# SURPLUS FOOD MANAGEMENT SYSTEM

### A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree of

### **BACHELOR OF ENGINEERING**

in

#### COMPUTER SCIENCE AND ENGINEERING





# RAJALAKSHMI ENGINEERING COLLEGE ANNA UNIVERSITY,CHENNAI MAY 2024

# RAJALAKSHMI ENGINEERING COLLEGE , CHENNAI BONAFIDE CERTIFICATE

Certified that this project titled "SURPLUS FOOD MANAGEMENT SYSTEM" is the bonafide work of "LAKSHMI KANTH M (2116210701130), LATHIKA P (2116210701131), MADHUMITHA S (2116210701142)" who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

#### **SIGNATURE**

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Internal Examiner External Examiner

# **ABSTRACT**

The Surplus Food Management System (SFMS) represents a multifaceted approach to addressing the pressing issues of food waste and food insecurity. In an era where a significant portion of food produced globally goes to waste while millions suffer from hunger and malnutrition, SFMS emerges as a promising solution with its structured and systematic methodology. At its core, SFMS encompasses a series of interrelated processes designed to identify, collect, sort, distribute, store, and preserve surplus food. The identification phase involves recognizing surplus food at various points along the food supply chain, including production, processing, distribution, and consumption stages. This requires collaboration and communication among stakeholders such as farmers, food manufacturers, retailers, restaurants, and house holds. Once surplus food is identified, the collection process begins, involving the retrieval of excess food from different sources. This may entail the establishment of partnerships with food businesses, the deployment of collection networks, and the mobilization of volunteers to gather surplus food efficiently and effectively. Sorting and inspection play pivotal roles in ensuring that collected surplus food meets safety and quality standards. Through meticulous examination, unsuitable items are identified and separated, while edible and nutritious food items are earmarked for redistribution. Distribution of surplus food to those in need forms a cornerstone of SFMS. This involves collaboration with charitable organizations, food banks, shelters, community centers, and other entities equipped to handle and distribute food to vulnerable populations. Logistics and transportation mechanisms are crucial in facilitating the timely and efficient delivery of surplus food to its intended recipients. To maximize the impact of surplus food redistribution, proper storage and preservation techniques are employed to prolong the shelf life of food items. This may involve refrigeration, freezing, vacuum sealing, or other preservation methods tailored to the specific characteristics of each food item. Continuous monitoring and evaluation mechanisms are integrated into SFMS to track the flow of surplus food, assess its impact on alleviating food insecurity, and identify areas for improvement. Data-driven insights gleaned from monitoring efforts enable stakeholders to refine and optimize surplus food management strategies over time.

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LAKSHMI KANTH M LATHIKA P MADHUMITHA S

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# CHAPTER 1 INTRODUCTION

In an era characterized by abundance and scarcity existing side by side, the paradox of food waste amidst food insecurity looms large as a global challenge demanding urgent attention. While a substantial portion of food is produced to meet the needs of a growing population, a significant fraction of it goes to waste at various stages along the food supply chain. Meanwhile, millions around the world continue to suffer from hunger, malnutrition, and food insecurity, highlighting a glaring disconnect between food production, distribution, and consumption.

The Surplus Food Management System (SFMS) emerges as a comprehensive and systematic approach to tackle this complex issue. Rooted in the principles of sustainability, efficiency, and social equity, SFMS aims to minimize food waste while maximizing the redistribution of surplus food to those in need. By leveraging collaborative partnerships, innovative technologies, and community engagement, SFMS offers a viable solution to address both the environmental and social dimensions of food waste and food insecurity.

This paper delves into the intricacies of the Surplus Food Management System, exploring its key components, operational processes, and potential impact. Through a detailed examination of each phase of the surplus food management cycle—from identification and collection to distribution and preservation—this study aims to shed light on the mechanisms by which SFMS can transform the current food landscape, fostering a more sustainable and equitable future for all.

#### 1.1 PROBLEM STATEMENT

Despite significant advancements in food production and distribution, the issue of food waste persists as a major global challenge with far-reaching economic, environmental, and social implications. Across the food supply chain, from farms to households, substantial quantities of edible food are discarded annually due to various factors such as overproduction, inefficiencies in distribution, quality standards, and consumer behavior. Concurrently, food insecurity remains a pressing issue affecting millions of individuals and families worldwide. Limited access to nutritious and affordable food exacerbates hunger and malnutrition, contributing to a cycle of poverty and social inequality.

#### 1.2 SCOPE OF WORK

Implementing a Surplus Food Management System (SFMS) entails a multifaceted approach aimed at addressing the intertwined challenges of food waste and food insecurity. The scope of work encompasses several key components, beginning with an assessment of current food waste generation and food insecurity levels within the target area. This assessment serves as the foundation for developing a strategic plan outlining the objectives, goals, and timelines for implementing SFMS. Stakeholder engagement is paramount, involving collaboration with food producers, distributors, government agencies, non-profit organizations, and community groups to establish partnerships and garner support for SFMS initiatives.

