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Food Share: A Collaborative Platform for Food Donation and Distribution

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Abstract
FoodShare is a mobile application designed to bridge the gap between food donors, volunteers, and recipients, facilitating the donation and distribution of surplus food. The platform aims to minimize food wastage while addressing the pressing issue of hunger in communities. Leveraging the power of modern technology, FoodShare provides a user-friendly interface for donors to list surplus food items, volunteers to collect and deliver donations, and recipients to access and accept available donations. The application employs Flutter and Dart for cross-platform development, ensuring accessibility across a wide range of devices. Backed by XAMPP server and MySQL database, FoodShare securely manages donation details, user information, and tracking data, ensuring transparency and efficiency throughout the donation process. This paper presents the design, development, and implementation of FoodShare, highlighting its features, functionalities, and the impact it can make in alleviating food insecurity.

Keywords
Food Donation
Volunteer Management
Flutter
MySQL

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I. Introduction

Android is a robust operating system that was developed by Google in 2005 and introduced to druggies in 2008. Android is grounded on the Linux operating system. It finds wide operation in a wide variety of electronic widgets, including smartphones, tablets, boxes, and indeed smart watches. A mobile operation is a small piece of software that has been created and erected specifically to run on mobile bias similar as smartphones, tablets, and boxes. The findings of the study indicate that there are further than 3.5 billion people using smartphones around the world in the time 2020. Smartphones have evolved to the point where numerous individualities now carry them around with them far and wide, they go. Because of their stoner- benevolence, broad vacuity, and lightning-fast performance, smartphones have snappily come commodity that the vast maturity of people regard as further of a demand than a luxury good. The employment of mobile operations in all professions, including education, healthcare, finance, and numerous other diligences, is a developing trend that's getting decreasingly popular. The population of benefactors throughout the world is likewise dependent on technology, and they favor the fast communication and moment responses that cell phones give them with.

Every day, people each over the world get together to celebrate special occasions like marriages and other life mileposts by hosting parties at which food is offered to guests. still, a significant quantum of it'll be squandered, If the attendees of these gatherings do not consume all of the food that's handed. thus, others who are less fortunate or empty and looking for food can admit this food by the act of giving it to them. The forestallment of people from starving to death could be greatly backed by normalizing the practice of giving food and making it more accessible to the general public. still, the challenge is to detect the position where the distribution of bestowed food is organized as well as the individualities who are looking for food. This dissociate between those who are suitable to give food and others who are in need of its commodity that the proposed design hopes to remedy. You're suitable to search for individualities or groups who are interested in giving food by using the programme that's appertained to as the list of benefactors includes details similar as the time and place of the donation, as well as a contact number for benefactors who are fluently accessible. In a world scuffling with food destruction and the pressing issue of hunger, the design emerges as a lamp of stop gap and effectiveness.

Food donation has long been a noble practice, but the challenge has been connecting fat food with those in need effectively. This action seeks to bridge that gap through innovative technology, introducing an

Android operation designed to grease flawless connections between food benefactors and donors. The background of this design is framed by the stunning statistics of food destruction juxtaposed with the patient issue of hunger in colorful communities. Feting the inefficiencies in traditional donation systems, the design envisions a dynamic and stoner- centric result that leverages the power of mobile technology. It aims to transfigure the sporadic and frequently disconnected process of food donation into a well- organized and community- driven experience. The provocation behind it's embedded in a collaborative responsibility to address societal challenges. With the relinquishment of nimble methodologies and a stoner- center design approach, the design seeks not only to give a technological result but also to produce an inclusive platform that encourages active participation from benefactors, donors, and levies. This bid represents a holistic understanding of the complications girding food donation, incorporating features like GPS, real- time shadowing, and levy backing to elevate the impact of each donation. In substance, the general background of the design is characterized by a commitment to using technology for social good. It acknowledges the transformative eventuality of a well- designed operation in not only reducing food destruction but also in fostering a sense of community and participated responsibility. As communities grapple with the binary challenges of cornucopia and failure, emerges as a promising action poised to review the geography of food donation.

