Food Donation

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Abstract

Hunger is a major problem in the world, with over 800 million people going hungry every day. At the same time, a significant amount of food is wasted each year. Food donation websites can contribute significantly to the reduction of food wastage. and alleviating hunger by connecting food donors with food banks and other organizations that distribute food to those in need. This paper proposes a new website for food donation that aims to be more efficient and user-friendly than existing websites. The proposed website will use a variety of features to make it easy for donors to find and donate food, including things like this website will empower users to register, log in, browse items, add products to the cart, remove items from the cart, and log out.

Keywords: food donation, hunger, food waste, food banks, food insecurity, technology, user-friendly, efficient, efficient donation, easy donation, reduce food waste, alleviate hunger

I. INTRODUCTION

The year 2020 was marked by the formidable challenge posed by the rapid transmission of COVID-19, a newly identified infectious illness. that impacted the entire global population. This pandemic brought about severe consequences, manifesting in critical shortages of everyday necessities such as disinfectant sprays, antiseptic wipes, hand sanitizers, and personal protective equipment (PPE) including face masks and respirators. Additionally, it exacerbated an already pressing issue – food shortages. The abrupt closure of public schools had particularly adverse effects, especially on schoolchildren who relied on these institutions for their daily meals. To address this crisis, food donation centers [1] emerged as essential providers of food aid, as depicted in Figure 1. These centers played a crucial role in ensuring that surplus food reached those in need during this time of extraordinary disruption.

In response to the challenges presented by the COVID-19 pandemic, businesses adapted to a new operational landscape that heavily relied on AI-based virtual environments until regular activities could resume. Some forward-thinking businesses seized the opportunity to enhance their AI-related platforms and expand their services to cater to new demographics. Notably, several food vendors capitalized on this newfound opportunity to evolve their operations in response to the growing demand for food assistance during these trying times.

A food donation portal is an online platform designed to facilitate the donation of surplus food to individuals and organizations in need. This web-based system has proven to be a highly efficient means of connecting food donors with recipients over the internet. In densely populated nations like India, the issue of food wastage has reached alarming proportions, evident from overflowing garbage bins, littered

streets, and overflowing landfills. Food surplus from canteens, weddings, restaurants, social gatherings, and events contributes significantly to this problem. The wastage of food not only reflects issues related to pollution and hunger but also underscores various economic challenges. The rise in living standards has led to the squandering of food resources, driven by rapid changes in lifestyles and consumption habits. Rather than allowing this food to go to waste, it can be put to good use by donating it to various institutions such as elderly care homes, orphanages, and more. The product under discussion is an online platform aimed at promoting charitable acts through food donations.

Fig. 1. Students receiving food packets amid school closures due to the COVID-19 pandemic [1].

II. LITERATURE SURVEY

Griffin et al. [2] provided a model for quantifying and comparing food waste throughout an entire community food system. The act of donating still-edible food can be viewed as a distinct application of urban mining, where food is reclaimed for its initial purpose - human consumption. While numerous projects have been initiated globally, the scarcity of data results in limited scientific literature on the topic.

Schneider [3], in 2012, provided insights into the distinctions and parallels among present organizations involved in distributing food to those in need, along with an exploration of the political, legal, social, and logistical obstacles and incentives associated with this subject. Food banks acquire donated food from both national and local sources, including The Emergency Food Assistance Program (TEFAP) and supermarkets.

In 2014, Davis et al. [4] designed transportation schedules that facilitated the collection of food donations from local sources by the food bank and the distribution of food to charitable agencies. While food plays a significant role in shaping people's identities, the swift increase in the prevalence of food banks and donation points in supermarkets and schools implies a normalization of food aid.

In 2016, Purdam et al. [5] investigated the discourse surrounding food aid and the stigmatization of individuals living in poverty, the extent of malnutrition, and the experiences of food bank users. They utilized survey data and case studies for their analysis. Non-profit hunger relief organizations aim to mitigate the adverse impacts of food insecurity by offering food and services to individuals in need.

