

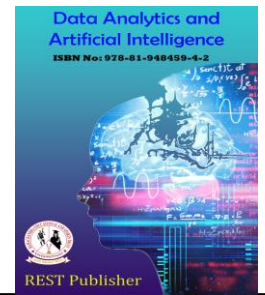


## Data Analytics and Artificial Intelligence

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# Developing Food Charity Operations Management System

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**Abstract:** This paper is presented to Food waste is a global concern involving several socio-economic factors that have led to an increased surplus of food in communities. Charitable organizations collect food donations from donors who have excess food quantities and then distribute the food to needy people. Nowadays, technology can contribute to reducing food waste and improving the management of food charity operations. The purpose of this paper is to present a web-based food charity operations management system that automates charity operations, from collecting food from donors to managing processes within food bank organizations and redistributing food to registered needy. The operations management system that has been developed significantly improves the efficiency of overall food charity operations and also overcomes the food access gap between the main entities, including food charity organizations, donors, and needy people, ensuring a high level of service quality.

**Index Terms:** web-based application, food operations management, food charity, food banks

## 1. INTRODUCTION

This paper aims to develop a web-based operations management system. The primary goal of the system for charities is to automate food donation operations management and eliminate the food access gap between food charity organizations, food donors who have surplus food from a social event, and beneficiaries who need food. Going paperless, reducing calls, speeding up operations, and gaining full access to up-to-date data can rapidly enhance operations management for food charity organizations. Around one-third of the food produced worldwide is wasted, according to the Food and Agriculture Organization of the United Nations (FAO). Arabs pay close attention to hospitality, as providing food is considered a welcoming gesture. The Kingdom of Saudi Arabia is among the top 25 countries causing food waste, with 427 kg of food wasted per capita per year. It also has limited arable land and insufficient water supplies to support large-scale agriculture, relying on food imports from other countries. Waste is mainly caused by a lack of knowledge and poor buying practices, but culture still plays a part. As a result, food management is a critical problem for reducing waste. On the other hand, surplus food demand could increase the global price of food. economy at the moment. Numerous factors affect how much a house will actually cost. The number of bedrooms, bathrooms, and location are among them. In comparison to cities, costs are lower in rural areas. The housing price increased with factors such as proximity to a highway, a mall, a supermarket, employment prospects, top-notch educational institutions, etc. A few years ago, real estate businesses tried manually predicting property prices. For the purpose of estimating the cost of any real estate property, a dedicated management team is present in the organization. They made a choice

## 2. RELATED WORK

Food waste in the swiss food service industry—magnitude and potential for reduction Food losses occur across the whole food supply chain. They have negative effects on the economy and the environment, and they are not justifiable from an ethical point of view. The food service industry was identified by Beretta et al. (2013) as the third largest source of food waste based on food input at each stage of the value-added chain. The total losses are estimated 18% of the food input, the avoidable losses 13.5%. However, these estimations are related with considerable uncertainty. To get more reliable and detailed data of food losses in this sector, the waste from two companies (in the education and business sectors) was classified into four categories (storage losses, preparation losses, serving losses, and plate waste) and seven food classes and measured for a period of five days. A questionnaire evaluated customer reaction, and a material flow analysis was used to describe the mass and monetary losses within the process chain. The study found that in company A (education sector) 10.73% and in company B (business sector) 7.69% of the mass of all food delivered was wasted during the process chain. From

this, 91.98% of the waste in company A and 78.14% in company B were classified as avoidable. The highest proportion of waste occurred from serving losses with starch accompaniments and vegetables being the most frequently wasted items. The quantities of waste per meal were 91.23 g (value CHF 0.74) and 85.86 g (value CHF 0.44) for company A and company B, respectively. The annual loss averaged 10.47 tons (value CHF 85,047) in company A and 16.55 tons (value CHF 85,169) in company B. The customer survey showed that 15.79% (n = 356) of the respondents in company A and 18.32% (n = 382) in company B produced plate waste. The main causes of plate waste cited were 'portion served by staff too large' and 'lack of hunger'. Sustainable measures need to be implemented in the food service industry to reduce food waste and to improve efficiency.

### 3. EXISTING SYSTEM

Many food charities still use paper forms to fill out food data and other documents needed for donating and distributing food. Paper forms have many drawbacks, including problems related to loss, damage, editing, storage space, cost, and difficulty transferring them from one person to another. Charitable societies face challenges in registering beneficiaries of foodstuffs because they must come to the charity to register their personal information and places of residence. It is also difficult for food charities to review requests for food donations, arrange them through paper forms and review prior reservation submissions for donating food from donors via calls.