Problem Statement

Food wastage is a pressing global issue with far-reaching consequences that extend beyond mere inefficiencies in the supply chain. The wanton disposal of edible food not only perpetuates a cycle of economic losses but significantly contributes to societal problems, environmental degradation, and ethical concerns. In this context, it is imperative to address the multifaceted challenges arising from food wastage to pave the way for a more sustainable and equitable future. At the core of the problem lies a staggering economic loss incurred at every stage of the food supply chain. From production to consumption, the wasteful discarding of food represents a squandering of valuable resources. This not only imposes financial burdens on individuals and businesses but also drives up the overall cost of food production, adversely impacting economies globally.

Simultaneously, the paradox of hunger amid plenty persists as millions around the world grapple with malnutrition and food insecurity. The squandered resources could have been vital sustenance for those in need, underscoring a moral imperative to address food wastage as a direct contributor to a humanitarian crisis. The glaring dichotomy of food waste juxtaposed with the prevalence of hunger underscores the urgent need for systemic change. Furthermore, the environmental toll of food wastage is alarming. The excessive use of water, land, and energy in the production of food that goes uneaten contributes to resource depletion and ecological imbalance. The decomposition of wasted food in landfills releases greenhouse gases, exacerbating climate change and further intensifying the environmental footprint of this global challenge. On a societal level, the ethical implications of discarding food while a significant portion of the global population struggles for sustenance cannot be ignored. Beyond mere inefficiency, the unequal distribution of resources raises fundamental questions about social justice and ethical responsibility.

Addressing food wastage is not only an economic and environmental imperative but also a moral obligation to ensure a more just and compassionate world. In light of these interconnected challenges, there is an urgent need for comprehensive strategies and concerted efforts to tackle food wastage. By fostering awareness, implementing efficient supply chain management, and promoting responsible consumption, we can work towards a future where the resources dedicated to food production are maximized, hunger is alleviated, and the environmental impact is minimized. It is time to recognize food wastage not only as an economic burden but as a global crisis demanding immediate attention and collaborative solutions.

Efforts to address food wastage must focus on minimizing economic losses throughout the entire food supply chain. This entails developing and implementing strategies that optimize efficiency, reduce waste at each stage – from production and processing to distribution and consumption – and ultimately contribute to a more economically sustainable food system. A central objective should be the alleviation of hunger and malnutrition by redirecting surplus food to those in need. Collaborative initiatives with local organizations can ensure that excess food reaches vulnerable populations, making a tangible impact on food insecurity. This objective aligns with a broader commitment to fostering social equity and addressing the stark contrast between food wastage and persistent hunger.

To tackle the environmental impact of food wastage, there is a critical need to promote sustainable agricultural practices. This objective involves encouraging farmers and food producers to adopt environmentally conscious methods that conserve resources, reduce pollution, and contribute to biodiversity preservation, thereby creating a more sustainable and resilient food production system. Improving supply chain efficiency is paramount in the battle against food wastage. This objective involves leveraging technology and data analytics to enhance coordination and communication within the supply chain. By streamlining processes, businesses can minimize losses, optimize inventory management, and ensure that food products are distributed efficiently,

reducing waste across the entire chain.

