

Meal Match Bridging the Gap between Food Waste and Hunger

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Abstract— World hunger still happens to be one of the principal and fatal problems faced by millions of people every day and is rising every day. It will not be a surprise if we declare this a curable disease, but nobody cares. In the last year, almost 800 million people faced this problem. Nearly 21 million tons of food is wasted in India every year. That means 265 kilograms of food for each hungry individual could have been used to feed them. This problem can be dealt with proficiency if we channel our food waste and excess food precisely to these people. In this paper, we will address and try to build an approach to work upon the reasons, consequences, and solutions feasible for this aroused problem. We will look at the current operations executed to solve this problem and how we can help find a solution. In this paper, we will present our solution for this problem and how we can use the web application as a helping hand to help needy people with food. We have focused on creating a system that will help channel the waste food in social gatherings and better utilization of the leftover food to the needy through a website and an NGO. We have also focused on keeping proper track of all the resources and materials available by developing an inventory system for the same. All the different parts will work together to help us accurately run the system that helps manage food waste properly for the needy.

Keywords—Hunger, Needy, Waste Food, NGO, Donation.

I.INTRODUCTION

The UN's Hunger Report states that the term "hunger" is used to describe times when populations are suffering from acute food insecurity, which means they go for entire days without eating because they lack money, access to food, or other resources.

Despite the fact that more than enough food is produced around the world to feed everyone, up to 811 million people still go without food. 9.9% of the world's population is now experiencing an increase in hunger after a decade. Malnutrition has increased by 161 million

from 2019 to 2020. Conflict, climate change, and the COVID-19 outbreak are the main causes of this issue. [1]



Figure 1.1: WFP 2015

Hunger and poverty share a tight relationship and are influenced by a variety of social, political, human, and socioeconomic issues. Living in unsafe neighbourhoods with high access to water, sanitation, and sanitation, as well as in the capacity to access or receive health care and education, poor people frequently experience household insecurity, practise insufficient caregiving, and utilise care methods that can result in famine.

Facts about hunger

1. The world produces more than enough food to feed everyone on the earth.
2. Throughout the world, 811 million people go to bed hungry each night.
3. Although small farmers, herders, and fishers contribute roughly 70% of the world's food supply, they are particularly vulnerable to food insecurity since rural areas are where poverty and hunger are most severe.
4. Just 25% of acutely malnourished children have access to life-saving therapy, despite the fact that an estimated 14 million children under the age of five suffer from severe acute malnutrition, also referred to as severe wasting. [9]

According to the Food and Agriculture Organization, India loses about 40% of its annual food production as a

result of different food chains and system failures (FAO). Even before the food is consumed, there is a loss like this.

Also, a lot of the food that is produced in our homes is thrown away. A startling 50 kg of food is wasted per person in Indian homes each year, according to the Food Waste Index Report 2021. This food waste frequently ends up in landfills, where it produces greenhouse gases that are harmful to the ecosystem.

We all prepare food each day for our nutrition, but occasionally there is leftover that we won't eat and end up throwing away—wasting food that would have been needed by a hungry person. By giving contributions to NGOs that assist these people, we may aid those in need. By contributing our leftover food, leftover takeout from hotels, and food that was wasted at events like parties and weddings, we can also contribute.

II.LITERATURE SURVEY

All of the existing systems, including NGOs, food banks, small donation camps, etc., operate on the premise that they have the food needed to distribute to the poor but struggle to locate such populations. Also, they may only provide assistance where they are needed and only in a certain location. There is an absence of a centralized system. A system that can link the general public and NGOs so they can work together to tackle the issue.



Figure 1.2: Reasons for hunger

Every family wastes a significant amount of good, consumable food that may be donated to people in need. Current food donation programs include:

1. Non-governmental organizations (NGOs): Normally, NGOs serve meals to the hungry after it has been prepared. Instead of using surplus consumable food as their aid capital, they typically use money. Some NGOs only serve a small

geographic area and are unable to provide services elsewhere.

2. Food Banks: A food bank is a nonprofit, benevolent organization that provides food to people who find it difficult to buy enough to avoid going hungry, typically through middlemen like food pantries and soup kitchens. Some food banks use their own food pantries to directly distribute food.
3. Small Charity Groups: These organizations are made up of like-minded people who desire to do well, but only on a very small scale.
4. There is currently no system that possesses all the necessary capabilities to address this issue.

