Food Waste Management App: Muskaan

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ABSTRACT
Food waste is the most challenging issue humankind is facing in today's world. In the current era, the amount of food wasted is gradually increasing over the years. Approximately, 40% of the food produced in India is wasted and not consumed by anybody. Negligence towards the necessity of food has led to such an increase in the numbers. It is estimated that the value of food wastage in India is around Rs. 92,00 crores per annum.
Food waste is an ethical issue on a global scale. According to the Food and Agriculture Organization (FAO) of the UN has reported that about 190 million Indians remain undernourished. Here in India, the bigger the wedding, the bigger is the food wastage is expected to be. Reports state that 190.7 million Indians remain undernourished, it refers to 14.5% of the entire population. Food waste is an alarming issue in India. Major generators of food waste in India are Hotels, Restaurants, supermarkets, individual resident blocks, airline cafeterias and food processing industries. This scenario emphasizes the need to keep a check on these activities and proper management of the food supply chain so as to reduce the amount of waste as much as possible. Reducing food wastage will be beneficial in alleviation of poverty and preserve environmental resources.
Keywords: Food waste, Food quality, Social Impact, Indian poverty, Muskaan, Application for better India, Survey.

I.   INTRODUCTION

Food waste is a major problem in India and a major part of the population is suffering its consequences. A lot of initiatives have been taken by various public sector organizations, government, NGOs and individuals. But these efforts are beneficial to a certain level and not scalable as they are unable to reach a huge number of needy people. Hence, many people are deprived of these initiatives. It is necessary that these initiatives and efforts are carried out with a systematic approach. This will help to reach people on a bigger scale and solve the problem more efficiently. One of the approaches could be an android application designed for this purpose [1].
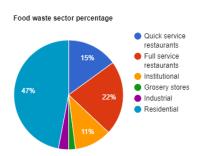
This android application would be accessible to most of the people and will be a centralized platform to carry out the food donation drive efficiently. Most of the food wastage is contributed by weddings, big parties and other events. NGOs could have this information and be a mediator to make this bulk amount of unconsumed food to a large number of people. Not only this application will focus on the wastage of bulk food, but also solve this problem at household level. Each registered user on the application will be able to donate a plate or more which is leftover and unconsumed. People could easily search for this information in the nearby localities and could consume this leftover food. Hence, this android application approach would successfully solve the problem of non-uniform distribution of food and food wastage. As well as fulfil its main aim to reach out to as many people as possible. [2]
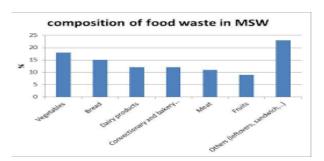
Although after a lot of social awareness, there are many people who do not consider the food wastage problem seriously and also neglect participation in food donation drives. Such types of people contribute to a large amount of the population. Hence, it is extremely important that we increase the participation of this group of people to solve the problem efficiently. The android application would also be fruitful to make people actively participate in this initiative by including many fun features. These would definitely gain people's attention and increase the contribution accordingly.

II.   PROBLEM STATEMENT

The growing numbers of population suffering from malnutrition which the country is facing today is the root cause of declining economy. India is one of the most developed agricultural countries. The root cause of people suffering from malnutrition and not able to receive one meal a day is the amount of food wasted every day. If this unconsumed food reaches the needy people, cases of malnutrition will definitely reduce by a great number. [3]

Figure 1: Food waste sector percentage [3]

Figure 2: Food waste in hotels by type [4]

People who tend to donate could reach out only to a few people who they know are in need or a certain organization. But there are a lot of individuals which require food and are not connected by any organization. An online platform is required to systematically handle the tasks of donating and receiving the food. Along with that, people taking active participation and donating the leftover food rather than throwing it is important.