II. Literature Survey

[7] Seva: A Food donation app for smart living: An important thing in our world moment is to count food waste by reutilizing available food sources within original communities' leftover food particulars in caffs stores and food distribution centres that may be approaching expiration; and any perishable particulars not used in wholeness within their asked period. This is largely significant, particularly during heads similar as the COVID- 19 epidemic. Thereby diving two major issues, that's hunger and food waste. This app is material to the UN SDGs (United Nations Sustainable Development Goals) and fits the general realm of AI for Smart Living in Smart megalopolises. In addition to containing IoT (Internet of goods) and ubiquitous computing, this work makes positive impacts on both healthcare and terrain by reducing hunger and food waste independently. We describe our Seva app development using principles from AI, and especially HCI (Human Computer Interaction), along with its evaluation encompassing stoner checks. We also list some open issues with the compass for unborn work. The time 2020 has been hit with gruelling times due to the spread of COVID- 19. Some businesses have taken this occasion to enhance their AI- related platforms with new demographics. Several food merchandisers are learning from this newfound occasion. Given this background and challenges, we feel truly motivated to address the problem of food insufficiency affected by COVID- 19. This is achieved via the development of a new mobile operation(app) called Seva to help in food donation. The Seva app is designed to act a mediator between the food supplier(dealer) and consumer. We produce a knowledge base (KB) within the app for addicts to pierce, in order to communicate with each other. Both types of addicts (suppliers and consumers) can login and opt the option that fits their profile to produce an account. They can enter the information demanded to get the asked affair. For illustration, if food suppliers intend to contribute food through the Seva app, they can enter the type of food they would contribute, the volume of the item(s), date of expiry, whether the particulars are perishable and so on. These are a multitudinous obligatory entry (for consumers to be alive of the food). There are parameters similar as geographic and temporal bones to insure newness of the food upon delivery. Certain foods may have a short shelf life therefore we've distance and time constraints incorporated into the app, rested on the addresses and times of vacuity. Principles from constraint satisfaction problems in AI are incorporated within the prosecution consequently. The ideal and private evaluation of the prototype Seva app convey a truly good event on the whole. It's clear that check actors find this app useful, and feel that it's particularly helpful during COVID- 19 epidemic and its fate. The verbal commentary from the checks is truly encouraging since they reflect a positive original response and the appetite to see the eventual release of app. It's good that some actors also offer ideas for improvement. [4] An Examination on Food, Clothes and Books Donation Based Android Application: For people, the three most abecedarian and essential need are food, clothes, and training. humanity's three most crucial requirements should be fulfilled snappily. Despite the fact that there are numerous individualities in this day and age who cannot manage or involve these basics for abidance. also again, we see a ton of rich and instructed individualities squandering a ton of products like food, dress, and books. Our strategy effectively settles this problem. The abecedarian thing of the operation is to associate those with fat means and arrears who are anxious to award the original area with other people who are out of luck and suitable to admit. With the backing of our program, guests can uninhibitedly give effects like food, vesture, and books, and different guests can openly gather the wares on a case- by- case base. The top advantage of our program is that it joins guests who have gotten donations with the people who have made relative donations accessible for study. Food For Everything is a cell phone operation made determined to stress food availability for the NGO and averting food squander. At the point when cell phones originally appeared, it's just capacities were the capacity to call, communication, and save connections. These three capabilities alone made our lives such a ton easier in light of the fact that they permitted us to keep in contact and speak with our musketeers and family at whatever point we demanded. It was a fabulous accomplishment. Following came the web, cell phones, contact telephones, 3G and 4G, and different developments. They gave invention and cell phones a completely new look and drive. We cannot comprehend how much easier our lives come because of it. These characteristics bring about a large number of replies to the tremendous issues that the whole world is presently encountering. We in this manner fostered an operation that empowers individualities to give or partake their cornucopia or redundant particulars that are presently not helpful to them still might be important to others to resolve the issue of waste administration while also tending to individualities' major musts. As invention creates in this nuclear age, there might be colourful purposes that are profitable to society. In the present invention climate, individualities use a Cell phone and the web to do day to day scores like shopping, covering bills, dealing with their positions, etc. The essential musts of poor people or the individualities who cannot satisfy their requirements each alone aren't adequately met by any stage on a major scale in the present web climate. [1] Developing Food Charity Operations Management System: Food waste is a global concern involving several socio- profitable factors that have led to an increased fat of food amounts in communities. Charitable associations collect food donations from benefactors who have redundant food amounts and also distribute the food to indigent people. currently, technology can contribute to reducing food