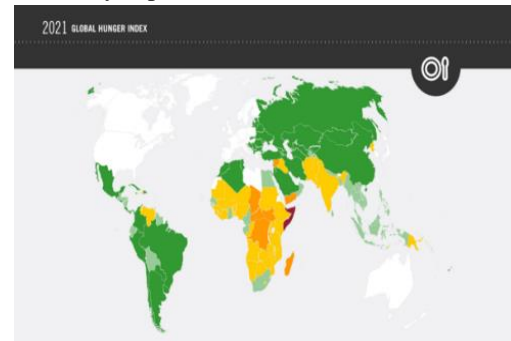


Figure 2: Global Hunger Index 2021

Acute, chronic, and concealed hunger are the three types of hunger that experts distinguish between.

(1) Acute hunger (famine) is the medical term for prolonged malnutrition. It is the most severe type of hunger and typically occurs in conjunction with emergencies like wars, disasters, and El Nio-related droughts. Those who are already dealing with chronic hunger are frequently affected. That holds true for roughly 8% of all hungry persons.

(2) Chronic Hunger refers to a long-term undernutrition condition. More food is consumed than the body can assimilate. Although chronic hunger is by far the most prevalent worldwide, the media primarily covers sudden food emergencies. It frequently occurs in relation to poverty. Those who are frequently hungry do not have enough money for a good diet, access to clean water, or medical treatment.

(3) Hidden hunger is a form of chronic hunger. Important nutrients like iron, iodine, zinc, and vitamin A are insufficient as a result of an imbalanced diet. Although the effects may not be immediately apparent, over time these vitamin deficits result in catastrophic diseases. Children in particular are unable to physically or cognitively

develop properly. The likelihood of dying is high. Two billion individuals worldwide, including those in developed nations, experience chronic nutritional deficiencies. In addition to harming individuals, hidden hunger can also prevent an area's general development by lowering people's productivity and health.

Table 1: Gap Identification

Sr. No.	Existing System	Current System	Gap Identification
1.	Only social media platform— <i>Facebook</i>	Informative and operative website.	Lack of awareness about the service to the world.
2.	Records resources and funds manually	Inventory management module	Inefficient record maintenance

III.PROBLEM STATEMENT

The work proposed in this paper addresses the following issues:

- 1) To set up a mechanism for providing food assistance to those in need.
- 2) To assist NGO in reaching out to those in need.
- 3) To assist NGO in monitoring incoming and departing inventories.
- 4) To create a centralized system for the management of food stocks, money transactions, invoices, and records of donors and receivers.

IV.DATA COLLECTION AND VISUALIZATION

Data is gathered from a number of news websites. The information displays statistics on global hunger. The primary indicator of hunger used by the UN Food and Agricultural Organization is the prevalence of undernourishment as a percentage of the population. It calculates the proportion of the population whose calorie consumption falls short of the minimal levels of energy considered necessary for a specific population. The percentage of the world's population that is considered undernourished is depicted on the map of undernourishment prevalence. Nations with prevalence rates under 2.5% are not displayed.

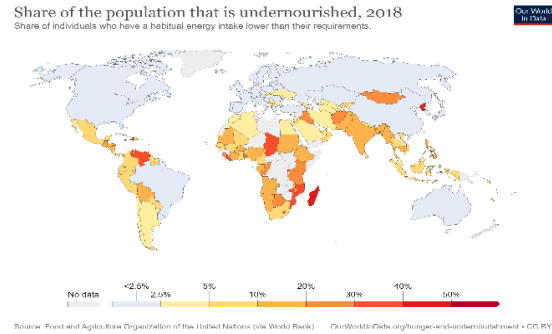


Figure 3.1: Number of undernourished people

By world region, the prevalence of undernourishment is displayed.

Here, we can observe that the prevalence of hunger has decreased globally and in the majority of regions since the turn of the millennium. Worldwide, this decreased from 13.3% in 2001 to 8.9% in the most recent year.

