

Food Waste Management System

Ganesh Sawalkar, Vaibhav Salve, Bhakti Salve, Pooja Arjune, K. O. Akhade

Dept. of Computer Engineering
Sinhgad Institute of Technology and Science, Pune, India

Abstract: An intelligent logistics system is an important branch of intelligent transportation systems. It is a great challenge to develop efficient technologies and methodologies to improve its performance in meeting customer requirements and this is highly related to people's life quality. Its high efficiency can reduce food waste, improve food quality and safety, and enhance the competitiveness of food companies. This paper investigates new integrated planning for intelligent food logistics systems. An important goal in our world today is to eliminate food waste by re-utilizing available food sources within local communities: leftover food items in restaurants, stores, and food distribution centers that may be approaching expiration; and any perishable items not used in entirety within their desired period. This is highly significant, particularly during crises such as the COVID-19 pandemic. This paper focuses on creating an interesting mobile application (app) that provides a ubiquitous platform wherein users can visualize available food resources in their local area and consequently gain access to food, thereby tackling two major issues, i.e. hunger and food waste.

Keywords: food waste, hunger rate, sustainable development goals, social entrepreneurship.

I. INTRODUCTION

An important goal in our world today is to eliminate food waste by reutilizing available foods that occur within local communities: leftover food items in restaurants, stores, and food distribution centers that may be approaching expiration; and any perishable items not used in entirety within their desired period. This is highly significant, particularly during crises such as the COVID-19 pandemic. This paper focuses on creating an interesting mobile application (app) called Seva that provides a ubiquitous platform where users can visualize available food resource in their local area and consequently gain access to food, thereby tackling two major issues, i.e. hunger and food waste. This app is pertinent to the UN SDGs (United Nations Sustainable Development Goals) and fits the general realm of AI for Smart Living in Smart Cities. In addition to entailing IoT (Internet of Things) and ubiquitous computing, this work makes positive impacts on both healthcare and the environment by reducing hunger and food waste respectively. We describe our SeVa app development using principles from AI, and especially HCI (Human Computer Interaction), along with its evaluation encompassing user surveys. We also list some open issues with the scope for future work.

II. LITERATURE SURVEY

Author/Year of publication	Title	Strength	Weakness
Shinta Okaviana R, Dinna Ambar wati Febriani, Intan Yoshana	FoodX, a system to reduce food Waste	The process of channeling food to donors and the community is still practically a manual where the community contacts the donors one by one, so it is considered less effective.	Social entrepreneurs are not to get profit but to implement an increase in the welfare of society at large, the financial benefits obtained are considered as a means or tool to complete social missions
Ayesha Anzer, Hadeel A. TAbaza, Wedad Ahmed, Hassan Hajjdiab	A Food Wastage Reduction Mobile Application	We decided to create our application to link the restaurant with the unfortunate people, so instead of throwing the food, the unfortunate will be able to pick it up from the	There are various applications, which are developed to control the huge waste of food, and it provides the opportunity to send that extra food to the people who need it.

		restaurant at the end of the day.	
Gaytri N, Divagaran A R,	IoT-based smart Waste management system	If food wastage is monitored individually and providing them with rewards, there is a high chance of reducing the amount of food wastage in those public areas	Food wastage not only affects the environment but also creates a negative impact on the economy of a nation and creates great demand for food products
Hsiu-Hua Chang	Sustainable development: Drivers of consumer food wasting	This study attempts to construct an ethical decision-making model of the predisposing influence factors of consumers' food waste behaviors for providing academic and practical suggestions.	Food waste increases the use of energy, food, water, and land as well as greenhouse gas emission and environmental damage.
M.D.C.J Gunawardane, H.A.N Pushpakumara ,E.N.M.R.L Navarathne, Shashika Lokuliyana, K.T.I Kelaniyage, Narmadha Gamage	Zero Food Waste: Food Wastage sustaining mobile application	The system is also composed of a smart chatbot that can communicate with the user and guide the user through the recipe	In low-income countries, most loss occurs during production, while in developed countries much food about 100 kilograms per person is wasted at consumption.