waste and improves food charity operations operation. This paper aims to present a web- grounded food charity operations operation system that automates charity operations, starting from giving food from benefactors to managing processes within food bank associations and re- distributing food to the registered indigent. Around one- third of the food produced world-wide is wasted, according to the Food and Agriculture Organization of the United Nations (FAO). Arabs pay close attention to hospitality, as furnishing food is considered a drinking gesture. The Kingdom of Saudi Arabia is among the top 25 countries causing food waste, with 427 kg of food wasted per capita per time. It also has limited pastoralist land and inadequate water inventories to sustain mass husbandry, and depends on food significances from other nations. Waste is substantially caused by a lack of knowledge and poor buying practices, but culture still plays a part. As a result, food operation is a critical problem for reducing waste. On the other hand, fat food demand could increase the global price of food. Throughout the last many times, the use of technologies to help with food waste operation has expanded. operations that aid in the operation of food waste around the world are reviewed below. mess tourney A exploration platoon at the University of Washington created a food waste result in the form of an open- source website (Meal Matchup), centred on a timetable of bills, planned deliveries, and exertion details. The donation agency, the receipting agency, and the levies who transport food from the giving agency to the receipting agency are the three guests. The giving agency provides the food after the entering agency approves the order. The levy collects it and coordinates it. The proposed operations operation system aims to develop a unified and automated operations operation system for food charities. Further, the end of the system is to grease processes operation for the donations and enrolment of heirs. Another focus is on food collection service through four types of druggies including benefactors, heirs, administrators, and platoon leaders. Table clarifies the druggies and their places in using the system. likewise, Figure demonstrates the commerce between the druggies and the system in the use case illustration of the proposed system. The enormous extent of food waste in transnational food force chains is gaining interest due to its artistic, social, and profitable consequences. thus, charities are working to help food waste and educate the community to determine applicable amounts of food. This paper offers a result to help reduce food waste, which is eventually salutary for both the frugality and the terrain. [5] Data to Donations: Towards In-Kind Food Donation Prediction Across Two Coasts: Predictive model, the optimal amount of historical data, and the type of window that provided the best predictions. We found that no one method gives consistently good predictions of food donations due to the changing nature of the data and the presence of concept drift in the data. Thus, we use an Average of the predictions derived from each combination. Although this approach is simple, it outperformed the base methods for both food banks consistently both on a monthly and weekly basis. From this, we can conclude that for this problem, we must combine predictions generated based on the observed data. Our future work will focus on combining these predictions with more robust meta-learning models. Furthermore, since these in-kind donations are not made by a single donor, but rather by many donors, we will investigate a bottom-up learning approach for predicting these donations in our future work. Our goal in this work is to build an effective yet robust model to predict in-kind donations made to food banks. Generally speaking, donations made to food banks can be classified as monetary vs. in-kind. The former refers to cash donations from the federal and state governments and offers flexibility in management, while the latter refers to non-cash donations made by individuals and retail donors that vary from day to day. In one of the food banks in this work, for instance, over half of the food distributed is perishable. Food banks are unable to provide adequate refrigeration and storage due to uncertainty about in-kind donations, which can lead to food wastage. Predicting these donations in advance not only helps food banks plan storage facilities for fresh and nutritious food better, but also helps them plan distributions that are equally distributed. While in-kind donations are important, they can be very challenging to predict as there are so many variables such as income, social status, age, and gender that impact non-cash donations from retailers and individuals. In addition, unobserved factors such as empathy can be a driving force in individual donors' donations while retail donations are susceptible to changes in the economy, which is volatile, and to customer consumption patterns. [2] modelling And Simulation of Food Bank Disaster Relief Operations: In Food banks gain in- kind donations (i.e., inventories) from individual benefactors, and from public and private associations. The number of inventories needed to support distributing agencies is veritably dynamic, especially after natural disasters when food banks come major players in the disaster relief sweats. thus, planning for the operation of food banks under both, normal and disaster relief conditions, is a gruelling problem. In this paper, a separate-event simulation model is developed to represent the operations of a network of food banks at the force chain position. The model is used to probe the impact of multiple disaster relief functional programs (i.e., force prepositioning, distribution centre assignment) in the distribution of inventories and in meeting the demand. The model simulates the inflow of donations at three food bank installations and the demand for inventories of 55 demand locales ahead and after a natural disaster. The value of the simulation is demonstrated through the analysis of multiple scripts. The results show that there's a 48 increase in the overall demand fulfilment rate if food banks operate as an intertwined network with force prepositioning and demand splitting between operating installations. Food banks arenol-profit associations that collect and distribute inventories to people in need. Food