### 4. PROPOSED SYSTEM

The proposed operations management system aims to develop a unified and automated operations management system for food charities. Furthermore, the system's goal is to make process management for donations and beneficiary registration easier. Another focus is on food collection service through four types of users, including donors, beneficiaries, supervisors, and team leaders. Table I clarifies the users and their roles in using the system. Furthermore, it demonstrates the interaction between the users and the system in the use case diagram of the proposed system. The proposed system model works. After choosing the donor for food donation service through the system, the system enables donors to fill out the order form and submit it. Simultaneously, the beneficiary can register their personal information through the system to be viewed by the supervisor. The system allows the supervisor to view and accept the food collection requests as well as the beneficiaries' registration. According to location, assigning the request to the appropriate team leader completes the vehicle receipt and packaging tools form. The team leader displays the request before going to the location. On arrival at the location, they sort the food and complete the health and safety food receipt using the system. Upon returning to the food charity organization, the supervisor ensures food entry to the food charity. After all, food delivery by the team leader completes the food distribution form.

### 5. MATERIAL AND METHODS

**DJANGO:** Django is a high-level Python web framework that enables rapid development of secure and maintainable websites. Built by experienced developers, Django takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It is free and open source, has a thriving and active community, great documentation, and many options for free and paid-for support.

**HTML:** The Hyper Text Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

By using **HTML With combination of django we create signup and login page and food details page**

**MYSQL:** MySQL is based on a [client-server](#) model. The core of MySQL is MySQL server, which handles all of the database instructions (or commands). MySQL server is available as a separate program for use in a client-server networked environment and as a library that can be embedded (or linked) into separate applications.

MySQL operates along with several utility programs which support the administration of MySQL databases. Commands are sent to MySQL Server via the MySQL client, which is installed on a computer.

MySQL was originally developed to handle large databases quickly. Although MySQL is typically installed on only one machine, it is able to send the database to multiple locations, as users are able to access it via different MySQL client interfaces. These interfaces send SQL statements to the server and then display the results.

**The Python Framework**

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed. Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python programs is easy: a bug or bad input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple approach very effective.

## 6. METHODOLOGY

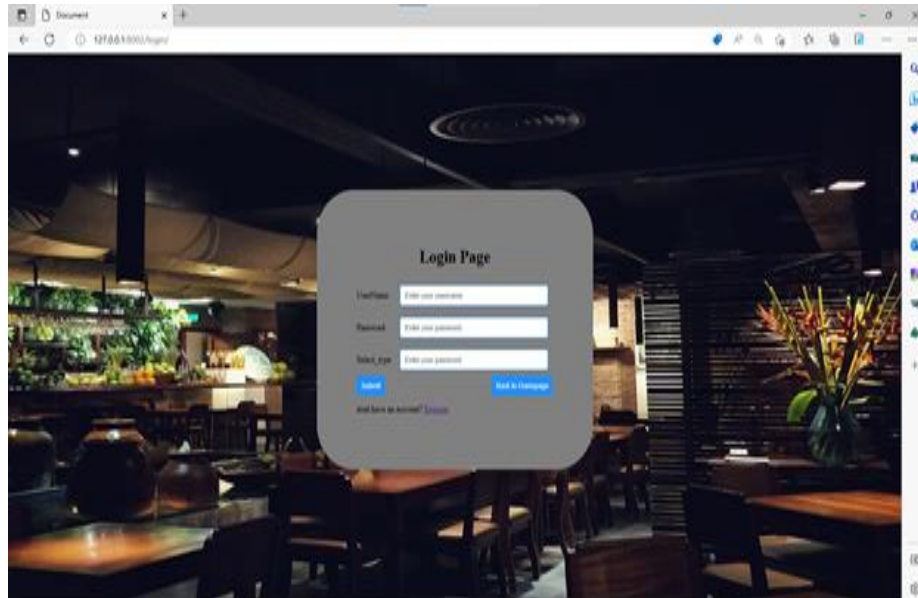
### ADMIN:

1. **Register:** A user can register using personal details.
2. **Login:** The user can login to his personal account using his ID and password.
3. **DONOR:**
  - List restaurants: list all available restaurants.
  - Add or Register a New Restaurant
4. **NGOs:**
  - See All NGOs
  - Add or Register New Non-Profit Organizations