In 2016, Davis et al. [6] conducted a study that analyzed and predicted food donation behavior for a domestic hunger relief organization. Their comprehensive numerical investigation aimed to quantify the level of uncertainty associated with the donor, product, and supply chain structure.

In 2017, Lee et al. [7] explored how BPS (Buy-Donate-Sell) can alleviate food waste in a retail grocer setting and examined its interactions with other waste reduction mechanisms, such as waste disposal fees and tax credits for food donation. The findings indicate that under BPS, the threshold net tax benefit needed to encourage donation rises because BPS competes with donation for surplus primary units.

Various policies related to food waste management, reduction, and donation are established to enable and incentivize individuals, organizations, and businesses to diminish their food waste.

In 2018, Chen et al. [8] concentrated on examining activities related to the prevention and diversion of food waste, utilizing data sourced from two U.S. waste reduction recognition programs, namely the U.S. Food Waste Challenge (FWC) and the EPA Food Recovery Challenge (FRC).

In 2020, Roe et al. [9] delved into various subjects within the food waste literature, highlighting ethical issues that, in their perspective, deserve additional contemplation. These encompass the focus on food donation as a strategy for minimizing food waste, the rise of markets for imperfect-looking food (i.e., "ugly food"), the suitability of guilt appeals for instigating reductions in wasted food, and the ethical dilemmas associated with selecting dates on food labels.

III. PROBLEM STATEMENT

The Food Donation Portal Proposed Program is a web-based platform designed to provide a forum for individuals and organizations to donate excess food, addressing the issue of food wastage, particularly in densely populated regions like India.

Excessive food is often discarded from various sources, such as weddings, canteens, pubs, social gatherings, and events. This website seeks to channel this surplus food towards organizations like orphanages and old age homes, based on the needs of these organizations. A website has been developed to facilitate food donations according to user's capacity and to allow organizations to request specific items they require.

The website acts as a bridge between those who wish to donate excess food and those in need, reducing food wastage and aiding vulnerable organizations. The primary goal of this initiative is to minimize the significant issue of food waste in India. Ongoing improvements and optimizations are planned to enhance the website's reliability and utility.

IV. EXISTING SYSTEM

Manual processes and limited technology support are typical of the current food waste management and donation system. Traditional methods of connecting and coordinating food donations include phone calls, physical visits or word of mouth. The manual approach leads to inefficiencies, delays and a lack of transparency. In restaurants and food operations, basic spreadsheets or manual tracking systems are used for inventory management. Increased food waste and financial losses can be caused by this manual approach. Sales forecasting in the restaurant industry is based on historical data and intuition.

This strategy might not yield precise predictions, resulting in issues such as excessive food production or inadequate preparation, both of which contribute to food waste. The existing system lacks efficient communication channels, advanced analytical capabilities, and real-time data insights necessary for effective food waste management and donation. There is a requirement for a more streamlined and technology-driven system that can optimize food stocks, facilitate connections between donors and NGOs, and offer precise sales forecasts to minimize food waste.

V. PROPOSED SYSTEM

In order to overcome the constraints of the present system, we suggest establishing an integrated system for managing and donating food waste. The proposed Food Donation Website is designed to

provide an efficient and user-friendly platform for connecting donors, administrators, and agents to streamline the food donation process. This system offers three main features, each serving a distinct role.

1. Donor Interface: The Donor feature allows individuals, organizations, and businesses to register as food donors. Donors can easily post information about surplus food items they wish to donate, including type, quantity, and availability. They can schedule pickups, track the status of their donations, and receive notifications when their contributions are accepted or picked up by agents. Donors will have a user-friendly dashboard to manage their donations and view their impact on the community.

2. Admin Panel: The Admin feature empowers system administrators with the tools to oversee and manage the entire platform. Administrators can verify and approve donor and agent registrations, monitor donation postings, and ensure the system's integrity. They can also generate reports, resolve disputes, and maintain the website's overall functionality. The admin panel is a vital component to maintain transparency and ensure ethical food handling.