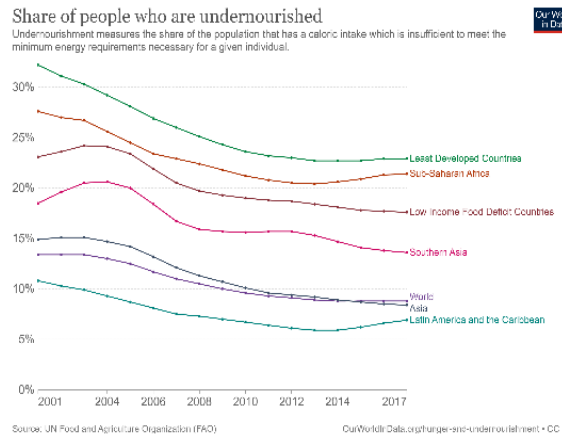


Figure 4.2: Share of people who are undernourished

The primary measure of hunger according to FAO metrics is the prevalence of undernourishment. Although it shows us how many people fall below the minimal energy requirements, this measurement does not indicate how severely undernourished they are on average.

The FAO employed a statistic known as the "depth of the food deficit" to estimate the severity of undernourishment in a population. This measurement gives an estimate of the number of calories a typical person would require to maintain a healthy balance between their caloric intake and energy needs. The average daily calorie deficit per person is expressed in kilocalories.

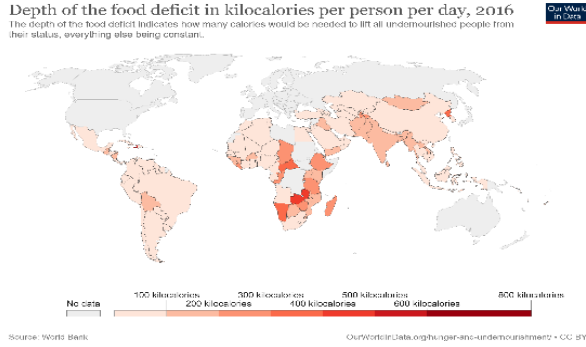


Figure 4.3: Depth of food deficit

Children who are stunted, wasted, or experiencing an insufficient calorie intake for an extended period of time might be considered undernourished, or the occurrence of being underweight for age.

The graph displays the percentage of children under the age of five who are deemed underweight for their age globally since 1990. From roughly 25% in 1990 to 15% in 2015, there has been a steady decline on a global scale. South Asia has improved significantly over the past three decades, decreasing undernourishment by 20 percentage points from 1990 to 2017 while having the greatest regional frequency. Sub-Saharan Africa's rate of undernourishment has also significantly decreased, from 30% in 1990 to under 20%

East Asia, Latin America, North Africa, and the Middle East all have rates that are significantly lower than those in South Asia and Sub-Saharan Africa, while they have also experienced large drops, with each region's incidence of undernourishment more than half since 1990.in 2017. [12]

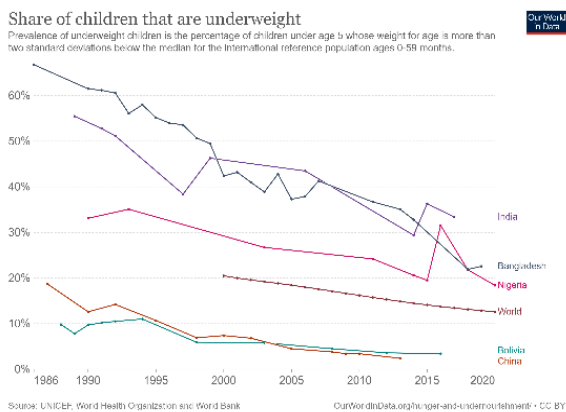


Figure 4.4: Share of children underweight

Data Sources:

- 1) World Bank – World Development Indicators
- 2) International Food Policy Research Institute (IFPRI)
- 3) International Food Policy Research Institute (IFPRI)
- 4) WHO – Global Health Observatory (GHO)

V.PROPOSED WORK

The solution we're putting forth will assist in bridging the gap between the regular people who want to contribute to society and the NGOs now assisting the less fortunate. Users will be able to input data into our system based on their location. When a user notices a group of hungry people and is unable to provide for them, he can utilize the system to alert NGOs and other users. Anyone who can assist will then reply to the request, providing the group with food.

[5.1] FoodWill: Food Provider for Needy

The sign-up and login screens will assist with registering the user; if the user is using the system for the first time, they can register; if they are already registered, they must log in in order to use it. The donation system will be made up of NGOs and places where volunteers are needed to perform various tasks linked to the production, distribution, and much more of food. Also, it will have information whenever food is required. NGOs and other users who are eager to fulfill the request as quickly as feasible might take care of these requests. Additionally, it will detail forthcoming food drives, food donation events, and other activities so that users are continually informed.

