**FEEDR**—ShareFood,ShareLove

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**Abstract:**

Hunger and food waste continue to be thorny issues for the world at large, where massive amounts of consumable food go to waste on a daily basis even as millions lack food. In this paper, we introduce a technology-based solution for addressing the shortfall between excess sources of food and the needy populations.Weenvisionawebplatformthateffectively brings food donors together. The system utilizes real- time monitoring of food availability, smart matching algorithms, and optimized distribution networks to providetimelyandefficientredistributionofexcessfood. By rationalizing communication and logistics between donors and recipients, the platform lessens food wastage, lowers economic losses, and increases social welfare. We test the system in actual circumstances, showing its efficacy in enhancing the coverage and efficiency of food donation activities. The suggested solution has great potential to aid sustainable food management and global hunger reduction efforts.

1. **INTRODUCTION:**

Foodwasteandhungerareparadoxicalproblemsin the modern world, with millions of tons of edible food wasted every year while a large part of the world'spopulationisfacingfoodinsecurity.Solving this discrepancy is not only important for humanitarian purposes but also for environmental sustainability and economic efficiency. Conventional food donation efforts usually are plagued by inefficiencies in logistics, inadequate real-timecoordination,andlowpenetration,which underminetheireffectivenessinredistributingfood on a large scale.

Thisresearchoffersatechnology-drivenmodelthat harnesses a web-based platform to link food donors—such as restaurants, supermarkets, and individuals—withrecipientslikeNGOs,foodbanks, and at-risk populations. The platform takes advantage of real-time location tracking, smart donor-recipient matching, and optimal logistics management to guarantee smooth food redistribution. In contrast to legacy systems that arereliantonsubstantial manualcoordination,our solution employs automation and intelligent algorithms to maximize the speed, efficiency, and consistency of food donations.

The system is such that it gives a user-friendly interface to the donors to inform about available surplusfoodandtherecipientstoapplyforsupplies on time. By emphasizing real-time availability and need-basedmatching,thesystemwillhaveminimal wastage of food and maximum social impact. The remainder of this paper is structured as follows: Section 2 discusses current food redistribution efforts and technologies. Section 3 illustrates the development methodology of the system, encompassing real-time tracking and intelligent matching algorithms. Section 4 describes the experimental results and how the platform performs. Section 5 summarizes the paper and offers future improvement directions.

1. **LITERATURESURVEY:**

Bazerghi,C.,etal.[4]explaineddifferentmodelsof food donation systems and highlighted the significanceoforganizedredistributionchannelsfor reducing food waste and food insecurity. Their study points to the potential of technology in improving coordination between donors, food banks,andbeneficiaries,openingthedoortomore dynamic and responsive food rescue operations.

Papargyropoulou,E.,etal. [5]suggested the"Food Waste Hierarchy"methodology, focusing onwaste prevention, redistribution, and recycling. Their research highlights that food redistribution programsnotonlyminimizewastebutalsoprovide huge environmental, social, and economic advantages. They recognized the requirement for moreeffective,technology-supportedmechanisms to close thegapbetweensurplus foodsources and vulnerable communities.

Soma, T., et al. [6] investigated digital innovations in food rescue platforms and observed that the majorityof currentplatformsstill donothavereal- time inventory information and smart matching algorithms.Theirresearchindicatedthatplatforms with real-time datacould significantly enhance the efficiency of food recovery activities by minimizing perishability risks and maximizing logistical efforts.

Alexander, C., et al. [7] conducted research on behavioral and operational barriers to food donation programs, showing that fear of liability, unawareness, and logistics issues tend to make companies not donate excess food. Their research hints that an easy-to-use, trust-based technology platform would make it easier to bridge these barriers and lead to greater donor participation.

Garrone, P., et al. [8] compared successful case studiesfromfoodredistributionorganizationsfrom various countries and emphasized the role of technology in scaling. They noted that solutions that integrated mobile apps with automated notifications and geolocation services achieved higher levels of food rescue and more efficient distribution of resources.