banks gain donations (i.e., inventories) from the public, and from public and private associations. Food banks act as food storehouse and distribution depots for lower frontal- line agencies; and generally, don't themselves give out food directly to people floundering with hunger. The demand of inventories demanded by supporting agencies is veritably dynamic and delicate to prognosticate. A variety of factors impact how food banks work, from the size of the installation to the number of staff members. Food banks admit donations (i.e., inventories) from retailers, individualities, and from public and private associations. Once donations are entered by the food bank, the inventories are sorted, audited according to quality norms, scrutinized to modernize the product in the Enterprise Resource Planning (ERP) system and are assure-packed for storing in the food bank storehouse. Food banks schedule order pick- ups and/ or deliveries to distribution centres (i.e., seminaries, food presses or individualities). Deliveries are performed using food bank exchanges. Indeed, though utmost food banks are part of the Feeding America network (Cohn 2014), each installation generally operates as independent supplier which takes care of agencies located within a certain distance compass. In general, collaboration between food banks is veritably limited. Natural hazards, like hurricane Harvey in 2017, showed that better planning and collaboration are demanded between food bank installations. The demand for relief inventories increases after a natural disaster and a single installation might be unfit to cover similar demand. In addition, natural hazards could damage roads and structures which can limit the operation capacity of food banks located near to area impacted by the natural miracle. [6] G-GET: All in One Donation App: Poverty stands as a barricade in one's life in achieving their dream and making life hard. Our operation is designed to help the people who are floundering in their life due to poverty and multitudinous other issues. This app focuses on forming a ground between the penurious and those who are willing to help, so that both are satisfied. The operation has two major divisions WANT HELP and WANT TO HELP. Those who are willing to help others by furnishing food (illustration, for orphanages), giving blood, giving capitalist, etc come under WANT TO HELP. The donors and indigent can get connected by registering in this app. In our operation, all three donations are incorporated in a single operation, so the user can use all the three donations in the same app. In this app we only display the information about the request raised by the penurious and do not entertain payment to be done through the app. So, if a patron wants to help, he she has to go in person and contribute or communicate him with the details specified and get his/ her account information and contribute through online mode. By this system multitudinous scams can be avoided and the patron can get positive feedback on his donation. In this operation the receiver can give a feedback or write a review about the patron and can rate for his/ her donation. This app also incorporates a patron rank list where different donors can view their current position in the rank list predicated on the number of donations and also predicated on the conditions given. In this fastmoving world, no bone has time to notice the struggles of the poor people. It's our responsibility to make everyone lead a happy life by helping others and spreading positivity with the people around us. Till now there is no operation which has the three donations integrated in a single app that also enables to give conditions. Through our app these problems can be overcome and giving is made easier.

Method

Existing System

[3] The proposed project, "Donatify," emerges as a solution to tackle the existing disconnect between those with surplus food resources and individuals in need. This innovative system is designed to serve as a dynamic platform, facilitating seamless connections between potential food donors and those actively seeking food assistance. The primary goal of Donatify is to streamline and enhance the process of food donation by providing a centralized and user-friendly interface.

At its core, Donatify empowers individuals or groups interested in contributing to the community by allowing them to search for donation locations effortlessly. Through a user-friendly application, donors can access a comprehensive list that details various donation opportunities, including specifics such as the time, location, and contact information of fellow donors. This feature not only simplifies the donation process but also encourages transparency and efficient communication between stakeholders.

A notable feature of the system is its commitment to inclusivity. The user interface is intentionally designed to be accessible to individuals of all ages and backgrounds. By prioritizing simplicity and ease of use, Donatify aims to ensure that the application becomes a tool that resonates with a diverse demographic, thereby fostering widespread adoption and engagement. In essence, Donatify represents a comprehensive and well-thought-out solution to the challenges associated with food donation. By offering a user-friendly platform that encourages transparency, efficient communication, and inclusivity, the system is poised to bridge the gap between food donors and recipients effectively. The technological underpinnings further enhance the system's capabilities, ensuring that Donatify is not only impactful but also scalable and adaptable to the evolving landscape of food donation and distribution.

