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FOOD WASTAGE MANAGEMENTAPPLICATION

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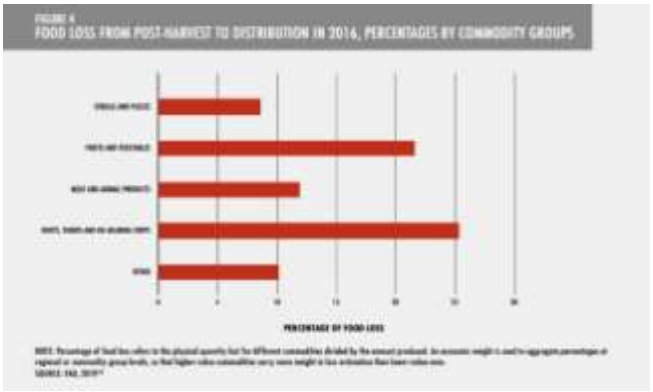
ABSTRACT

As much as one-third of the food intentionally grown for human consumption is never consumed and is therefore wasted, with significantenvironmental, social and economic ramifications. Wasting food has become a common problem in our society. There is growing evidence that a significant share of global food is thrown away, with concomitant detrimental repercussions for sustainability. Reducing food waste is a keysustainability challenge for the food serviceindustry. As the title suggests our project aims to analyse and tackle the problems associated with the food wastage. We aim to explore and provide a reliable and efficient solution for both consumers and producers. We have identified the use of mobile technology to reduce food wastemanagement and built an application that allows restaurants to donate and share theirfoods and leftovers with people in need.

INTRODUCTION

[3] Roughly, one-third of the food producedin the world for human consumption every year - approximately 1.3 billion tonnes - is lost or wasted. Food losses and waste amount to roughly US$ 680 billion in industrialized countries and US$ 310 billion in developing countries. Industrialized and developing countries dissipate roughly the same quantities of food - respectively 670 and 630 milliontonnes. Fruits and vegetables, plus rootsand tubers have the highest wastage rates ofany food.



[6] Fig1: Food Loss around the world in 2016

Global quantitative food waste per year is roughly 30 per cent for cereals, 40-50 percent for root crops, fruits, and vegetables, 20 per cent for oilseeds, meat and dairy plus 30 per cent for fish. Every year, consumers in rich countries waste almost as much food (222 million tonnes) as the entire net food production of sub-Saharan Africa (230 million tonnes). The amount of food wasted every year is equivalent to more than half of the world's annual cereals crop (2.3 billion tonnes in 2009/2010). Per capita waste by consumers is between 95-115 kg a year in Europe and North America, while consumers in sub-Saharan Africa, Southand South-eastern Asia, each throw away only 6-11 kg a year. Total per capita food production for human consumption is about 900 kg a year in rich countries, almost twice the 460 kg a year produced in the poorest regions.

In developing countries, 40 per cent of losses occur at post-harvest and processing levels while in industrialized countries more than 40 per cent of losses happen at retail and consumer levels. At the retail level, large quantities of food are wasted due to quality standards that over- emphasize appearance. Food loss and waste also amount to a major squandering of resources, including water, land, energy, labour, and capital, and needlessly produce greenhouse gas emissions, contributing to global warming and climate change.

Fig2: Food Waste percentage in India

Crains	Total loss in farm operations	Total loss in storage	Overall total loss
Paddy	3.9%	1.3%	5.2%
Wheat	4.7%	1.3%	6.0%
Maize	2.8%	1.3%	4.1%

Note: Total loss in farm operations include wastages during harvesting, collection, threshing, winnowing or cleaning, drying, packaging and transport

Total loss in storage include losses at farm, warehouse, wholesaler, retailer, and processing unit levels

Source: ICAR/CIPHET

[4] Data reveals that India wastes as much food as the whole United Kingdom eats, contrary to Indians' perception that we do not waste food. In fact, food waste in India is a troubling concern, and the streets of the country, especially garbage bins and landfills have ample evidence to prove this. Up to 40 per cent of the food produced in India is wasted, according to the United Nations Development Programme, and about 21 million tons of wheat is wasted annually. Every year in India, about 67 million tonnes of food is wasted, which has been estimated to be around of Rs. 92,000 crores. In other words, this amount is adequate to feed all of Bihar for a year. Nearly 21 million metric tons of wheat is found to rot in India per year. This number is equivalent to the gross annual production of Australia. Mumbai produces almost 9,400 metric tonnes of solid waste per day, 73 percent of which is dairy, vegetable, and fruit waste, while just 3 percent is plastic, according to old BMC data from 2018. National Delhi also produces about 9,000 metric tonnes of waste per day, with East Delhi being the largest landfill in the region.