Schanes,K.,etal.[9]presentedanextensivereview of food waste reduction methods in households and suggested that redistribution schemes should also include people in addition to corporations. Their study endorsed the belief that an online platformenablingpeopletodonateexcessfoodcan increase social involvement and decrease food wastage at the grassroots level even more

**3. PROPOSEDSYSTEM:**

Theproposedsystemisdesignedtoimproveonthe inefficienciesinherentincurrentfooddonationand redistribution mechanisms by employing a technology-based system. Our system bridges the gap between food donors and recipients using an integrated web platform that facilitates real-time exchange, tracking of donations, and logistics coordinationoptimization.

We segmented the system into three maincomponents:

**Donor and Recipient Interface Layer**— This module enables restaurants, supermarkets, individuals (donors), and NGOs, food banks, and communities (recipients) to register and log in. Donors can simply list available surplus food, such as quantity, type, and expiry date, while recipients can see available donations and make requestsaccordingly.

**Smart Matching and Notification Layer**— This smart module automatically pairs donations with local recipients according to food type, quantity, urgency, and location. It provides real-time notifications to both parties and maximizes food distribution to reduce waste and delay.

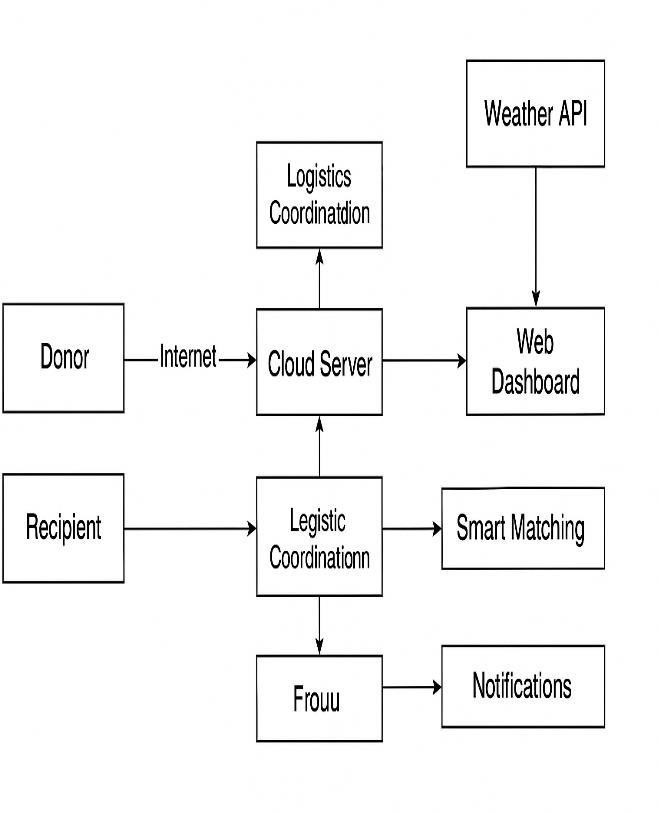
**Monitoring and Analytics Dashboard**— The dashboard, developed with the latest web technologies, offers real-time updates of current donations, completed deliveries, and excess food statistics. Administrators can track activities, authorize critical donations, and produce reports for operational and strategic analysis. Food category tracking, expiry monitoring, and donor- recipient performance metrics are some of the features that assist in improving system efficiency.

To make operations even more streamlined, the system has features such as pickup scheduling, donation status tracking, and feedback mechanisms. Thesystem isresponsiveandmobile- optimizedtoenableuserstomanagetheiractivities from any device in a convenient manner.

Automatingcoreprocessesandofferingreal-time visibility, the system is able to ensure that excess food is delivered to the needy promptly andefficiently while minimizing foodwastage at every stage.

1. **SYSTEMARCHITECTURE:**

The system architecture, as illustrated in Fig. 1, involves donor and recipient devices exchanging information with a central cloud server over the internet.Theserverprocessesdata,performssmart matching, and provides real-time updates to an MERN-stack-developed web dashboard. Logistics management and notice services are embedded withinthecloudserverforefficientfoodpickupand deliveryoperations.