Also, hoteliers and restaurants who already have half prepared meals are just thrown away by the workers after the restaurant's closing hours. If this food is made available to people at lower rates, this in turn would not only help the needy but gain some profits for the restaurants as well. It would turn out to be a great benefit for the people who are living all alone and need to pay huge amounts to restaurants every day for meals. me institution, list the common university, then list the email addresses at the end in the same order as the authors appear. Food wastage in India is currently the biggest issue faced which needs immediate actions. Big parties, events are the major source of food wastage. Also, restaurants and household waste have prominent contributions in food wastage. About 40% of food produced in India is wasted. It is further estimated that the value of food wastage in India is around Rs.92000 crores per annum. A huge population below the poverty line is deprived of healthy food and nutrition. This leads to the problem of malnutrition in the country which ranks second worldwide in farm outputs. We wanted to solve this biggest issue of non-uniform and inefficient food distribution using android applications and emerging technologies. [4]

III. LITERATURE SURVEY

A few existing systems are studied and analyzed as follows:

I. Aahar
Rating and reviews: 4.0
Size: 8.1 MB
Downloads: 10k+ [9]

Figure 3: Aahar App Icon[9]

Features:
- User registration/ Login
- Donate, receive and procure facilities
- Simple and easy to use UI design
- Regular updates available

Limitations:
- OTP verification takes a lot of time
- Constant internet connection required and app modules take more time than usual to load
- The application is limited to provide facilities in a particular city
- The application requires access to all permissions like calls, media, contacts before loading.
- Although being a great initiative, less downloads and usability.

II. Share the Meal
Rating and reviews: 4.8
Size: 14 MB
Downloads: 1M+ [9]
Figure 4: Share the MealApp Icon[9]
Features:
- Easy to use, simple interface
- Opportunity to donate and help simply and efficiently
- Worldwide scope
- No ads and runs smoothly

● Available options for making payment makes donation convenient

Limitations:
● Not everyone is able to help through money, excess food could also be means of helping
● Only money donations
● Few technical glitches occur while loading pages
● Achievement features doesn't recognize often
● No transparency to the users
● Most of the funds are being used for fundraising and marketing. Users should be aware and assured of the money reaching the needy.

III. Food Donation
Rating and reviews: No ratings
Size: 1.6 MB
Downloads: 100+ [9]

Features:
● Easy and simple design
● Easy to generate food donation request
● Food requests easily viewed on maps

Figure 5: Food Donation App Icon[9]

Limitations:
● Very limited features
● Application takes very long to respond

IV. Daan India
Rating and reviews: 4.6
Size: 8.8 MB
Downloads: 1k+ [9]

Features:
● User registration/Login
● Allows to donate varied items including blood donation
● Provision to remain anonymous
● Hiding phone number and contacting through mail

Figure 6: Dann India App Icon[9]

Limitations:
● Technical glitches during signing up
● Although being a great initiative, less usability and downloads.

V. Hungry
Rating and reviews: 1.8
Size: 15 MB
Downloads: 1k+ [9]

Features:
● User registration/Login
● Simple design

Figure 7: Hungry App Icon[9]

Limitations:
● A lot of technical glitches faced during loading and user signup.
● Simple and great initiative, yet less downloads.

VI. Anna Daan
Rating and reviews: 4.0
Size: 4.7 MB
Downloads: 100+ [9]

Features:

● 　　　User friendly application structure
● 　　　Maintains donation records

Figure 8: Anna Dann App Icon[9]

Limitations:
● 　　　Email confirmation takes longer time than usual
● 　　　Less downloads and usability

IV.　　　LITERATURE SURVEY CONCLUSION

It has been analyzed that apart from a few technical glitches, the usability of these apps is much low than usual. Being a noble work, the systems have been able to gather very less attention among people which makes it less popular.

It is required that many people come together to bring this change and take active participation, so that the systems are able to fulfil their aim and reach out to as many needy people as it can. But, research on human psychology says that unless and until a majority of people see some outcome or benefits, they don't tend to take active participation. Hence, the best possible strategy to gather public attention and increase usability of these applications would be giving some incentives or benefits after making donations.

The second point of focus on the system's less usability is limitations of area. Well-developed applications have limited their usability to certain areas. A centralized system and proper management are required to solve the problem of food wastage in India and efficiently handle the food distribution system. The existing systems are designed with a noble cause but for people to take active participation, a system has to be designed considering the above two points and accordingly features to be added. The features to be added in such a way that the system itself generates revenue to help the needy people.

V.　　　PROPOSED SOLUTION

Muskaan, a food donation service system is an online platform which aims to feed the needy out of the unconsumed food which is wasted.

The application is aimed to help the society and create a sense of solidarity through modern techniques. The social implications it will have after being launched will certainly aim at closing the gap in terms of quality of life for the less fortunate citizens. It not only works as a medium for transporting the unconsumed food to the needy, but also aims to make more and more people engage in the food donation service and actively participate.

