

Original Article

Using Food Waste as Consumable Organic Resource

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Abstract: It's common to have gatherings with plenty of food, but unfortunately, a lot of it goes to waste. Food waste occurs for various reasons, and this project aims to address it by creating a system to manage excess food and vegetables. The system is designed to connect food providers with TRUST/NGO personnel who require it. The system comprises an administrator, a food/vegetable supplier, and a Trust member. The food provider is the individual who donates the food to those in need, and the administrator manages information about both the provider and the Trust's members, including the number of meals and members. The Trust member is responsible for collecting the food and vegetables and distributing them to people in need. The system also maintains a record of food requests received from the supplier, which the administrator reviews and approves before allocating to the Trust member.

Keywords: Food Wastage, Food provider, TRUST/NGO, Admin, OTP.

I. INTRODUCTION

Food that goes to waste or spoils is commonly referred to as food loss or food waste. Poor management of the food supply chain, from production to processing and distribution, is a common cause of food loss [1]. It is estimated that globally, 1.3 billion tonnes of food, or one-third of all food produced for human consumption, is wasted annually. Food waste occurs at every stage of the food supply system. In low-income countries, food waste is more prevalent during the production phase, while in high-income countries, it is more common during the consumption phase, with approximately 100 kilos of food wasted per person annually [2].

India is a densely populated country where 49% of the population lives in poverty, despite its economy being in its early stages of development. One of the emerging threats to food security in the country is food waste [3]. On average, an individual in India wastes about 5.5% of the food they buy per day. Moreover, during special occasions such as weddings and birthdays, approximately 52% of food goes to waste [4]. Food waste is a concern for the nation's food security, despite rapid economic growth and increased productivity.

Preventing food waste and feeding the impoverished requires a system for collecting excess food from events and donating it to various charities, such as nursing homes and orphanages. Currently, individuals donate leftover food by physically visiting each organisation a certain number of times [5]. However, it is essential to establish a more efficient means of collecting and distributing excess food to minimise food waste and address food insecurity.

The objective of this website is to reduce food and vegetable waste and channel surplus food to charities, orphanages, and street children. The platform simplifies communication between restaurants and charities, making it easier for them to collaborate. Charities and restaurants/donors are required to create an account on this website. Donors can log in to their account to donate their surplus food to charities. The website's primary goal is to collect excess food from donors and distribute it to charities by establishing a connection between them. This website acts as a bridge between the two parties, enabling efficient and effective food donation.

II. RELATED WORKS

In a study by P. Manjunath et al [6], a real-time measurement system for food wastage in office premises was developed, providing employees with live input on food wastage through a computer-based dashboard. Lu, Y et al [7] analyzed the phenomenon of recycled waste edible oil and discussed possible solutions. Rajvor et al [8] created a web-based portal called "Surplus Food for Orphanage" to reduce food wastage. Jethwa et al [9] connected donors directly to orphanages for food donation. Patil et al [10] utilized ML and IoT technology to create the "Zero Hunger" system, which collects surplus food from public spaces and delivers it to NGOs. Naman Talati et al [11] presented "Helping Hands," an application that provides a platform for donating old clothing and surplus food. Aron Ciaghi et al [12] presented the use of ICT tools to collect



food surplus at various stages of the supply chain and proposed an integrated set of ICT tools to decrease waste. Divyesh Jethwa et al [13] developed a web-based application to donate food remnants without manual work. Adline Freeda et al [14] created an application that visualizes the impact of food waste, sends alerts to NGOs and orphanages to collect surplus food, and reduces wastage. Finally, a paper by et al [15] described the challenges in establishing a food donation system, which involves collecting, storing, and distributing surplus food to those in need.

III. PROBLEM STATEMENT

The issue of food waste involves several challenges that must be addressed, including:

- Disposal of food as garbage waste.
- Manual processes required to deliver food to slum areas.
- Difficulties in finding NGOs and orphanages to donate food to.
- The need for phone communication to coordinate with NGO authorities.
- Delays in the process that may result in food expiration.

