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Food Waste Reduction and Redistribution Platform

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Abstract: *In an era of global challenges, where food waste and hunger coexist, our project shines as a beacon of hope and innovation. The Food Waste Reduction and Redistribution Platform offers a visionary solution to address one of the world's most pressing issues: food waste. Our mission is straightforward: to bridge surplus food sources with charitable organizations and communities in need. Our vision is a world where food wastage is drastically reduced, and hunger is no longer a prevalent concern. Through the strategic integration of cutting-edge technologies, data analysis, machine learning, and artificial intelligence, our platform aspires to bring about transformative change. This project aims to develop a Food Waste Reduction and Redistribution Platform that connects surplus food sources with charitable organizations and communities in need, ultimately reducing food wastage and combating hunger. The platform's core objectives encompass user-friendliness, security, scalability, and real-time tracking for impactful outcomes.*

Keywords: *Food Waste Reduction, Food Redistribution, Surplus Food Management, Hunger Alleviation, Technology Integration, Data Analysis, Machine Learning Algorithms, Artificial Intelligence Applications, Sustainable Supply Chain, Chatbot Implementation, Environmental Implications, Sustainability Initiatives.*

1. INTRODUCTION:

The issue of food waste is pressing globally and leads both to the pollution and destruction of mother Earth (as well) as to deepening hunger and economic losses. Millions and millions worth of food is thrown away at every stage of supply from farm to fork. For this urgent challenge, what is required is a coordinated and effective response. That's where the "Food Waste Reduction and Redistribution Platform" concept becomes meaningful.

A Food Waste Reduction and Redistribution Platform is a dynamic network of interconnected entities (producers, retailers, restaurants, customers…) operating in the same space to prevent wastage and promote more sustainable and efficient practices throughout the entire supply chain. Using technology, data analysis, and cooperation, we aim at reducing food waste and guaranteeing that surplus food gets delivered to the people in need. It is an accelerator changing the narratives on how we eat, distribute, and dispose of food.

With the rise of digital era, leveraging tech to combat food waste has never been more essential. By bringing together a unified hub that enables effective distribution for surplus food to flow where it is needed most, we can take a large step towards minimizing food waste's negative social, environmental and economic impacts. The platform is not just convenient for businesses as it reduces wastage but fulfills the moral duty of making sure no edible food goes to waste when people lack access to adequate nutrition.

2. RELATED WORK:

In the quest to combat food waste and hunger, several initiatives and studies have contributed to our understanding of the challenges and opportunities. The following related work highlights the importance of addressing these critical issues:

1. "SeVa: A Food Donation App for Smart Living" - C. Varghese, D. Pathak, and A. S. Varde, 2021 17
2. The SeVa app is a notable example of a food donation platform, showcasing how technology can facilitate food waste reduction and efficient donation processes.

3. "Cloud-based Smart Waste Management for Smart Cities" - Aazam et al., Journal of Smart Cities, 2020
4. This research explores the use of cloud-based technology in managing waste efficiently within smart cities, shedding light on the potential of digital solutions for waste reduction.

5. Quantifying environmental implications of surplus food redistribution to reduce food waste" - Damiani et al., Environmental Sustainability Journal, 2021
6. The study provides insights into the environmental impacts of surplus food redistribution, emphasizing the ecological benefits of reducing food waste.

7. "A study of barriers for adoption and growth Of food banks in India using hybrid DEMATEL and Analytic Network Process" - Dubey and Tanksale, Socio-Economic Planning Sciences, 2022, Vol. 79.

8. This study investigates the adoption and growth barriers faced by food banks in India, shedding light on the unique challenges and opportunities in the Indian context.