The application will not only focus on some basic activities like food donation and receive, but will also include a lot of activities for the food donors so that they could be benefited with something out of the good karma done by donating food. Muskaan will be a centralized platform with no area limitations and will be accessible to all individuals in India. Overcoming the technical glitches faced by the existing systems, it will also include features which will make more and more people engage to donate food. The donor will be rewarded with bonus points and vouchers on the basis of good karma points earned in the application.

On the other hand, to assure people that the food donated is of good quality, a specialized feature to check the quality of food and on that basis give ratings to the food donated. Users before receiving food can be completely assured of the quality of food provided to him. The application itself will be able to generate revenue itself as an extra means of contributing to the welfare of less fortunate people. Muskaan, a non-profitable android application, is a means of effective food donation drives, which will also assist NGOs in their work and reach out to a large number of people.

VI.　　　OBJECTIVE OF PROPOSED SYSTEM

Objective of the system is to overcome below problems:

1.　　　OTP verification takes too long.
Reason: Due to a massive disruption in SMS services Several users are facing issues in receiving one-time passwords (OTP) through SMS.

Solution: This problem will be solved by using firebase mobile authentication service as it takes only 15 seconds to send OTP and validate it. Moreover, Firebase provides the first 10K verifications for free each month.

2. Constant internet connection required and app module take more time than usual to load.

Reason: Some applications require constant internet connection as it loads resources on every click. Such Large data loading causes problems like buffering, freezing. [5]

Solution: poor network connection gives a poor user experience. Muskaan application will be used on the internet only when and where needed. Internet use and requirement can be minimized using one time rendering. Loading time can be reduced by [6],

a. Preventing costly re-renders
b. Using <FlatList>, <SectionList>, <VirtualizedList> instead of <ListView>, <ScrollView>
c. Using upgraded React Native newest version and pure components.
d. Reducing Application Size
e. Optimizing assets.

3. The application is limited to providing facilities in a particular city.

Reason: Low storage capacity, Less Maintenance, Low performance efficiency are major reasons behind location restrictions for using particular applications.

Solution: Muskaan application will be available for every user in India without location restrictions for that strong configuration of the server is needed. [8]

● Average Monthly Visitors: 300,000
● Average Number of Page Views Per Visitor: 30 / visitor
● Average Monthly Page Views: 9,000,000 Pageviews / Month
● Average Page Size: 1 MB

Data transfer per month: 9,000 GB /Month
Internet Speed Requirement: 27.38 Mbps

4. Some applications require access to all permissions like media, contacts, etc. or do not load.

Reason: Requirement of resources on every screen load is necessary but it reduces speed of the application. Reason behind such an issue is using local databases for which we need to render data on load. [7]

Solution: Firebase provides a separate module for react - native application development which allows us to get required data in a millisecond. Built-in security, static file hosting, quick response, data scalability and efficient storage management are other advantages of using a firebase database.

5. Other technical glitches.

Reason: Memory management, software lifecycle, inadequate testing, error and exception handling are major reasons behind technical glitches of application.

Solution: React native is a cross platform application development framework which provides advantages like reusability, Live and hot reloading, simplified UI and Plugin support. Using such a framework avoids low level technical glitches and increases the performance of the application.

6. Less downloads and usability.

Reason: In spite of a great initiative, the application not being popular and having less usability is because of clients not being benefited and less user interactive.
Also, users not being assured of the food quality they might be receiving.

Solution: The solution consists of two features to increase usability-

1. Rating Food quality
2. KARMA points

FEATURES OF PROPOSED SYSTEM
User Account Management:
a.   User Registration:
The application will allow users to register themselves and create profiles.
b.   User Authentication:
When signing/login users will require their passwords for authentication
c.   User Login:
Users shall be able to login, log out or deactivate their accounts.

Profile Management:
The user profile will contain the following data:
● First Name, Last Name, Email Address, Gender
● Contact details, Address
● Identity Proof

User profile modification:
Users shall be able to edit/delete data on their profiles.