IV. PROPOSED SYSTEM

A proposed solution to address the issues related to food waste is to develop a new system that enables food providers to donate excess food to those in need. The system is designed to have an admin who acts as a mediator between the food provider and the trust. The food provider provides details about the excess food to the admin, who searches and collects details about nearby trusts in need of food. The admin then informs the food provider about the nearby trust/NGO along with the distance and generates an OTP verification code between them. The trust member collects the food from the food provider location using the verified OTP code and delivers it to the needy people. This system eliminates the need for the food provider to search for NGOs and orphanages, and it reduces the delay in the process of delivering food to the needy.

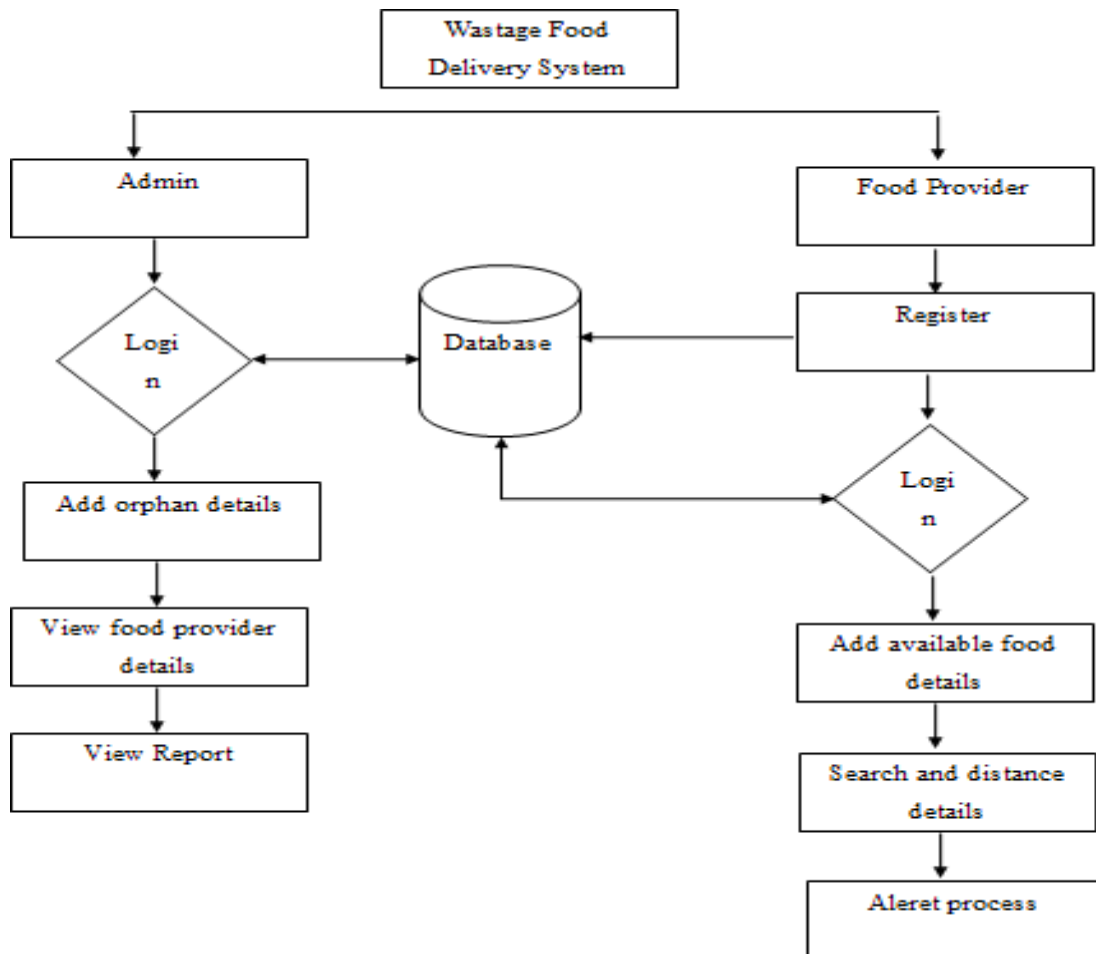


Figure 1: Work Flow of Proposed System

The proposed methodology is constructed based on the several modules namely:

- Admin
- TRUST/NGO
- Search
- Alert
- Report

A. Admin

The initial module is crucial in the proposed system as it involves the participation of the system admin. The food provider is not able to donate their excess food without the involvement of the admin. The food provider can donate surplus food from events such as weddings, parties or from hotels to the needy such as old age homes or orphanages with the help of the admin.