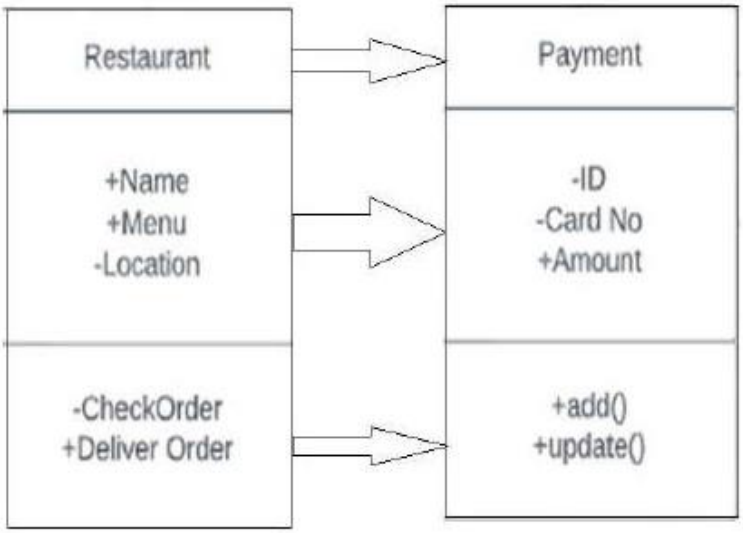

Figure 1. List of Nearby Food Donors

III. Results

The FoodShare mobile application has demonstrated significant success since its implementation, showcasing its potential to revolutionize food donation and distribution processes, combat food wastage, and mitigate food insecurity within communities. One of the most notable outcomes has been the marked increase in food donation rates following the launch of FoodShare. The intuitive and user-friendly interface has encouraged a growing number of individuals and organizations to contribute surplus food, thereby enriching the available resources for those in need and fostering a more sustainable food distribution network. In addition to stimulating increased donation activity, FoodShare has also enhanced volunteer engagement and participation. The platform's integrated volunteer management features have streamlined coordination efforts, allowing volunteers to efficiently schedule and execute donation pickups and deliveries. This improved logistical efficiency has resulted in faster response times and more reliable food delivery, ensuring that donations are distributed to recipients in a timely and organized manner.

The platform's browse-and-select functionality allows recipients to make informed choices, promoting dignity and autonomy in the food assistance process. This personalized approach has been well-received by users, who have expressed gratitude for the platform's ability to offer a more dignified and respectful food assistance experience. Transparency and accountability have also been enhanced through the implementation of real-time tracking features within FoodShare. Donors, volunteers, and recipients can monitor the status and progress of donations, receive notifications, and track delivery routes, fostering trust and confidence in the platform. This increased transparency has been instrumental in building a more cohesive and trustworthy community network around food donation and distribution.

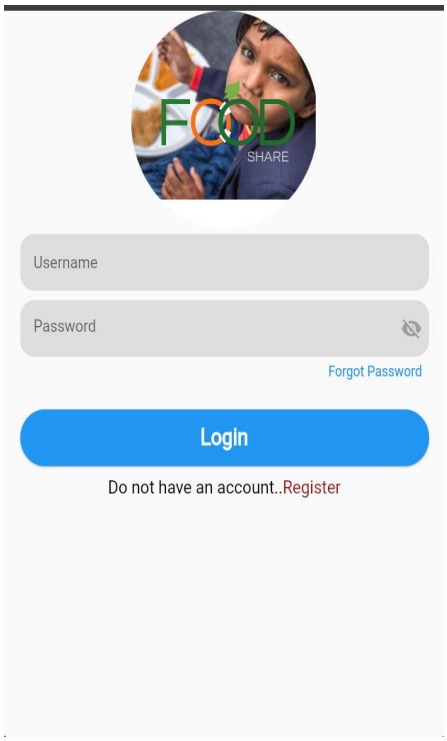

Figure 2. User Login

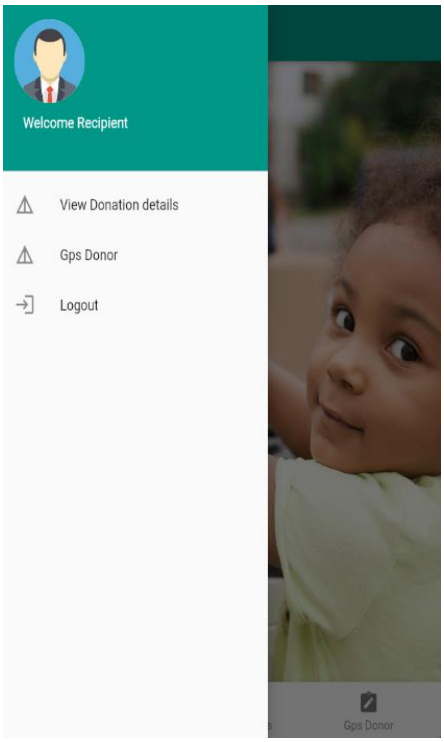

Figure 3. Recipient Main Page

The FoodShare mobile application has not only met but exceeded expectations since its inception, demonstrating its transformative potential in addressing the critical issues of food wastage and insecurity. One of the most compelling outcomes has been the substantial increase in food donation rates, driven by the platform's user-friendly interface and intuitive listing process. This surge in donations has expanded the pool of available food resources, enabling more individuals and families to access nutritious meals and reducing overall food wastage within communities.