[5.2] Inventory Management System:

Using alternatives like packaged food, raw food, or cooked food, the user or donor can decide what kind of food to provide. Users have the option of giving any kind of food they like to NGOs or directly to those in need.

The food quantity page is another place where you may choose whether you want vegetarian or non-vegetarian cuisine. Also, you must enter the amount of food you intend to contribute. If the food is cooked, the system will also ask when the meal was made because it is important to provide consumable food to the needy. Users can put it on the system so that anyone who has those prerequisites can respond to it.

The user or donor will have options on what kinds of food to donate, including the admin can manage the contribution records, which will comprise different food products in category kinds, as well as the stock of food that is needed, received, requested, and donated, using the inventory management system. Also, it will include invoices for donations that were made and records of food donation camps. It will also monitor User Records and User Activity.

DESIGN PHASE

[6.1] System Analysis

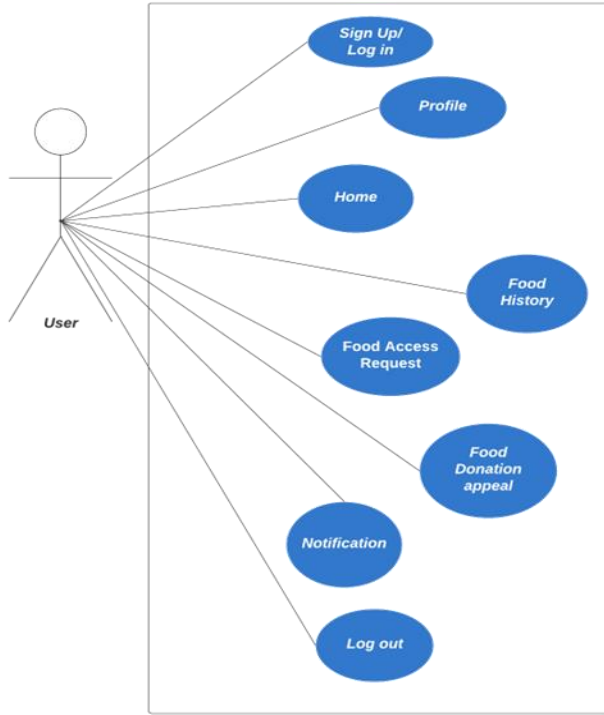


Figure 6.1.1: (a) Use Case Diagram - User