B. TRUST/NGO

The Trust module allows trusts to register themselves on the system as members. During the registration process, the manager of the trust, old age home or orphanage must provide the total number of people living in their facility. This information will be used to match the excess food provided by the food providers with the needs of the trust, ensuring that the food is distributed to those who need it. Once registered, the trust can receive information about nearby food providers through the system admin and can collect excess food from them to distribute to the people they serve. The trust module also includes a reporting feature that allows the manager to report any issues related to the food or the distribution process.

C. Search

Once the trust member sends a request for food to the admin, the admin searches for nearby trusts or NGOs that are in need of food and have registered with the system. The admin then sends the details of the nearby trust to the food provider, along with the distance between them and an OTP verification code. The trust member uses this OTP code to acknowledge and collect the food from the food provider's location. The collected food is then delivered to the needy people living in the trust, old age home or orphanage. This way, the excess food from the provider is utilized effectively, reducing food wastage and helping people in need.

D. Alert

The OTP can be generated and shared between the food provider and the trust member through the admin system, ensuring that only authorized individuals can receive and collect the food.

E. Report

The reporting module can be useful in keeping track of the food donations made by the providers over time. This can help the admin and the providers to see how often they are donating, which organizations they are donating to, and what types of food are being donated. This information can be useful in making decisions about future donations, identifying any patterns or trends, and ensuring that the donations are being utilized effectively. The reporting module can also provide feedback to the providers and the admin about the impact of their donations and the benefits they are providing to the community.

V. EXPERIMENTAL RESULT

It sounds like the system developed in this research work is a web-based application developed using PHP and the Zend Framework. The system is designed to support an online food donation system, allowing food providers to offer excess food to nearby organizations in need, and facilitating communication between the food provider, the admin, and the trust members.

The system includes modules for food provider registration, trust registration, food donation request management, and reporting. The use case and project workflow diagrams are used to illustrate how the proposed system works. Overall, the system is intended to be an effective means of donating food to various organizations over the internet.