Volunteer engagement has also seen a significant boost through FoodShare's integrated volunteer management features. Volunteers play a crucial role in the food distribution process, and the platform's streamlined coordination tools have empowered them to execute their roles more efficiently. By facilitating smoother communication and task management, FoodShare has enabled volunteers to optimize donation pickups and deliveries, resulting in improved logistics and enhanced service delivery to recipients.

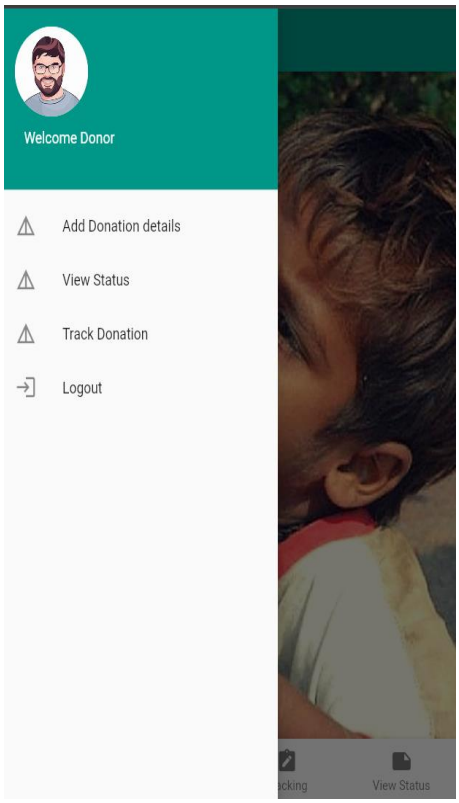

Figure 4. Donor Main Page

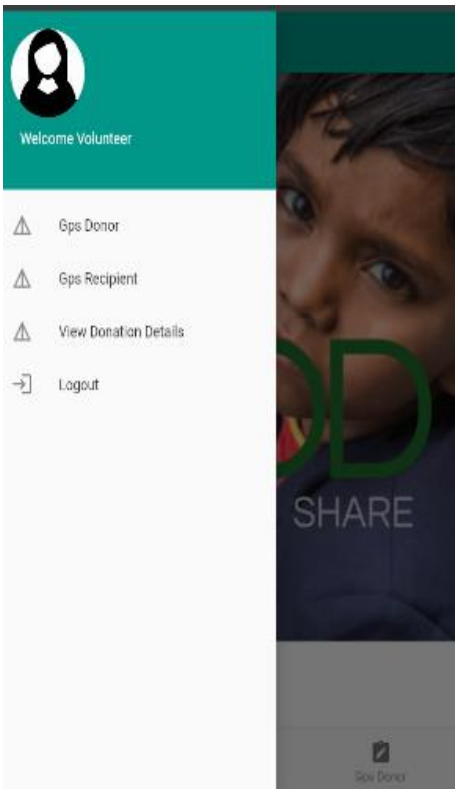

Figure 5. Volunteer Main Page

Moreover, FoodShare has revolutionized recipient access to food donations by offering a personalized and dignified user experience. Its interface allows recipients to browse available donations, view detailed information about food items, and select options that best align with their dietary needs and preferences. This empowerment has shifted the paradigm from passive food assistance to active participation, fostering a sense of agency and choice among recipients and promoting a more respectful and very equitable food distribution process.