[6.2] Flowchart

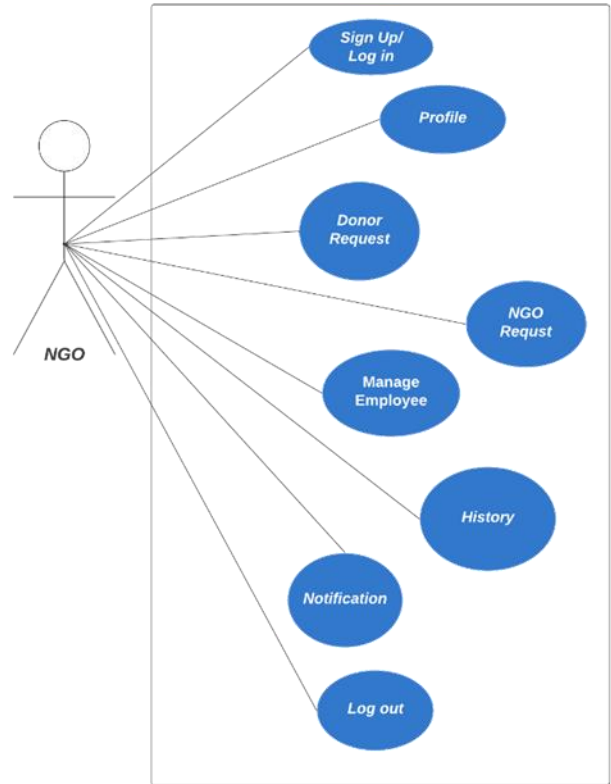


Figure 6.1.2: (b) Use Case Diagram - NGO

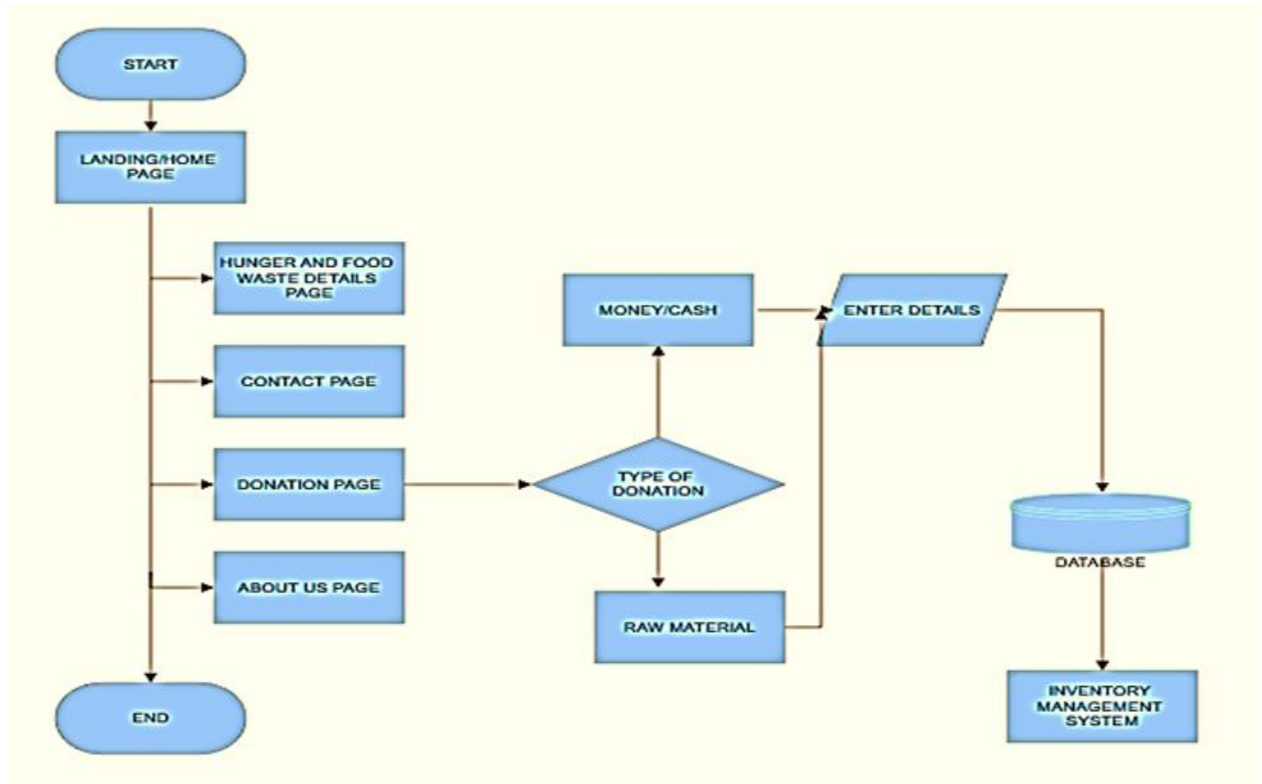


Figure 6.2: Project Flowchart

VI.USER INTERFACE

[7.1] FoodWill: Food Provider for Needy

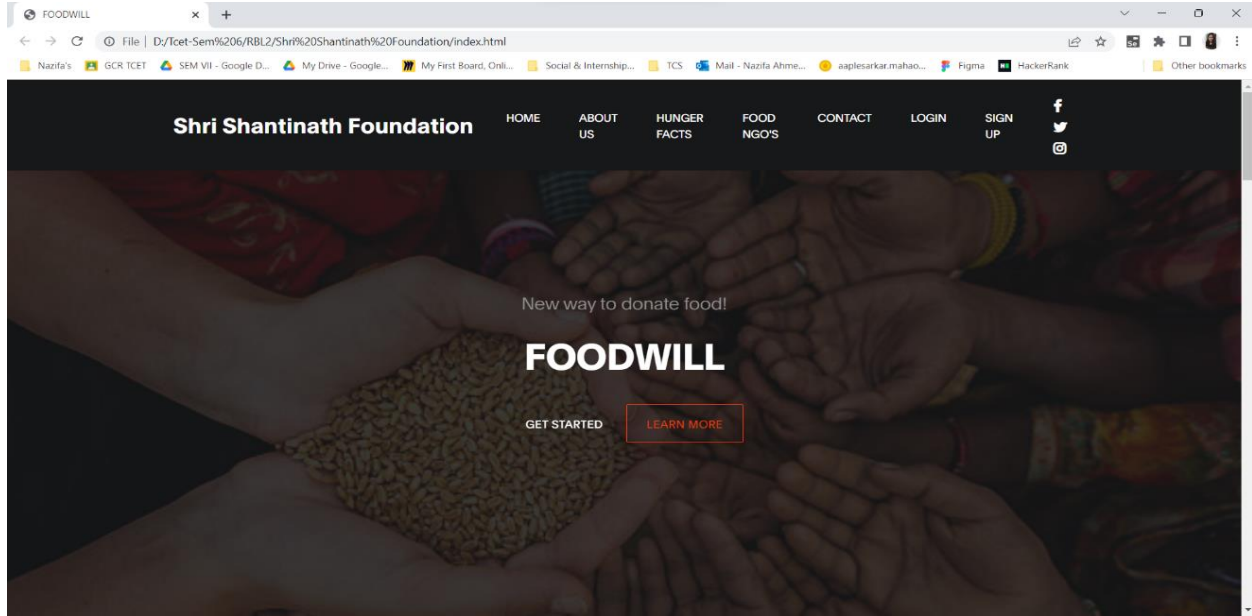


Figure 7.1.1: Homepage

[7.2] Inventory Management System

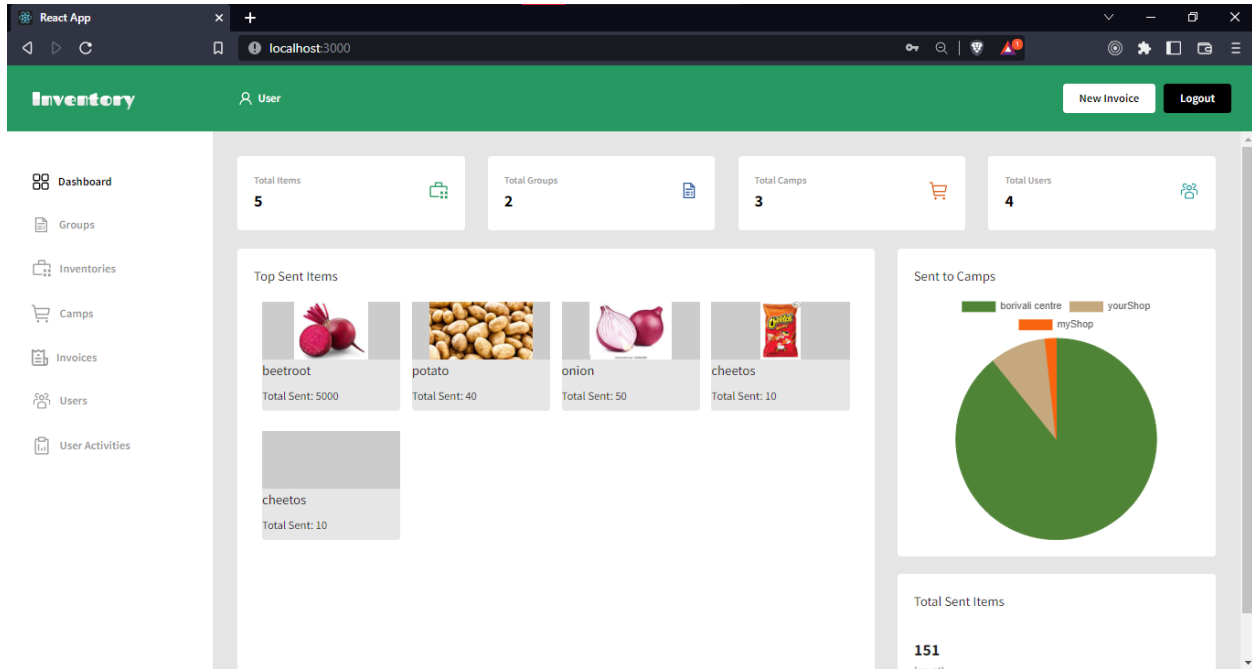


Figure 7.2: Inventory Dashboard

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University, Food Donation and Food Safety: Challenges, Current Practices, and the Road Ahead.

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