3. PROPOSED MODEL:

The proposed system is a comprehensive food waste reduction and redistribution platform .The system comprises several key components and functionalities involves the following steps:

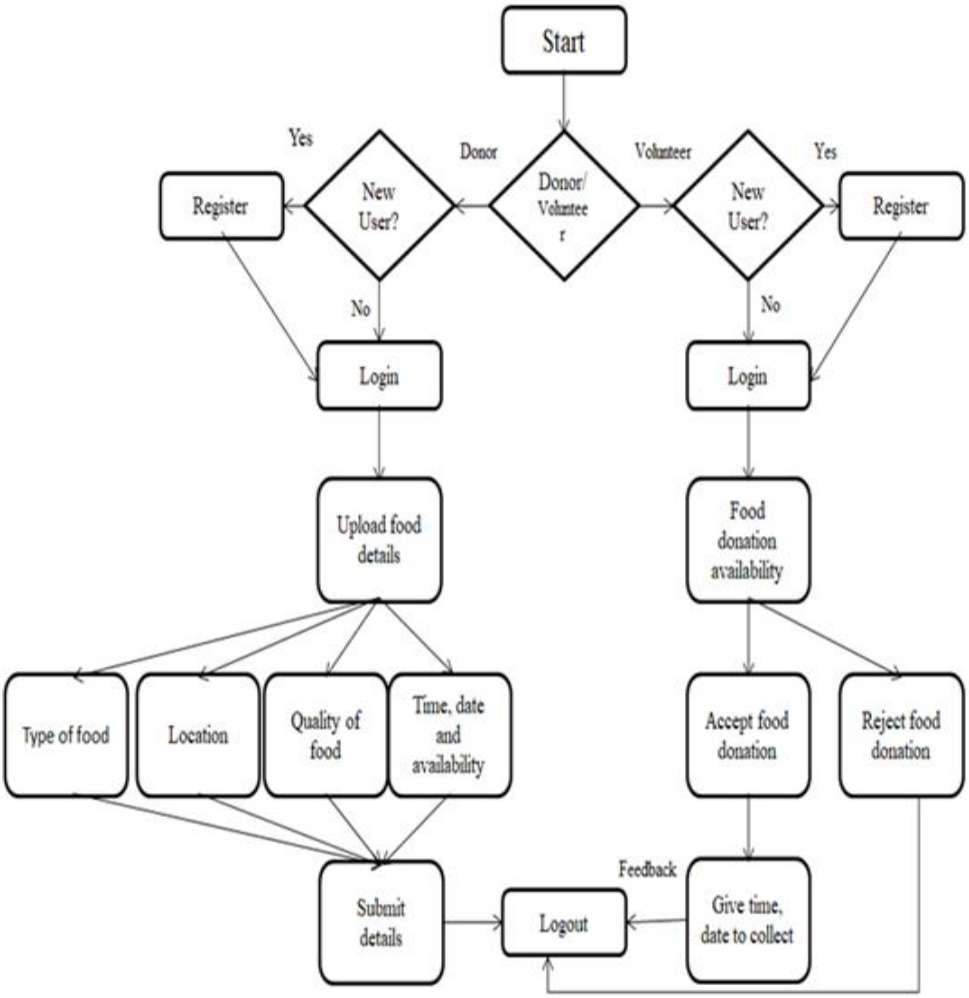

Fig. 1. Design of the system

1. **USER-FRIENDLY USER INTERFACE**

The user interface (UI) of the Food Waste Reduction and Redistribution Platform has been designed with a focus on user-friendliness. We utilized a combination of HTML, CSS, and JavaScript to create a responsive and intuitive interface.

1. Responsive Design: The platform's UI is responsive, ensuring optimal user experience on both desktop and mobile devices. We employed responsive design principles and media queries to adapt the layout to various screen sizes.
2. Intuitive Navigation: The navigation menu is structured logically, making it easy for users to access different sections of the platform. Users can quickly find options for registration, food donation, food claiming, and accessing their profiles.
3. User Registration: The registration process guides users' step by step, collecting necessary information while ensuring a smooth onboarding experience. Validation checks for email formats and password complexity have been implemented.