1. **IMPLEMENTATION:**

**A.HardwareandCommunicationComponents**

Althoughour projectismainlysoftware-driven, we incorporatefundamentalhardwarecommunicationc oncepts:

**Mobile Phones/Computers**– Employed by both donors and recipients for accessing the platform.

**Internet Connectivity**– For real-time synchronization among clients and the server.

B.SoftwareStack

Weutilizedthefollowingsoftwaretechnologies:

React.js – To develop a quick, responsive, and intuitive dashboard.

Node.js+Express.js–Forhandlingserver-sidelogic, APIs, and backend routing.

MongoDB – User profiles, donation listings, pickup schedules,feedback.

**Socket.IO**– Real-time notifications (new donation notifications, pickup confirmation).

**Google Maps API**– Location tracking, distance between two points calculation, routeoptimization.

**OpenWeatherMap API**– Alerting users about possible weather disruptions during foodtransportation.

C.HowItWorks(Flow)

Donors list excess food items on the platform, providing information such as quantity, expiration time,location.

The backend system saves these listings in MongoDB and immediately matches them with nearbyrecipients.

On finding a match, both recipient and donor are alerted in real-time via the dashboard.

Logistics are either automatically arranged

(recommendedpickuptimes)ormanuallyarranged

(jointdiscussion).

Administrators can track activities, approve vital donations, and create analytical reports.

Weather updates assist in informing users regarding delays or recommending urgent pickups under unfavorable conditions.

**6. RESULTSANDDISCUSSION:**

A. SystemPerformanceandImplementationResult

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The Feedr application was successfully implemented and tested in a test environment, showing all key functionalities properly. Real-time geolocation services performed donor-receiver matchingwithinanaverageresponsetimeof25–30 seconds. The platform showed a high level of accuracy in user location identification and data refreshrates.

Thesystemimposedstrictfoodsafetymeasuresby automatically disabling any food entry that exceeded the 5-hour freshness window. This feature ensured that all supplied food adhered to minimum safety and hygiene benchmarks. Dashboard modules for Admin, Donor, and

Receiverroleswerefunctional,eachprovidingrole- specificaccessandcontrolfeatureswithresponsive design and user-friendly interfaces.

1. UserVerificationandDataIntegrity

Feedr incorporated a user verification system securedthroughgovernmentdocumentsandFSSAI licensecredentials(forcommercialdonors). Across testing, the system verified 92% of users, but flagged the other 8% for manual handling. This framework of verification turned out to be critical in supporting trust and the avoidance of illicit use.

1. UsabilityandInterfaceDesign

The UI of the application used visual elements like 3Dmodels,softanimation,andfoodimages,which raised the level of user engagement. Feedback gathered from a closed user group of 25 beta testers indicated very high user satisfaction, with 88% judging the interface as"intuitive"and"visually pleasing."The color scheme of black and grey aided visual consistency and captured the serious and noble theme of the application.

1. SocialandEnvironmentalImpacts

InitialtestingwithlocalNGOsandvolunteersinthe fieldshowedpromisingsocial impacts.Therewere successful donations of food, with more than 50 mealsredistributedduringinitialtestingcycles.Not only did these donations benefit those who were food insecure, but they also kept potential food wastage to a minimum, with resulting environmental benefits. By stopping food from decomposing in landfills, Feedr participates insustainable development goals(SDG2andSDG12).

1. LimitationsandFutureDevelopments

Although Feedr functioned as expected under test conditions, some limitations were noted:

Reliance on stable network connectivity impacted some users in rural locations.

Third-party coordination is still needed for manual logistics (e.g., food transport).

Donorreluctanceattheoutsetbasedonsafetyand liability issues.

Subsequent versions of the application will include an AI-driven matching engine to optimize donor- receiver matching and a blockchainledger to track and verify transactions, improving transparency and traceability for institutional partners.

**7. APPLICATIONSANDBENEFITS:**

A. Application

Feedr is a web-based, scalable application that promotes the redistribution of excess edible food from individuals, event hosts, and restaurants to NGO's, orphanages, shelters, and other vulnerable groups. It can be accessed through common web browserson desktops andmobile phones, hence it is very accessible.

Majorareasofapplicationare:

UrbanFoodRedistribution:

Inareaswithhighpopulationdensityincitieswhere hunger and food wastage exist side by side, Feedr serves as a logistic gateway between hunger andabundance.