3. Agent Dashboard: Agents play a pivotal role in connecting donors with beneficiaries efficiently. The Agent feature allows individuals or organizations to register as agents who facilitate the collection and distribution of donated food. Agents can view available donations, accept and schedule pickups, and arrange deliveries to food banks, shelters, and other recipients. The agent dashboard also assists in optimizing routes and managing logistics to minimize food waste and ensure timely deliveries.

By incorporating these key features, the Food Donation Website aims to create a seamless and accountable system that encourages food donors, assists administrators in maintaining order, and empowers agents to efficiently bridge the gap between surplus food and those in need. This platform will enhance the food donation process, reduce food waste, and contribute to the well-being of communities while fostering a spirit of generosity and social responsibility.

VI. METHODOLOGY

The methodology applied in crafting the food aid website focuses on establishing connections between food donors and registered agents, with the primary objective of reducing food wastage and streamlining the distribution process. The website encompasses functionalities such as donor, agent, and admin registration and login/logout procedures. It further incorporates capabilities for specifying food details, expiration dates, and quantities. The methodology is organized into distinct stages, including Needs Assessment and Planning, System Design, Development, Testing, and Deployment.

1. Needs Assessment and Planning:
- Identify the key stakeholders (donors, administrators, agents) and conduct surveys and interviews to understand their requirements and expectations.
- Define the goals and objectives of the Food Donation Website, including the scale of operation, geographical reach, and target beneficiaries.

2. System Design:
- Develop wire-frames and prototypes for the website's user interfaces (Donor, Admin and Agent).
- Design the database structure to store donor, donation, and beneficiary information.
- Plan the architecture and technology stack for the website, considering scalability and security.

3. Development:
- Create the website's front-end and back-end components according to the design.
- Implement user registration and authentication systems for donors, administrators, and agents.
- Develop features for posting donations, managing donations, scheduling pickups, and delivering food

to beneficiaries.

- Integrate a matching algorithm to connect donors with nearby agents and beneficiaries efficiently.
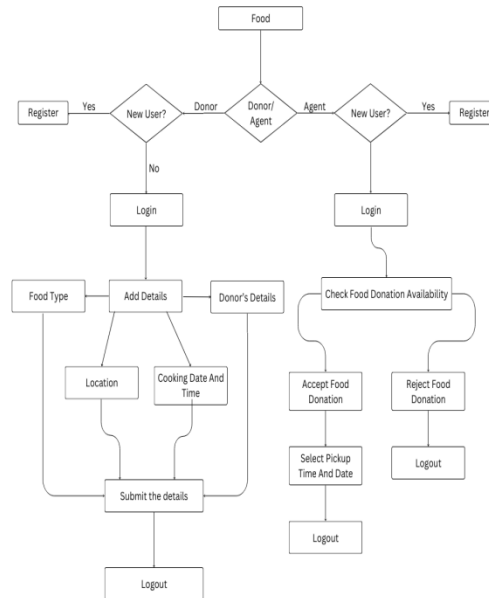

Fig. 2. Flowchart Diagram

4. Testing:

- Conduct thorough testing, including functionality testing, usability testing, and security testing.
- Ensure that the website is user-friendly, responsive, and free of critical bugs and vulnerabilities.
- Seek feedback from potential users to make necessary improvements.