### DONOR:

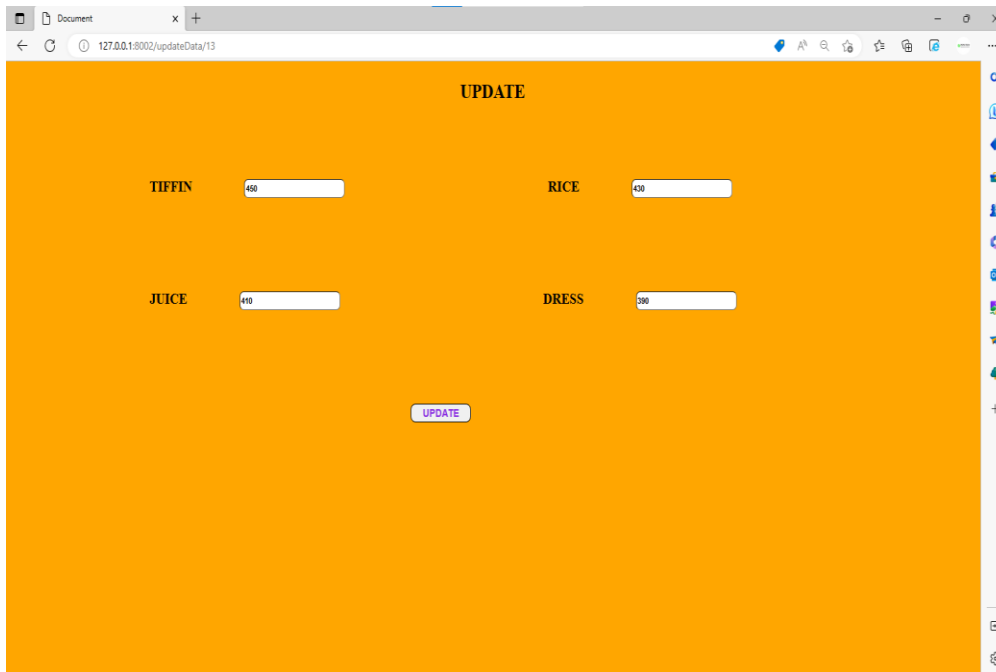
1. **Register:** A user can register using personal details.
2. **Login:** The user can login to his personal account using his ID and password.
3. **Profile:**
  - View Profile/Donor Details
  - Change Password
1. **History:**
  - View Your Order History
    - Accepted
    - Pending
    - Confirm

**Food:** Donate food to Donor



### NGOs:

1. **Register:** A user can register using personal details.
2. **Login:** The user can login to his personal account using his ID and password.
3. **Details:**
  - View Other NGOs' Profiles
  - View donors' requests
4. **Add Request:**
  - Request food for NGOs from the restaurant.
  - Designate an NGO to deliver the food.
5. **Donor management, NGO:**
  - Add a new donor or NGO.
  - Update donor and NGO details
  - View donor and NGO profiles
6. **Records:**
  - View Donor Information
7. **Profile:**
  - View Profile/Donor Details
  - Change Password



### **Sign-Up Page; Food Details:**

#### **PAGE FOR SIGNING UP:**

MySQL is a database that is used to store values. Here, the signup details are stored in our database.

#### **FOOD DETAILS:**

The food details are saved in another database so that the same information can be shared with the NGO site.

