduction Mobile Application," 20/8 6th International Conference on Future Internet of Things and Cloud Workshops, pp. 152-157, 2018.
- 8. G. Farr-Wharton, J. Choi and M. Foth, "Food Talks Back: Exploring the Role of Mobile Applications in Reducing Domestic Food Wastage," in 26th Australia Computer-Human Interaction Conference on Designing Futures: the Future of Design, Sydney, 2014.
- 9. J. Harvey, A. Smith, J. Goulding and I. B. Illodo, "Food sharing, redistribution, and waste reduction via mobile applications: A social network analysis, Industrial Marketing Management, 2019.
- **10.** E. De Boeck, L. Jacxsens, H. Goubert and M. Uyttendaele, "Ensuring food safety in food donations: Case study of the Belgian donation/acceptation chain," 2017.
- 11. C. Varghese, D. Pathak and A. Varde, "SeVa: A Food Donation App for Smart Living," in JEEE CCWC 202, Las Vegas, 2021.
- 12. Abhijit Ashok Patil, "Designing A Mobile Application for Food Wastage Reduction", Bharati Vidyapeeth University, June 2021.