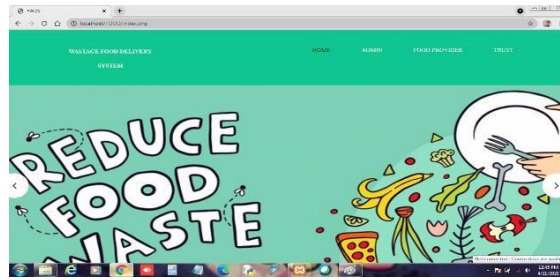


Figure 2: Homepage

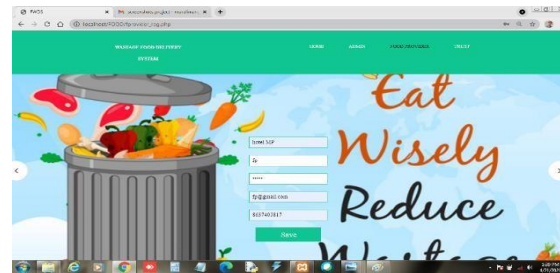


Figure 3: Food Provider Registration

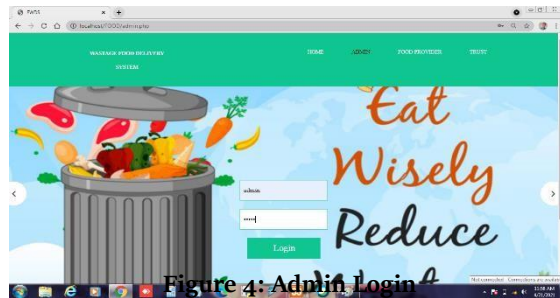


Figure 4: Admin Login



Figure 5: Admin Activates Food Providers



Figure 6: Providers Login



Figure 7: Provider Details

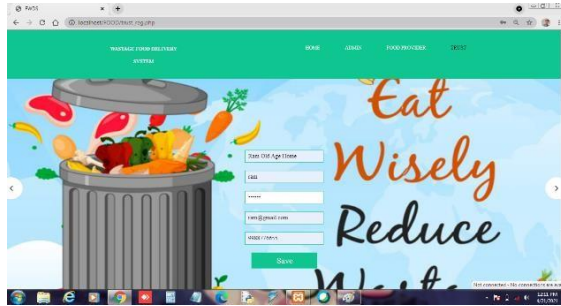


Figure 8: TRUST/NGO Registration

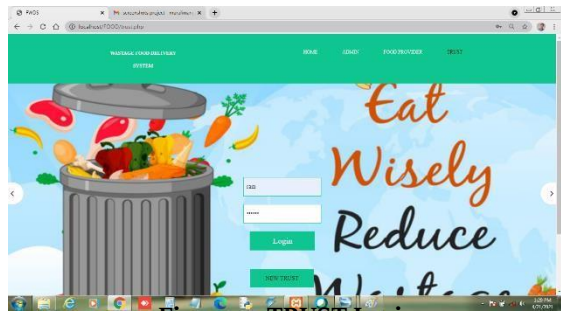


Figure 9: TRUST Login

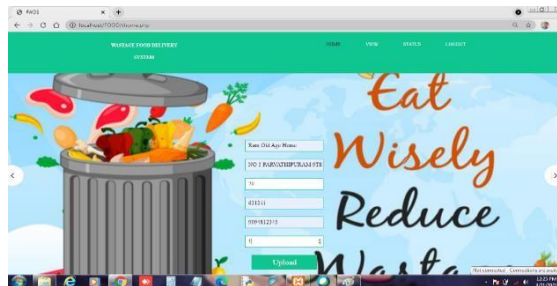


Figure 10: TRUST Details

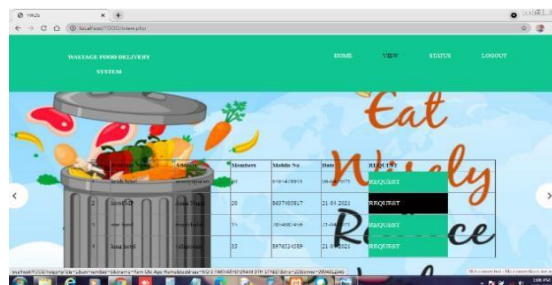


Figure 11: Food Search and Request



Figure 12: Admin Viewing Provider's List



Figure 13: Allocating Food

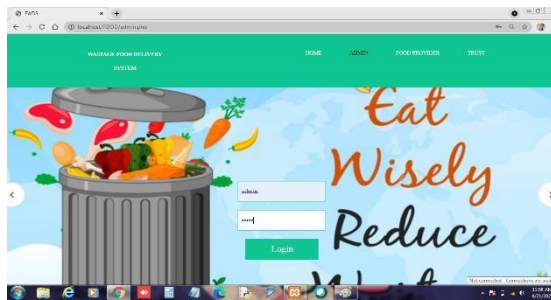


Figure 14: OTP Allocation

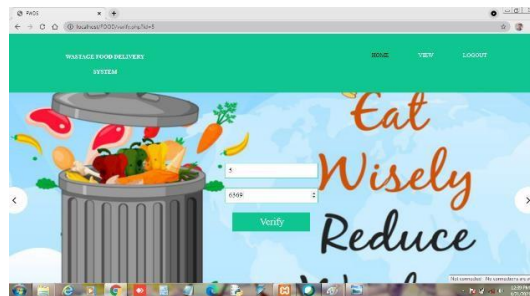


Figure 15: OTP Verification

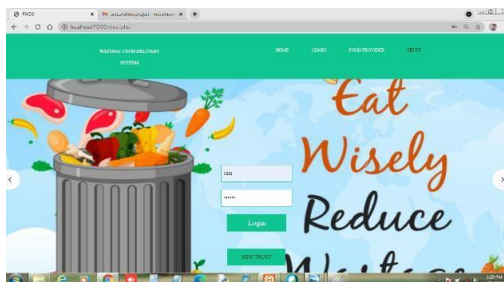


Figure 16: Report Generation

VI. CONCLUSION

This waste food management system efficiently addresses the issue of food waste by allowing an admin to allocate excess food to the appropriate trust member. By generating an authentication OTP code, the food provider can securely provide the food to the trust member. This system streamlines the process of food donation to ensure that food is provided to those in need. Developed in PHP, this user-friendly system is easily accessible for anyone new to the system.

VII. REFERENCES

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