2. **WASTE PREVENTION TIPS AND EDUCATION**

To promote awareness and educate users about reducing food waste, we've seamlessly integrated a dedicated section for waste prevention tips and education within our platform. Furthermore, we've incorporated a user-friendly dashboard to address the urgent issue of malnutrition. This analytical insight enables us to facilitate highly targeted interventions and allocate resources efficiently, ensuring that surplus food reaches those who need it most.

3. **FOOD GRADE ASSESSMENT:**

1. User Input: Users provide details about the food items they intend to donate, including expiration dates and packaging conditions.
2. Machine Learning: The platform employs machine learning algorithms to assess the quality and safety of food items based on the provided information. It provides recommendations on whether items should be donated or disposed of

4. **CHATBOT**:

Chatbot Integration: A chatbot assists users in navigating the platform, finding information, and resolving common issues. It employs natural language processing (NLP) for improved user interactions.

5. **FEEDBACK RATINGS**

1. Rating System: Users can rate their experiences on a scale of 1 to 5 stars, with optional comments for additional feedback.
2. Feedback Analysis: We implemented an algorithm to analyze user feedback and identify trends or areas requiring improvement.

6. **REWARD POINT BENEFITS:**

1. Points Calculation: Users earn points based on predefined rules. For example, donating a specific quantity of food may earn them a certain number of points.
2. Redemption: Users can redeem their accumulated points for rewards, such as vouchers or discounts from partner organizations supporting the platform's mission.

4. MODULE DESCRIPTION:

MODULES

1. Home page
2. Donor Registration
3. Donee Registration
4. Dashboard
5. Chatbot
6. Database

1. **HOME PAGE MODULES**

The primary landing page that consumers see when they visit a website is usually the homepage. It includes tools for users to participate in minimizing and redistributing food waste, a chatbot, icons for donor and done registration, donate now, and accessible contribution.

Fig.2: Home Page

2. **DONOR REGISTRATION**

A donor registration page is an essential component of any platform or organization that relies on donor contributions. It acts as a doorway for people who want to contribute to a cause, charity, or project.

Fig.3: Donor Registration

3. **DONEE REGISTRATION**

A donee registration page is intended for people, groups, or initiatives seeking community support and donations. The donee registration page connects you with possible supporters who are passionate about making a difference.

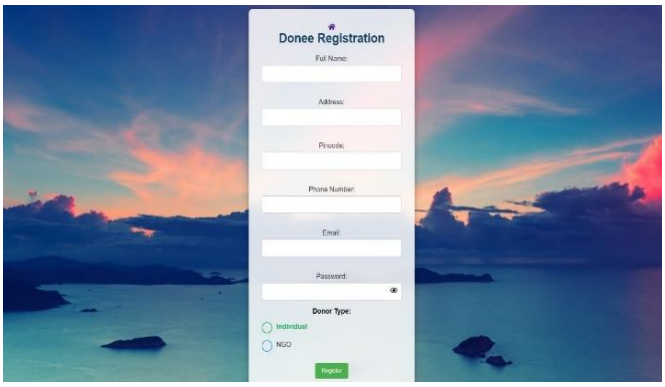

Fig.4: Donee Registration

4. **DASHBOARD**

The dashboard offers a comprehensive overview of the types of surplus food currently in our inventory. Whether it's fresh produce, packaged goods, or perishable items, you can quickly identify the variety of food available for redistribution.