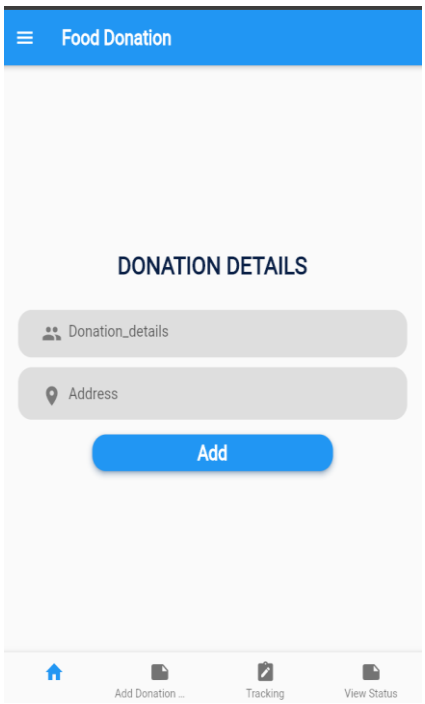

Figure 6. Add Donations

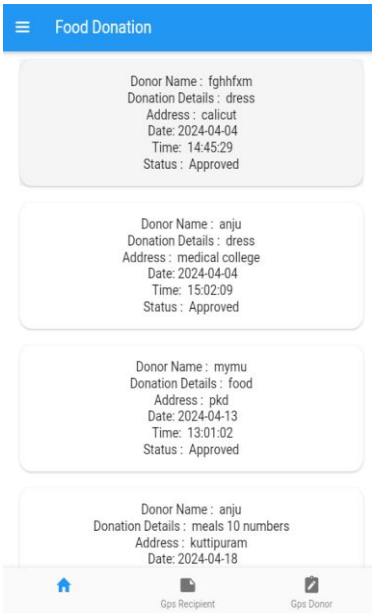

Figure 7. View Donations

In conclusion, the results of the FoodShare design reflect a successful integration of innovative technology, community collaboration, and stoner- centric design to address the multifaceted challenges of food destruction and instability. Through its comprehensive features, scalable armature, and positive community impact, FoodShare is paving the way for a more sustainable, inclusive, and flexible approach to food donation and distribution, making a palpable difference in the lives of individualities and communities likewise.

IV. Discussion

The FoodShare mobile application represents a pivotal advancement in addressing the critical challenges of food wastage, insecurity, and accessibility through technological innovation. Adopting Flutter and Dart for cross-platform development has enabled FoodShare to create a user-centric and inclusive platform, reaching a diverse audience of donors, recipients, and volunteers. This technological accessibility has democratized access to food resources and services, ensuring equity and inclusivity within the food donation ecosystem.

The integration of volunteer management features within FoodShare has fostered a robust community engagement and volunteer participation. Volunteers have played a crucial role in optimizing the food distribution process, contributing to improved logistics, faster response times, and enhanced service delivery. This collaborative approach has not only strengthened community bonds but also highlighted the indispensable role of volunteers in addressing food insecurity at the grassroots level.

Transparency, trust, and accountability have been central tenets of the FoodShare platform, facilitated through real-time tracking and monitoring features. Donors, volunteers, and recipients can track the status of donations, monitor delivery progress, and receive timely notifications, fostering a culture of responsibility and trust. This transparency has been instrumental in building stronger community relationships, mitigating potential inefficiencies, and reinforcing the platform's credibility.

V. Conclusion

Looking forward, FoodShare's scalability, adaptability, and commitment to innovation position the platform for sustained growth and continued impact. As the platform evolves to meet the changing needs of its users and adapt to emerging technologies, it will remain a vital tool in the fight against food insecurity and wastage. By fostering inclusivity, promoting sustainability, and empowering individuals and communities, FoodShare is paving the way for a more resilient, equitable, and food-secure future for all.

In conclusion, the FoodShare project exemplifies the successful integration of technological innovation, community collaboration, and user-centric design to create a sustainable and impactful solution to pressing societal issues. Through its comprehensive features, positive community impact, and unwavering commitment to transparency and accountability, FoodShare has set a new benchmark for food donation and distribution platforms. As FoodShare continues to grow and evolve, it promises to make a lasting difference in the lives of individuals and communities, driving positive change and creating a brighter future for everyone.

Acknowledgement

Every success stands as a testimony not only to the hardship but also to hearts behind it. Likewise, the present work has been undertaken and completed with direct and indirect help from many people and we would like to acknowledge the same. We wish to express our deep sense of gratitude to the project coordinator Ms. Shabna M, Hod and Asst professor, Department of Computer Science and Engineering, who coordinated in right path. Offering our thanks to Ms. Reshma M, Asst professor Department of Computer Science and Engineering, for her encouragement and guidance in carrying out the project.

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