From this project, we aim to tackle this issue by using mobile application. Mobile phone applications have seen wide use in recent years. It's known that Android is the most popular platform for mobile, right now android is

used on over 190 countries in the world on millions of mobile devices. Android is the most installed platform for mobile, and the number is increasing rapidly since almost 1 million users every day purchase new Android devices and use it immediately to get digital content such as games, application, and many other services. Due to that, we are developing a mobile application because it will reach a wider range of audience since most people nowadays use android phones. To improve the performance of the image processing algorithms, noise estimation can be used to adapt the detection step.

The Objectives of this project are:

- The ultimate objective of

  this **project** is to communicate those investments in **food wastage** reduction is the most logical step in the pursuit of sustainable production and consumption,
  including **food** security, climate change and other
  adverse environmental effects.
- This can be achieved by helping the consumers to better manage ingredients bought from retailers and make it easier to consume food items before the expiry date, reducing waste and the associated environmental impact.
- Apart from reducing food waste at the source, the most desirable outcome is to divert food waste through food donation to people, as animal feed, industrial uses (such as rendering fats into value-added materials), or composting.
- Our goal is to reduce food wastage by at least 35% through this app across all food types including dairy products and junk food.
- To help, NGO's, Old age homes, Orphanage, food banks connect to restaurant so that the excess food from them can be donated.

RESEARCH/WORK DONE

[2] According to Leejiah J. Dorward, where are the best opportunities for reducing Greenhouse gas emissions in the food system in the age of modern era, where we are developed through artificial intelligence, people are more dependent on the smartphone. There are various applications, which are developed to control the huge wastage of food, and it provides the opportunity to send that extra food to the people who need it. There are multiple applications, which control food waste. The most useful food waste application for android and apple are discussed below: [6]

Feedie

Feedie turns food photography into a charitable donation. Users visit a participating restaurant in the United States or South Africa and take a photo of their meal. Then, they share the photo on Facebook or Twitter and the restaurant donates to The Lunchbox Fund, a non-profit donating meals to impoverished schoolchildren in South Africa. For every 500 restaurants that sign up, 5,000 children in South African schools receive enough meals for one year. The app encourages foodies to share their passion while contributing to a good cause.

Flashfood

A family member's horror after catering an event that disposed of
$5,000 worth of food inspired the creation of Flashfood. The app

prevents food waste in the UnitedStates and Canada in two ways: Itre-sells grocery foods approachingtheir best-before date at a discount, and it saves "not good enough" retail items and ships them to customers. Farmers and growersalso can give Flashfood items thatwere rejected by grocers, to be sentto-environmental-conscious consumers.

Food for All

Food for All eliminates last-minuterestaurant food waste in Boston andNew York City. It connects customers to restaurants one hour before they close, for meal discounts as high as 80 percent. Customers can enter their location and explore nearby deals, and they pick up their order at a timespecified by the restaurant. Users also can donate food to people in need through the app.

Foodfully

Foodfully aims to inspire thoughtfulconsumption of food before itsexpiration date. Foodfully has a connection to more than 14 grocery stores in the U.S. and their loyalty cards. Every timea user makes a purchase with aloyalty card, the app records the transaction. The app also can scan receipts and record manually entered purchases. Users manage their food items on the app by entering them inthe fridge and freezer, deletingthe consumed ones and throwing food away. Food fully arranges items by perishable dates and sends the user notifications before they go bad. Additionally,the app suggests recipes based on what is available in the user's fridge.

NoFoodWasted

NoFoodWasted aims at reducing food waste in the Netherlands by 50 percent in the next five years. This app stimulates demand for discounted products with a best before date. It alerts supermarket shoppers which items are approaching their expiration date.Users do not even need to go to thesupermarket to explore the deals, asthey can check them online. So far,more than 77,000 users downloadedthe app, which achieved 13 percentof its waste reduction goal.