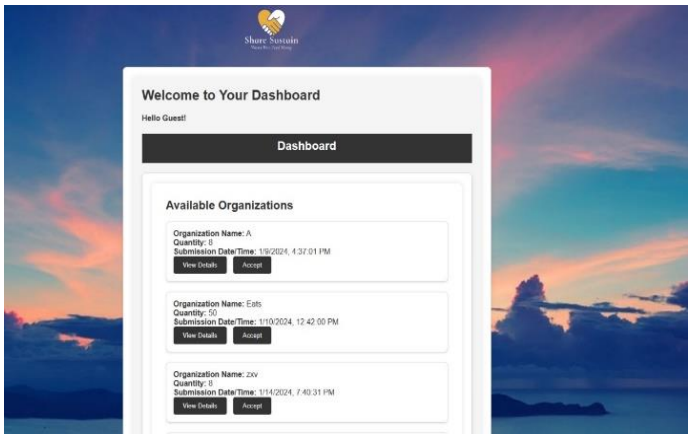

Fig.5: Dashboard

5. **CHATBOT**

The chatbot might function as an attribute that employs conversational interfaces to help users in the context of a platform that reduces and redistributes food waste. It can offer users with advice on cutting down on food waste or assist them in finding information on food donations. The chatbot may converse with customers to learn about their wants and deliver pertinent information, making the site more dynamic and user-friendly.

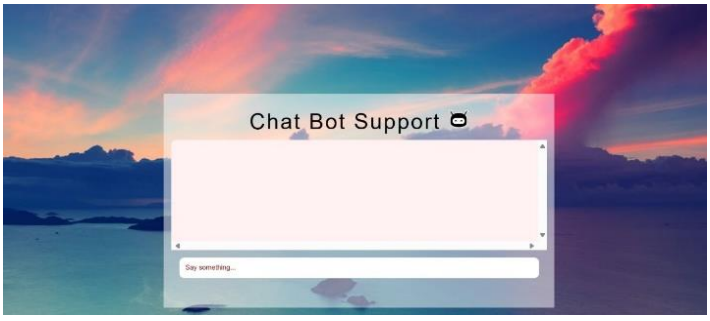

Fig.6: Chatbot

6. **DATABASE**

Important data on donee and donor registrations as well as complete documentation of food products provided are included in the database. While donee information comprises recipient profiles and particular requirements, donor data includes contact information and donation preferences. In-depth data, such as varieties, amounts, and expiration dates, are captured in the food specifics section, creating a comprehensive repository for efficient resource allocation and coordination.

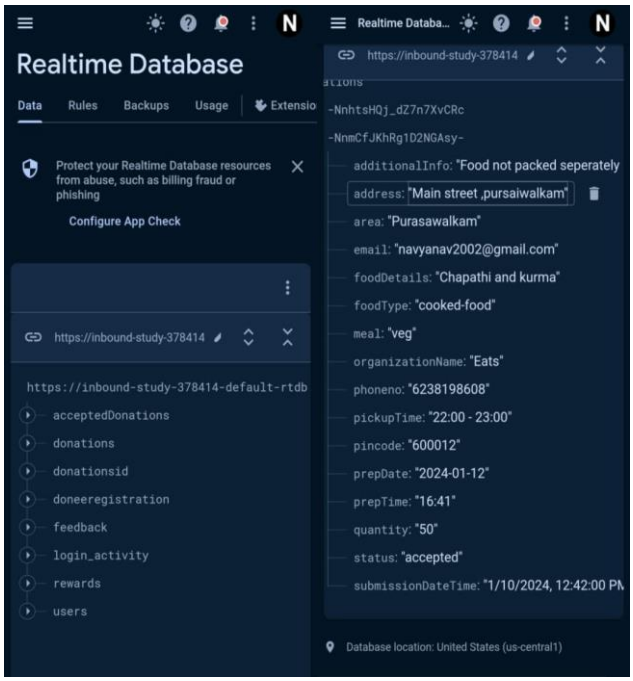

Fig.7: Database

5. FUTURE ENCHANCEMENT:

In our ongoing commitment to improving the Food Waste Reduction and Redistribution Platform, we propose the following enhancements, including the addition of data science and AI collaboration:

1. GEOGRAPHIC EXPANSION:

1. **Description:** Extend the platform's coverage to reach a wider geographical area, facilitating more surplus food redistribution and waste reduction.
2. **Benefits:** Enables a broader impact by connecting surplus food sources with charitable organizations and communities in need across a larger region.