Profile Upgradation:
The user will be able to register himself as an NGO/ restaurant person which will have their own specialties.
Required, a user has to present the documents stating the organization he/she is a part of.
● NGO person: The user will have the ability to receive a bulk amount of donated food so as to distribute among the needy, whereas a normal user will be able to only receive a few plates of food.
● Restaurant person: The user will be able to post leftover food items available on the restaurant's menu at lower rates for other users to book/ order.
Donor will add the following details:
● Food item, shelf life, number of plates
● Address and pickup timings
● Good quality picture of food
Donor will wait for the receiver's request and accordingly approve the requests.

Food receive process:
● Notifications will be sent to users for nearby locations.
● Search results shall enable filters and reviews/comments/ratings filters.
● Apply for receiving and wait for donor's approval.

Dine (Hoteliers, restaurants):
● Only the users who have upgraded and verified their account as a restaurant person will be allowed to mention food available for dining/order.
● Users can search for nearby restaurants and dine at low rates during closing hours.

Food Quality:
The application doesn't guarantee the quality of food that will be delivered but, still receivers and NGOs can be assured of the quality by checking the ratings of food donated at the time of applying.
The rating of food quality will be determined at the time the user captures an image of the food.

KARMA points:
An interactive beneficial feature for the user to be rewarded when donating food. On each donation KARMA points will be generated which could be later used while dining at restaurants or playing fun games and winning exciting coupons and prizes.

Muskaan Mingle:
A social media module specially based on food donation services can aid user's engagement and encouragement on the application. It will also act as a connecting link between the ones who need help and the ones willing to help.
Features:
● A leaderboard representing the top 10 KARMA points holder is released daily, weekly as required.
● A story upload feature:
Case: A person XYZ uploading a picture of donating food to some renowned NGO

● A post upload feature:
Case: A post mentioning certain people in need at a given location
● Verified account (tick mark icon):
An account with KARMA points above threshold, constant activity on the application and huge number of likes will be considered as a verified account. ('You can become a celebrity on this platform by doing good KARMA')
● Privacy:
An AI system which will detect that nowhere a user's identity as a 'Receiver' is revealed in any post or story by analyzing the content. Privacy of the user will be maintained.
● Fetching related content for surfing:
   User's data will be fetched as location, number of likes on an account's post, searched account's data and more viewed stories. Based on this data, more relatable posts will be fetched for surfing. Location based posts will maintain priority as to connect with other users.

SOCIAL IMPACT
Considering this platform with social impact perspective, we have identified three types of users:
i)   Middle class and rich people (10-20%):
In the upcoming years, it would be very difficult for the people to take out time for carrying out such social activities and reaching out to people. Such people would definitely feel very awkward to receive food from unknown people and save food according to social norms. But, these people can definitely serve as an agent and receive food from someone else. In this way, people need not take out time specially to do social work. They can just spare 10-15 minutes every day, surf the application, and receive food for such people who cannot access the application.

ii) Poor (20-30%):
   This group of people will be largely benefitted by the application. They can avail the food from the donor's place directly through the app.

iii) Poorest (40-50%):
   There is a huge number of people living below the poverty line in India. These people do not have access to smartphones and hence, they cannot become direct users of the Muskaan application. But certainly, such people should not be deprived of this good cause and availing food. Through a non-android device people can register themselves with a contact number through NGOs in the application. After that, they will start receiving SMS services about availing food at the location.

VII.   CONCLUSION
   Muskaan fulfils the aim of saving food wastage by providing an online platform as a solution for the excess food to reach out to the needy people. In this way, food will be uniformly distributed. Most of the people who are not capable of having food even once will be greatly benefitted by this android application. Also, individuals who cannot take out time for doing social work can spare their time on this application and become an agent. By doing good KARMA people can earn KARMA points and avail benefits through vouchers.
   The good initiative introduced through Muskaan can only be successful if it has huge active participation of people. To achieve this goal, more and more interactive and profitable features need to be added. In addition to lucky draw prizes, fortune wheels that give exciting coupons on winning, the future scope can have more such exciting features.
   The application will achieve its goal to help maximum people in need by collaborating with NGOs. The future scope will also prioritize collaboration with as many NGOs as possible.
   Improvement in feasibility and loading resources. Also, management of large numbers of users and scalability of applications accordingly.
   As of now the application's modules were using open resources and APIs to load maps, SMS and other features. The future scope will be minimizing the use of APIs.

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