A System to Reduce Food Waste

In the paper, JShinta Oktaviana R, Diana Ambarwati Febriani, Intan Yoshana,LR. Payanta proposed a method Food waste is a serious problem that occurs in various countries. Indonesia is a country that produces Food waste, the second largest after Saudi Arabia. Currently, several communities care about that issue of food waste and hunger in Indonesia. The Community collects excess food from eligible donor consumption but to people in need. They do to reduce the problem of food waste and numbers of the starving in Indonesia. However, the process of channeling food to donors and the community is still practically a manual where the community contacts the donors one by one, so it is considered less effective. This research aims to create a system to connect the community with individuals or organizations that want to donate excess food. For users to give faster feedback, this system was made using the prototype methodology. At the final stage of the development, testing was carried out by involving several volunteers and 3 communities to see the completeness of the features system. FoodX system made already accommodate the needs of 2 types of food communities (with and without volunteers) Food Wastage Reduction Mobile Application

In the paper by Ayesha Anzer, Hadeel A. Tabaza, and Wedad Ahed, Hassan Hajjdiab has proposed Wasting food is a common problem in our society. Food waste management is crucial since it can improve our environmental and economic sustainability. We have identified the use of mobile technology to reduce food waste management and built Android mobile application that allows restaurants to donate and share their foods and leftovers with people in need. This app will enable users to register, log in, view items, add items, add items to the cart, remove an item from the cart, and log out. This app is using Firebase storage and real-time database. Any user in need can see all the food images donated by different users and add it to his or her cart.

B. IOT Based Smart Food Waste Management System

In food detection, Nowadays, wasting food is common among the students in colleges, hostels, and workplaces. This results in a great demand for food products in the future, which may lead to food scarcity for future generations. As food waste management is a tedious process. In this paper we have mainly focused on measuring the food waste and providing rewards for the users, where it shows the real-time food wastage of every individual on a screen and in a website for future reference. This research mainly focuses on monitoring the food wastage of everyone. Our model

proposed over and create a parallel result to give a detailed report to the managing and the user about their amount of food excess each time. This helps to analyze and generate the list of user falls under the non-food wasting criteria and reward them for their noble act. We can do this either manually or automating the process using the Internet of Things as a key tool. We use an RFID sensor to monitor the wastage of individuals. They can be opened only by using the RFID card provided by the management. We are automating the method of identifying the amount of food wastage in the areas, where we are sure that the amount of food waste can be decreased by the analysis of food wastage by every individual and awarding them with rewards and prices by the reports generated by the System.

C. Food wastage sustaining mobile application

Food is the third most essential part of everyone's lives. But generally global food loss and wastage amount has been increased to an amount between one third and one half of all food produced. The reasons can be specified as a lack of appropriate planning, purchase and preparation of too much food, over the preparation of food in restaurant. As a solution the project team has implemented a mobile application which is capable of capturing an image of a food and identify it and measures the weight. With the gathered data, the implemented system contains an intelligent agent providing suggestions of food recipes with the leftover foods and several additional features such as guidance to the user to prepare any kind of food with the help of an interactive chatbot as well as the user has been directed to get healthy meals by considering the previous meal plans and statistical report analysis. As the results, the implemented recipe generation algorithm of sentimental analysis has obtained 76 percent accuracy and moreover the team has obtained more accurate unique technique for weight estimation than the currently available calibration technique

III. SUMMARY

These applications have changed the use of artificial intelligence by providing food to the needy people. It is considered one of the best uses of software development. However, food wastage is still a bad habit. According to [12], people need to be more careful while preparing or ordering food because many people around the world do not get to eat. Food wastage reduction has decreased a lot due to the usage of this application, but people need to be more sensitive and careful so that a better world can be created where no food is wasted.

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