5. Deployment:

- Roll out the Food Donation Website to a broader audience, extending its reach to a wider geographical area.
- Market the platform to attract more donors, administrators, and agents.
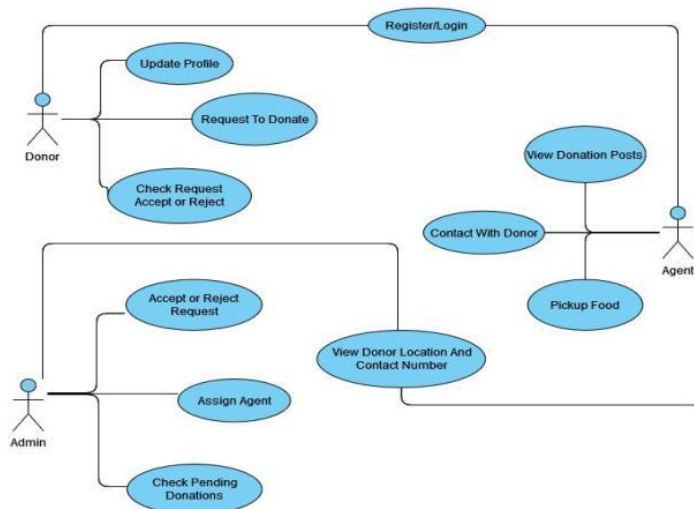
**Fig. 3. Use Case Diagram**

VII.   RESULTS

1. Login:

The food donation website's login page is designed to be visually appealing, easy to navigate, and secure. The use of a simple, clean design and clear labels makes it easy for users to identify and enter their login credentials. The login page also uses a secure connection (indicated by the https:// prefix in the URL) and a strong password requirement to protect users' accounts from unauthorized access.

Additionally, the login page includes links to create a new account and reset forgotten passwords, which makes it easy for new users to sign up for the website and for existing users to regain access to their accounts. Overall, the food donation website's login page provides a positive user experience and contributes to the overall security of the website.
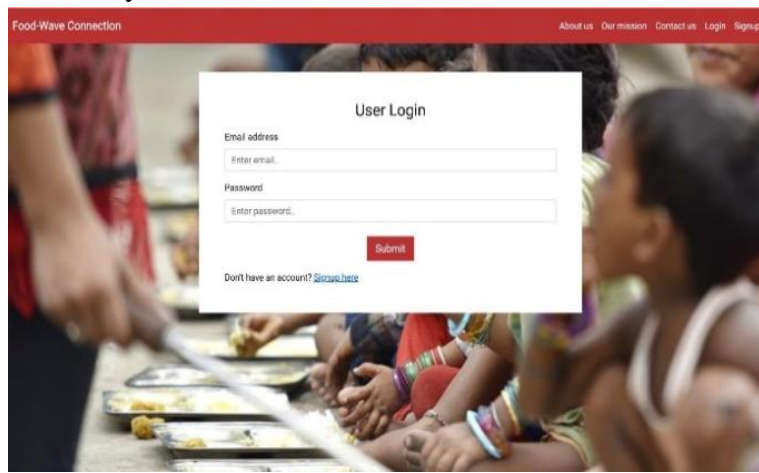

Fig. 4. Login Page

2. Register:

The registration form for this research study collected the following demographic information from participants: first name, last name, email address, and password. Participants were also required to confirm their password and to select a user role (donor, agent, or admin). The registration form used CAPTCHAs to prevent spam submissions.

The information collected on the registration form was used to create user accounts and to send participants important notifications about the study, such as updates on the study timeline and invitations to participate in surveys or interviews.
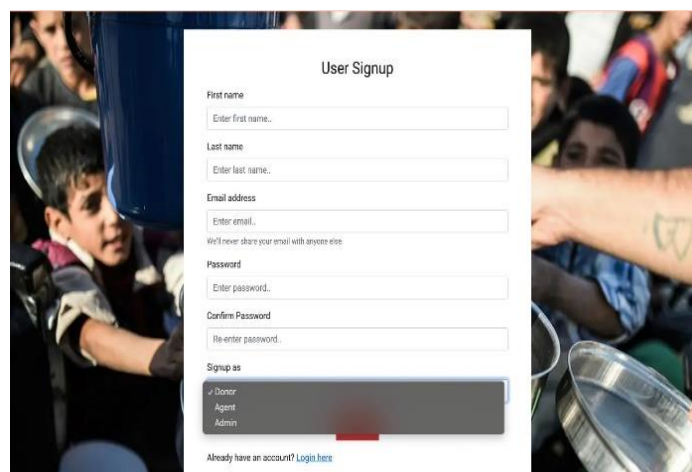

Fig. 5. Registration Page

3. Admin Dashboard:

The dashboard for the food donation management system displays a variety of information relevant to the food donation and collection process. This includes the number of pending donations, previous donations, agents, donors, new donation requests, donations not collected, donations collected, and yet to be collected. This information can be used to manage the food donation process efficiently and effectively.

