

Annapurna: *food for all*

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I Introduction

Food wastage is a global issue that affects food security and sustainability. In India, a country where millions of people live below the poverty line, food waste is a particularly pressing concern. According to recent studies, India wastes about 40% of its food production, which amounts to a staggering 67 million tons of food waste annually.

In addition to the economic and social impact of food wastage, there are also environmental consequences. When food is wasted, the resources used to produce it, such as water, energy, and land, are also wasted. Moreover, food waste contributes to greenhouse gas emissions as it decomposes and releases methane, a potent greenhouse gas that exacerbates climate change.

The issue of food wastage in India is multi-faceted, with a range of factors contributing to this problem, including inadequate storage and transportation infrastructure, poor agricultural practices, and lack of awareness among consumers. Additionally, the pandemic-induced disruptions in the food supply chain have further exacerbated the issue of food wastage.

In our project, we aim to tackle this problem by creating a mobile application-based solution. Our proposed application explores the process of managing food donation process from various restaurants, hotels and messes.

II Literature Review

A. Related works

[1] The Antyodaya Anna Yojana (AAY) is a government-sponsored food security scheme launched by the Government of India in December 2000. The primary objective of the scheme is to provide highly subsidized food grains to the poorest of the poor families across the country, especially in the rural areas. The scheme aims to ensure food security for the poorest families by providing them with 35 kg of rice or wheat at a subsidized rate of Rs. 3 per kg.

[2] talks about Karma, which is a mobile application that aims to reduce food waste and fight hunger. The app allows restaurants, cafes, and grocery stores to donate their unsold food to nearby individuals and

organizations in need. This solution is implemented in European nations.

[3] Food for All is a mobile application that allows users to purchase surplus food from nearby restaurants and cafes at discounted prices. The app aims to reduce food waste by providing an alternative to throwing away excess food and also provides affordable meals to individuals and families who may struggle with food insecurity.

Most of these solutions do tackle the problem of food wastage, however, they tend to sell the extra food on a discounted price. This solution seems feasible for the European and American cities, however, for a country like India where 20% of people are below poverty line, selling food at a discounted rate over an app cannot really hit the root of the problem. In our solution, we try to connect restaurants, cafes, hotels and mess to food donation NGOs so that donated food can effectively reach to the needy people free of cost.

III Motivation

A. To connect Food Donation NGOs with restaurants, mess, cafes, and hotels:

We want to build a platform that is able to connect NGOs directly to food donors.

B. To ensure that the food donated is fresh and healthy to consume:

We have proposed a live-picture-based authentication system where a donor has to click a real-time image of food that the user wishes to donate. This method ensures that the food which is being donated is fresh and healthy to consume.

C. To provide food at free of cost to the needy people:

Unlike the studied solutions in the literature survey, we want to provide food to needy people which is free of cost.

IV Proposed Methodology

We have proposed a user-admin-based architecture, where user will make a request for food donation/manage food/complaint from user side app while admin will accept/reject the request made by the user.



Fig 1. User-Administrator working

Food Donor/Main Application/ User side

The food Donor application has 80% of the features implemented in our solution. The user-side application allows users to log in to the app using Google sign-in feature. As soon as the user logs in to the application, his/her details get recorded in the Firebase database server. Followed by this, the UI shows 4 options to the user.

1. Food donation:

In the food donation section, the user is prompted by a food donation form which takes in details regarding the donation package. These details include type of food, username, email, phone number, type of food, serves, best before, time, and location. Along with this, the user is required to capture a live image of food so that administrator can verify whether the food package to be picked up is fresh and healthy to consume or not.

2. Food Wastage Statistics:

In this section, users can see live global food wastage statistics via The World Counts web interface. This is a third-party web interface that we have

implemented to make users aware of the live food wastage statistics.

3. Manage Food Waste:

The motivation for this section is to efficiently manage food waste generated by cafes, restaurants, and mess. By collecting food waste, we can direct it towards various recycling processes like domestic animal food, compost for creating manure, biogas, etc. The user is prompted with a form regarding a pick-up request creation. The details include-username, email, phone no, the description related to food wastage pick-up, type of food waste, type of food, amount of food waste, the reason for waste, time, and location. Finally, a live image must also be

Administrator Side

The administrator has the remaining 20% of the project's features. Even though the features are less in this application, it is one of the crucial sections of the entire project. The role of the administrator side application is to manage all sets of requests made by the user related to food donation/ food management/ complaints. Speaking in broader terms, the administrator will first authenticate the requests made by the users based on the details provided. If the request made is valid, then the administrator accepts the request, and an acknowledgment is sent to the user regarding the same. If the details regarding the pickup package do not match the standards for food donation, the request will be declined by the administrator.

submitted in the form for administration-side authentication.

4. Complaint:

This feature is added to allow users to raise a complaint against food wastage incidents. Whenever a user encounters any event where a lot of food is wasted, he/she can raise a complaint against the event organizers. The administration will ensure that the complaint is found authentic and forwarded to the concerned authorities/NGOs to take suitable action.