METHODOLOGY

[2] The user can register, login, logout, view food with image, title, and description, add food to the cart, and empty the cart. This app allows the user to have his/her account in the app using email and password authentication. Both restaurant and users who need the food must register using the login page. During registration, some information about the users is saved to the real-time database such as age, name and gender under the unique user id generated. Therefore, each user profile information is saved into the database and when a user login we can, get access to thatuser profile using its unique user id.

Fig3: UML Diagram for user registration and login

Credentials of restaurant and user will be authenticated. First, the app user chose to log in as a restaurant user who is donating food or as a user who needs to receive the food. If the restaurant is not registered withthis app, need to register. The restaurant user can add new data by selecting new data. On this screen, the user can add image, title, and description. Restaurant user can also add new data to the list by either selecting image from phone gallery or by taking a picture through the camera.

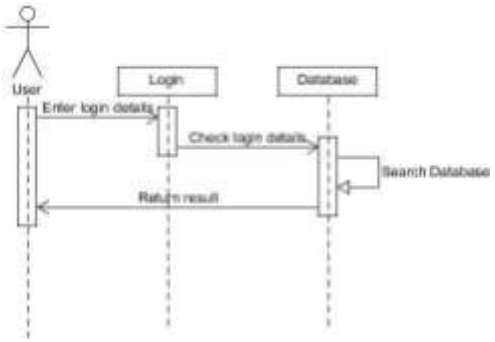


Fig4: user/restaurant authentication at the database

Once restaurant click on send button, if datais saved user successfully will receive a successful message. After sending data, an image will be uploaded in storage. In addition, a restaurant user can view new data uploaded in image tab of the application. In addition, a user can select animage from the gallery of a phone. By selecting gallery option, a user will grant the app access to their phone gallery from where a user can select an image to beuploaded to the list of items. Then, in the end, a restaurant user can log out.

Likewise, restaurant user, another user can register, login, and log out. After the user logs into the application, a list of meals willappear to him. The images of the meal are saved in the storage inside DBMS, and the link of that image in the storage saved in thedatabase along with the description of the meal and its title. In addition, the images ofthe meal are downloaded to the applicationwith the detail and displayed in a grid formfor the user to pick any meal.

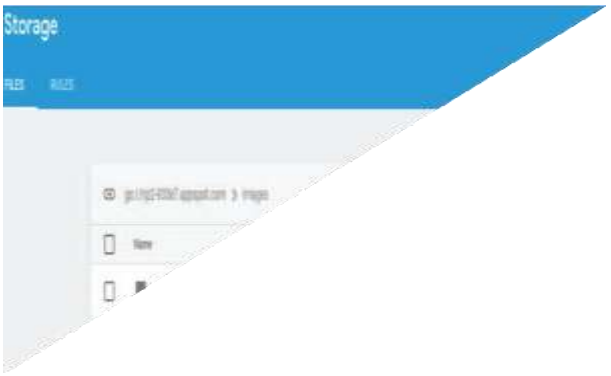


Fig5: Data stored in the storage system

The Google Map API will show the nearest food donation centers nearby. The user and restaurant can upload their images and poston the app. The machine-learning algorithmwill process the image and classify them based on the type of food. It will be visibleon the application. The food donation camps can be contacted and donate the extra food.

Fig6: Google API V3

The Donor performs operations like Registration and Login into the System. He can also put up items for donation and viewall donation requests (items required byorganizations). The Admin and Donor bothcan view the Receiver's location. The Admin can also monitor and update thedatabase. The Admin and Receiver both can view the Donor's location. The Receiver can also perform operations like requesting for items, viewing requested items and claiming donations.

CONCLUSION

Our study has investigated the problem of food waste that has many serious side effects economically and socially. However, the wastage of the food can be prevented or at least decreased using political rules and technology. Mobileapplication technology is beneficial for food waste management. The app aims to encourage better food management. Organizations taking waste management seriously might gain significant efficiency by collaborating with third-party companies or by borrowing solutions from other industries that can be adapted to foodservice establishments relatively easily.

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