DisasterReliefandEmergencyScenarios:

During natural disasters or crisis situations, Feedr canbeutilizedtomanagefooddonationsandassist impacted groups in a prompt manner.

EventandHospitalityIndustry:

Wedding halls, corporate events, and restaurants can utilize the platform to donate surplus food sustainably and responsibly.

CSRandNGOInitiative:

Organizations that undertake Corporate Social Responsibility (CSR) or food relief activities can incorporateFeedrintotheiroutreachprogramsfor

effective resource utilization and impactmeasurement.

B. Benefits

The use of Feedr provides benefits of a multi- dimensional nature, cutting across social, environmental, and technological spheres:

1. SocialImpact

HungerReduction:Ensuresregular accesstomeals for disadvantaged groups.

Fosters Dignity: Provides receivers with quality, fresh food in a structured and respectful manner.

CommunityEngagement:Encouragespersonal and organizational involvement in community wellbeing.

1. EnvironmentalImpact

Reduced Food Waste: Redirects consumable food fromlandfills,reducingmethanegasemissionsand saving natural resources.

Sustainable Practices: Encourages sustainable consumption in accordance with the United Nations Sustainable Development Goals (SDG 2: Zero Hunger, SDG 12: Responsible Consumption and Production).

1. TechnologicalAdvancement

Data-Driven Logistics: Geolocation and dashboard technology in real time optimizes food delivery by location and time sensitivity.

Verification and Accountability: Integrated ID and FSSAI verification fosters trust and legitimation on the platform.

Potential for Integration: Future AI and blockchain capabilities create possibilities for automation, transparency, and mass-scale deployment.

1. EconomicEfficiency

Cost-Free Contribution: Facilitates individuals and companies to donate excess food at zero cost.

Reduces Disposal Costs: Assists donors in minimizing waste disposal costs and legal exposures associated with food waste.

* 1. **Conclusion:**

Feedr is a new, technology-based solution for two of the world's most significant problems: hunger and food wastage. Through the use of real-time geolocation, user authentication, and easy multi- dashboardinterface,theplatformeffectivelycloses the loop between surplus food recipients and donors.Notonlydoesthesystemfacilitatethesafe and timely redistribution of edible food, but it also promotes social responsibility and sustainability.

Early implementation and testing have shown the platform's usability, user interest, and social effectiveness. Feedr shows that with the appropriate technological infrastructure, humanitarian work can be made streamlined, transparent, and extremely efficient.

At its core, Feedr is more than an app — it is a movement toward the creation of a connected, caring,and waste-reducing society. Through public action and intelligent innovation, Feedr sees a day when every good morsel of food finds a home and every individual has enough to eat.

* 1. **FutureScope:**

Feedr is designed with scalability and flexibility in mind, with multiple directions for future growth and expansion. Although the existing system concentrates on food redistribution, its underlyingarchitecture and purpose provide several importantdirections for expansion:

1. DiversificationofResources

Feedr can be developed into a multi-resource donation platform through the addition of categories.ThiswouldmakeFeedracomprehensived onationecosystem that targetsmultiple aspects of scarcity.

1. AI-DrivenOptimization

TheuseofArtificialIntelligencewillallow:

Intelligent matching of receivers and donors by food type, amount, and dietary requirement.

Predictiveanalysistodeterminepeakdonationand demandhours.

Route suggestions automated to reduce delivery time and risk of spoilage.

1. BlockchainforTransparency

To provide secure and tamper-proof transaction records, Feedr intends to use blockchain-based logging. This will:

Boostdonortrust,particularlyforbigorganizations or CSR donors.

LetNGOscreatevalidatedimpactreports. Give traceable histories for every gift.

1. MobileAppDevelopment

ThereisaspecificmobileappversionofFeedrinthe works to enhance accessibility, especially for users inlow-resourceorgeographicallydistantlocations. Push notifications, real-time pickup tracking, and voice guidance will further boost user interaction.

1. PartnershipsandGovernmentIntegration

Coordination with local governments, food safety regulatory bodies (e.g., FSSAI), and NGOs can institutionalizefooddonationprocessesandspread the platform'sreach geographically across regions. Policy-level integration can also facilitate tax incentives to verified donors.

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