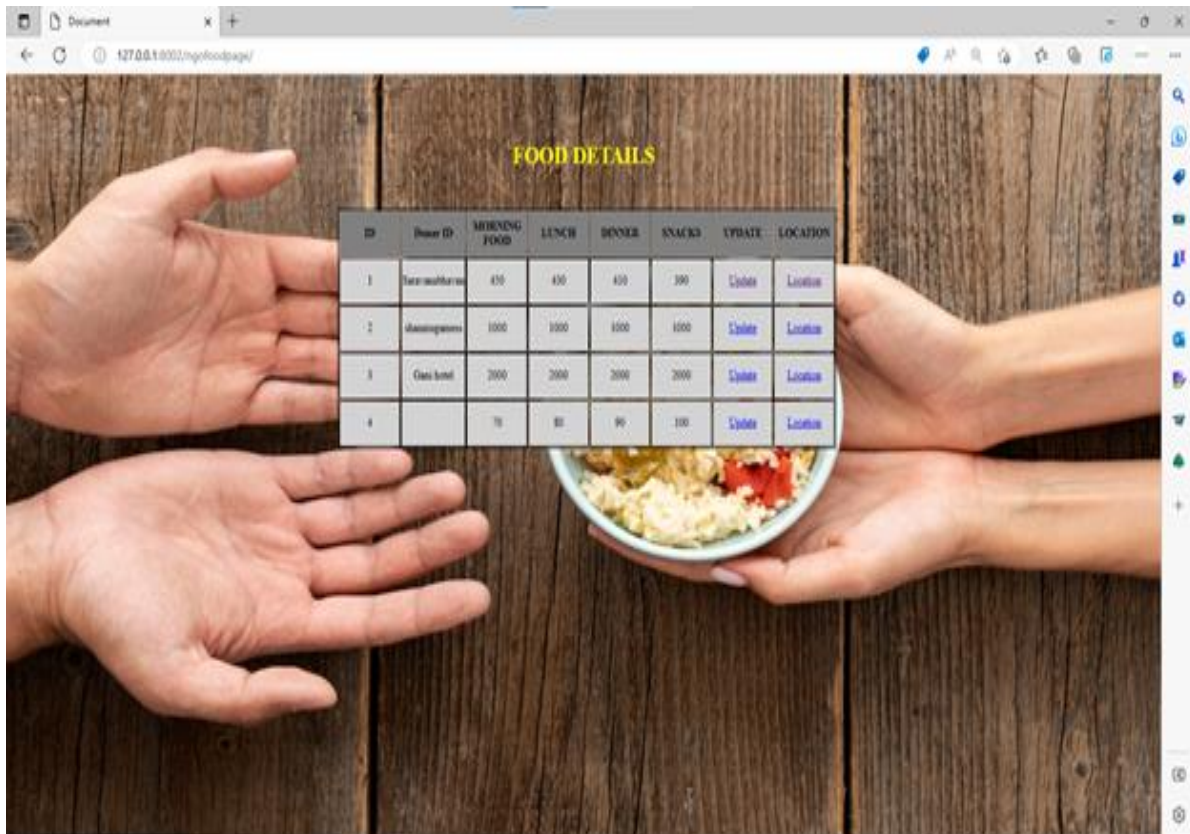
### **Login Page; NGO Page**

#### **LOGIN PAGE:**

Depending on the MySQL stored data, we check the user ID and password here. The page will advance to the next page if the user ID, password, and ID type are all the same. If the ID type is DONAR, the food quantity page is moved. If the ID type is NGO, it navigates to the NGO page.

#### **NGO PAGE:**

The page displays food quantity information obtained from the MySQL database.



## 7. RESULT AND DISCUSSION

This project aims to assist individuals and the world in reducing food waste and raising community awareness about the importance of preservation. By translating paper forms into online forms, the system helps food charities automate their food donation and distribution processes. The developed system makes it easy for charity workers to connect and collaborate with donors and have easier access to beneficiary information. It facilitates the fast donation of surplus food by donors. Also, beneficiaries would be able to quickly register through charities for food distribution. By designing this web-based application, which is created in the Arabic language to serve the target community, this paper enhances the technological aspect of food charity management. Four primary user groups, including donors, beneficiaries, supervisors and team leaders, interact with each other and their individual tasks through the developed system. The donation process begins with a food collection service request from a donor, which the supervisor approves. The process concludes when the team leader delivers the food to beneficiaries. Around Sixteen interfaces were designed to provide the best services to the food charity employees and clients. Through these interfaces, donors can quickly request food collection service. Also, beneficiaries can register their personal information. In addition, employees of food charity organizations can complete their forms. Incoming orders can only be directed to the supervisor, and assigned orders can only be directed to the selected team leader.

## 8. CONCLUSION

The enormous extent of food waste in international food supply chains is gaining interest due to its cultural, social, and economic consequences. Therefore, charities are working to prevent food waste and educate the community to determine appropriate quantities of food. This paper offers a solution to help reduce food waste, which is ultimately beneficial for both the economy and the environment. The solution takes advantage of surplus food by developing a web-based operations management system to ensure the efficiency of food charities, from the food collection process to food distribution. This management system contributes to automating the processes of food charities, which reduces the amount of time and effort required. It also makes

it possible to access beneficiaries' information faster and easier. Overall, the system encourages people to donate surplus food because it makes food collection service more accessible through a mobile device.

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