For example, the dashboard can be used to identify donations that need to be assigned to agents, donors who need to be contacted, and new donation requests that need to be processed. The dashboard also provides a snapshot of the overall status of the food donation system, which can be useful for making informed decisions about resource allocation and process improvement.
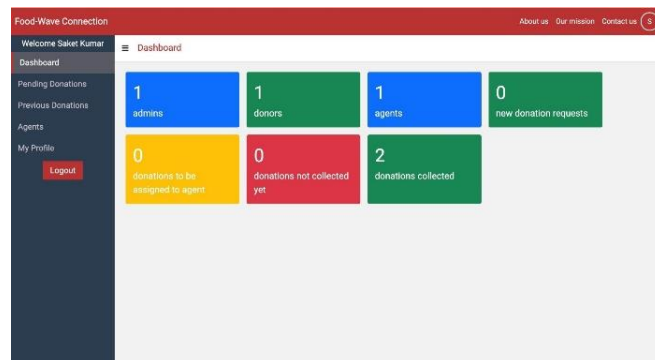

Fig. 5. Admin Dashboard

4. Donor Dashboard:

The donor dashboard is a web-based tool designed to provide donors with an efficient means of managing their charitable contributions. This comprehensive platform offers donors access to their complete giving history, allowing them to review details such as the date of each donation, the donation amount, and the specific campaign or cause they supported. Additionally, the dashboard includes a suite of donation management tools, enabling donors to make both one-time and recurring donations, monitor the status of pending donations, and conveniently update their payment information when necessary.

Furthermore, the dashboard offers a profile information section where donors can access and modify their personal details, including their name, email address, and mailing address. The user-friendly nature of the donor dashboard benefits both donors and non-profit organizations, as it empowers donors to efficiently oversee their contributions while fostering stronger and more sustained engagement in philanthropy.
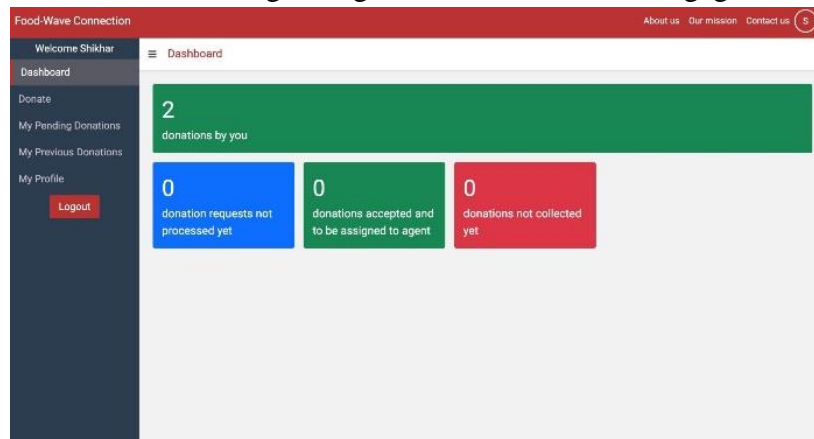
Fig. 6. Donor Dashboard
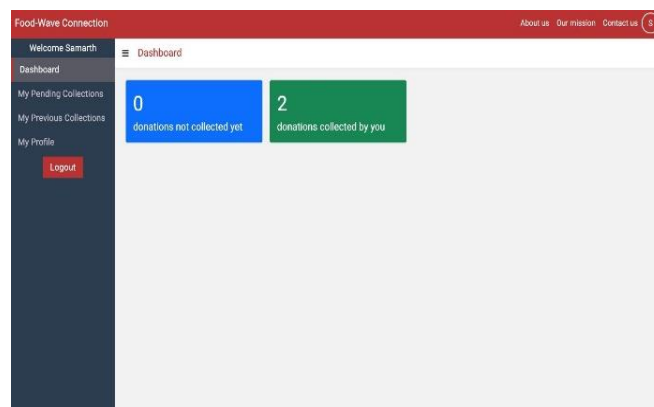
5. Agent Dashboard:

The agent dashboard plays a vital role in making food collection and distribution run smoothly. It helps agents in a few key ways. First, agents get important messages from administrators about where to pick up food from donors' homes. This makes sure everyone knows what they need to do.

After they collect the food, agents can use the dashboard to let everyone know that they've done it. It's like saying, "Mission accomplished!" This helps everyone keep track of what's been collected.

Agents can also look back at all the food they've collected in the past. This helps them see how much they've collected and when. It's like a record of their work.

Lastly, agents can update their personal information using the dashboard. This is handy for keeping their details current and making sure everyone knows how to reach them.

So, the agent dashboard is like the control center for agents. It keeps things organized and helps agents do their jobs effectively. This benefits everyone involved in food donation programs.

Fig. 7. Agent Dashboard

VIII. FUTURE WORK

Future work related to the food donation website project presents a range of promising directions for research and development. One avenue of exploration involves the integration of artificial intelligence and machine learning to optimize food collection and distribution processes, potentially enhancing route planning and automating certain aspects of the donation process. Expanding the project's geographical scope to address food waste challenges in new regions or countries is another prospect, albeit one that requires adaptation to specific local requirements and cultural considerations.

Additionally, the creation of dedicated mobile applications for donors, agents, and administrators could provide increased accessibility and convenience. These applications may offer features to facilitate food donation further. The accumulation of data within the platform offers opportunities for data analytics, with potential applications in route optimization, donation trend prediction, and insights into more efficient food distribution.

Evaluating the tangible impact of food donation initiatives, including food waste reduction, improved food security, and the well-being of recipient organizations and individuals, is an important area for future research. Continuous collection of user feedback and experiences within the platform can offer insights into user satisfaction and challenges faced, guiding improvements and enhancements.

The implementation of advanced security measures to safeguard user data and the integrity of the donation process remains a priority, especially as the platform expands. Collaborations with government

agencies, non-governmental organizations, and local businesses present the opportunity to scale the project further. Establishing strategic partnerships can extend the reach of the platform to a broader donor and recipient base.

Additionally, future work could focus on increasing user education and awareness about the platform's environmental and social contributions, exploring effective strategies for wider adoption. These potential future work directions underscore the project's potential for growth, positive impact, and continuous improvement.

IX. CONCLUSION

The establishment of a food donation website represents a pivotal step in addressing the issue of food insecurity within our society. By harnessing technology and uniting those in need with generous donors, we have the potential to profoundly impact the lives of individuals and families grappling with hunger. This research paper has delved into the advantages and obstacles associated with food donation websites, illustrating how they can streamline the donation process, boost efficiency, and reduce food wastage. Furthermore, they serve as a platform for individuals and organizations to collaborate and effect positive change in their communities.

Nevertheless, it is imperative to recognize that food donation websites, on their own, cannot offer a comprehensive solution to the multifaceted problem of food insecurity. They should be considered as one component of a more comprehensive strategy that encompasses policy reforms, educational initiatives, and community involvement. The pivotal element lies in collaborative efforts among government agencies, non-profit organizations, and businesses to establish a sustainable and all-inclusive food system.

By lending our support and utilizing food donation websites, we can contribute to a fairer society in which no one suffers from hunger. Let us persist in raising awareness, fostering empathy, and taking concrete steps to ensure that every individual has access to nourishing food. Together, we can generate a lasting impact and shape a brighter future for all.

X. REFERENCES

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