2. ENHANCED USER EXPERIENCE:

1. **Description:** Continuously refine the user interface based on user feedback and emerging design trends, ensuring a seamless and enjoyable experience.
2. **Benefits:** A user-centric approach guarantees ease of use and satisfaction, encouraging increased engagement with the platform.

3. DATA ANALYTICS AND REPORTING:

1. **Description:** Implement advanced data analytics and reporting capabilities to provide valuable insights into food waste reduction trends, impact assessments, and user behavior.
2. **Benefits:** Data-driven decisions and reporting enable better resource allocation and optimization, enhancing the platform's overall effectiveness.

4. EDUCATIONAL RESOURCES:

1. **Description:** Develop a comprehensive library of educational resources, including articles, videos, and interactive content, to further educate users about the importance of reducing food waste.
2. **Benefits:** Empowers users with knowledge and techniques to minimize food waste in their daily lives, fostering a culture of sustainability.

5. COLLABORATION WITH GOVERNMENT AGENCIES:

1. **Description:** Establish partnerships with government agencies to leverage their resources, infrastructure, and policies for a more coordinated effort in reducing food waste.
2. **Benefits:** Access to government support can amplify the impact of the platform, fostering greater awareness and compliance with food waste reduction regulations.

6. INTEGRATION OF DATA SCIENCE AND AI:

1. **Description:** Collaborate with data science and AI experts to implement advanced algorithms and machine learning models that optimize food distribution, predict surplus, and enhance food quality assessment.
2. **Benefits:** The incorporation of data science and AI technologies will lead to more efficient food redistribution and improved decision-making. Machine learning can predict food availability, enabling proactive redistribution

4. CONCLUSION:

In conclusion, the Food Waste Reduction and Redistribution Platform represents a significant step forward in addressing the critical issues of food waste and hunger. It provides an accessible, user-friendly, and technologically advanced solution that empowers individuals and organizations to make a meaningful impact. We express our gratitude to our project team, mentors, and partners who contributed to the successful development of this platform. By working together and embracing technological innovation, we believe that we can create a more sustainable and compassionate future where surplus food finds its way to those who need it most. This project has demonstrated that technology can be a powerful tool for positive change, and we are committed to its ongoing development and expansion to make an even greater difference in the fight against food waste and hunger.

5. References:

[1] Aazam, Mohammad, Marc St-Hilaire, Chung-Horng Lung, Ioannis Lambada is. "Cloud-based Smart Waste Management for Smart Cities." Journal of Smart Cities, 2020.

[2] Damiani, Mattia, Tiziana Pastorello, Anna Carlesso, Stefania Tesser, Elena Semenzin. "Quantifying environmental implications of surplus food redistribution to reduce food waste." Environmental Sustainability Journal, 2021.

[3] Gómez, Manuel, Mario M. Martinez. "Redistribution of surplus bread particles into the food supply chain." Food Logistics and Sustainability, 2023.

[4] Bergström, Pauline, et al. "Sustainability assessment of food redistribution initiatives in Sweden." Resources Journal, 2020, Vol. 9, No. 3.

[5] Mariam, Nikravech, et al. "Limiting food waste via grassroots initiatives as a potential for climate change mitigation: a systematic review." Environmental Research Letters, 2020, Vol. 15, No. 12.

[6] Cane, Massimo, and Carmen Parra. "Digital platforms: mapping the territory of new technologies to fight food waste." British Food Journal, 2020, Vol. 122, No. 5.

[7] Papargyropoulou, Effie, et al. "The future of surplus food redistribution in the UK: Reimagining a ‘win-win’ scenario." Food Policy, 2022, Vol. 108.

[8] C. Varghese, D. Pathak and A. S. Varde, "SeVa: A Food Donation App for Smart Living," 2021 17