The user is prompted with a form that takes details like username, complaint description, mobile number, and a live image record for authentication purposes.

Application Workflow

In Fig 2, user-administration workflow has been explained. The user side sends a food donation/manage/complaint request. If this is the user's first request or if there is no pending request which needs verification from the admin side, then the request gets recorded in the Firebase database. If the user wants to see live food wastage statistics, the world counts webpage shows the live statistics.

On the admin side, if any request has been made by the user, a notification will be received. Admin will authenticate the request made by the user based on the details provided. If the request is valid, the status of the request is updated as yes in the database. If not valid, then the status is updated as no. Notification is generated for the user.

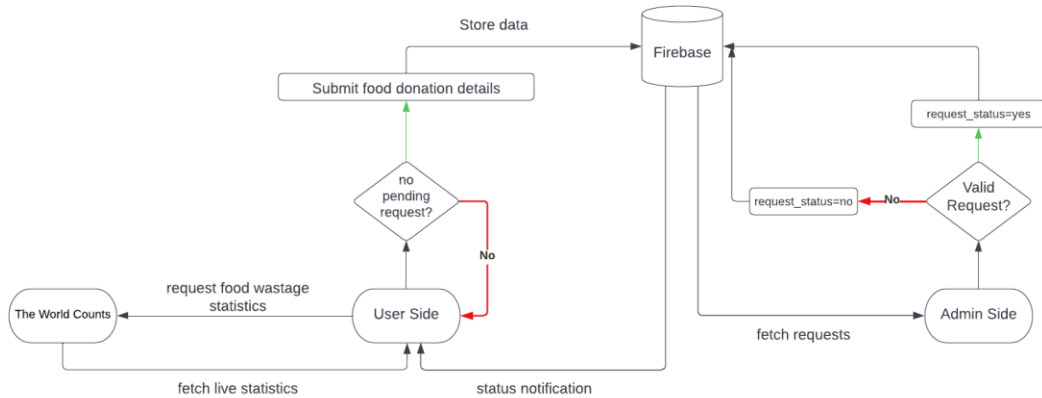


Fig 2. User-Administrator Workflow

V Mobile Application

Following figures show the working of our developed application.



Fig. 3.1: Home Page of User App

Fig 3.1 illustrates the home page of Annapurna app. User has been provided with 4 options to choose from:

1- *Food Donate*: For food donation

2- *Food Manage*: For food recycle/waste management.

3- *Complaint*: To raise complaint against food wastage incidents.

4- *Statistics*: To see global live food wastage statistics.

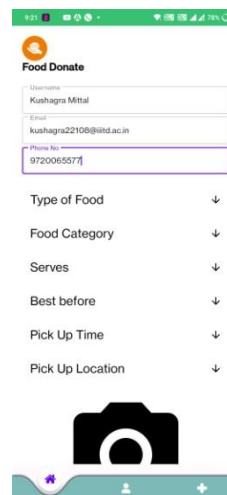


Fig. 3.2: Food Donate Form

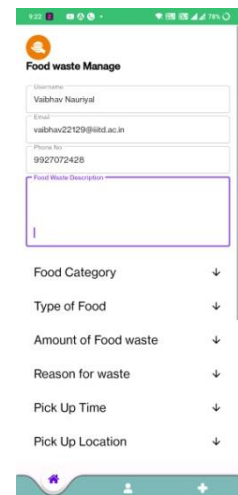


Fig 3.3: Food Manage Form

Fig 3.2 and Fig 3.3 shows the required details user need to enter for raising Food donate or Food manage request respectively.

Fig. 3.3 Request History

In Fig 3.3, we can see how user can access his/her raised requests in the app. There will be separate section for every type of raised request.

VI Conclusion

Our proposed solution is successfully able to establish a connection between user-side and admin-side via Firebase database. After successful login, user is able to raise a request based on the requirement. From the administrator's end, admin is able to accept or reject a request raised from the user side. Also, Google map based visualization has been added for the aid of administrator. There is also some room for future enhancements as we can make a more attractive, user-friendly UI. We can also aim towards adding new features like sending acknowledgement emails/SMS, finding shortest routes for package pickup, user-user based communication for coordinating donations after administrator's approval.

VII References

- [1] Source: Government of India. (n.d.). Antyodaya Anna Yojana. Retrieved <https://dfpd.gov.in/nfsa/Antyodaya%20Anna%20Yojana.pdf>
- [2] "Karma: The Food Waste App That Is Saving The Planet" by Emily Folk, published on Forbes on October 19, 2019. <https://www.forbes.com/sites/emilyfolk/2019/10/19/karma-the-food-waste-app-that-is-saving-the-planet/?sh=66e4387f7ba2>
- [3] "Food for All: This App Sells Cheap Leftovers From Fancy Restaurants Before They're Thrown Out" Fine Dining Lovers. (2021, April 16). Best Food Waste Apps. <https://www.finedininglovers.com/article/best-food-waste-apps>