#### 1.3 AIM AND OBJECTIVES OF THE PROJECT

The aim of the Surplus Food Management System (SFMS) is to create a sustainable and efficient framework for minimizing food waste and maximizing the redistribution of surplus food resources to alleviate food insecurity. By establishing coordinated processes and partnerships across the food supply chain, SFMS seeks to optimize the utilization of surplus food while addressing the pressing social, economic, and environmental challenges associated with food waste and food insecurity

Objectives is to Implement strategies and processes to identify, collect, and redistribute surplus food effectively, thereby minimizing food waste at various stages of the food supply chain. Facilitate the redistribution of surplus food to individuals and communities facing food insecurity, ensuring equitable access to nutritious food options and addressing hunger and malnutrition.

#### 1.4 RESOURCES

Resources for implementing a Surplus Food Management System (SFMS) encompass a diverse array of stakeholders, infrastructure, technology, and support systems. Food donors play a pivotal role in the SFMS framework, comprising farms, food manufacturers, distributors, retailers, and restaurants, all of whom contribute surplus food for redistribution. Complementing these donors are food recovery organizations, including non-profits, food banks, and community groups, which specialize in collecting, sorting, and redistributing surplus food to those in need. Government agencies provide crucial support through funding, grants, regulatory assistance, and the provision of infrastructure necessary for SFMS operations. Technology facilitates the coordination and tracking of surplus food donations, transportation, and distribution efforts, streamlining the process and enhancing efficiency.

# CHAPTER 2 LITERATURE SURVEY

A comprehensive literature survey on surplus food management systems reveals a growing body of research and scholarly discourse surrounding the intertwined issues of food waste, food insecurity, and sustainable food systems. Numerous studies have explored various aspects of surplus food management, ranging from the identification and quantification of food waste to the development and implementation of strategies for surplus food recovery and redistribution.

One key theme that emerges from the literature is the magnitude and impact of food waste on both environmental sustainability and social equity. Studies have documented the staggering amount of food wasted globally each year and its implications for greenhouse gas emissions, resource depletion, and landfill waste. Concurrently, researchers have highlighted the inequities embedded within the food system, whereby surplus food coexists with food insecurity, underscoring the urgency of addressing both issues simultaneously.

The literature survey reveals the importance of technology and innovation in enhancing the efficiency and effectiveness of surplus food management systems. Researchers have investigated the use of digital platforms, data analytics, and logistics optimization tools to streamline surplus food recovery and redistribution processes, improve resource allocation, and enhance traceability and transparency within the food system.

Studies have underscored the role of policy and governance mechanisms in shaping surplus food management practices and outcomes. Research has examined the regulatory landscape governing food donation, liability protections for food donors, tax incentives, and other policy interventions aimed at incentivizing surplus food recovery and redistribution while ensuring food safety and compliance with regulatory standards.

Overall, the literature survey highlights the multidimensional nature of surplus food management systems and the complex interplay between food waste, food insecurity, sustainability, technology, policy, and governance. By synthesizing insights from existing research, this study aims to contribute to a deeper understanding of surplus food management challenges and opportunities and inform evidence-based strategies for addressing them effectively.

# CHAPTER 3 SYSTEM DESIGN

#### 3.1 GENEREAL

In a general sense, surplus food management systems are structured approaches aimed at minimizing food waste and maximizing the redistribution of surplus food resources to those in need. These systems encompass a range of processes, strategies, and stakeholders working collaboratively to address the complex challenges of food waste and food insecurity within the food supply chain.

#### 3.2 SYSTEM ARCHITECTURE DIAGRAM

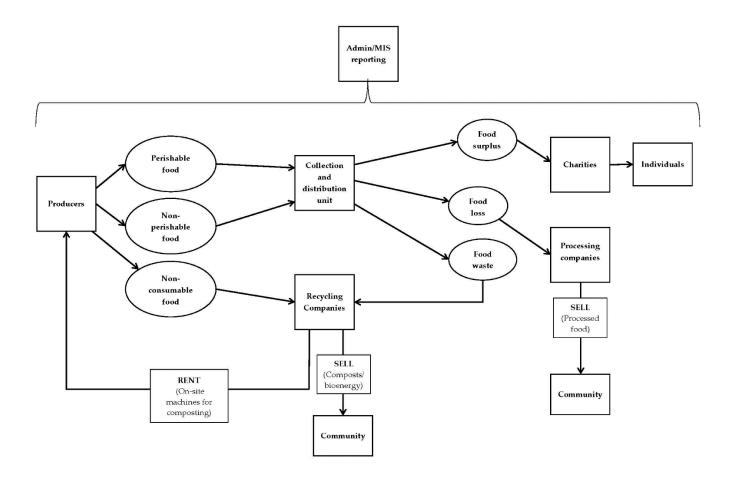


Fig 3.1: System Architecture

#### 3.3 DEVELOPMENT ENVIRONMENT

#### 3.3.1 HARDWARE REQUIREMENTS

The hardware requirements may serve as the basis for a contract for the system's implementation. It should therefore be a complete and consistent specification of the entire system. It is generally used by software engineers as the starting point for the system design.

COMPONENTS	SPECIFICATION
PROCESSOR	Intel Core i5
RAM	8 GB RAM
GPU	NVIDIA GeForce GTX 1650
MONITOR	15" COLOR
HARD DISK	512 GB
PROCESSOR SPEED	MINIMUM 1.1 GHz

TABLE 3.1 HARDWARE REQUIREMENTS

# 3.3.2 SOFTWAERE REQUIREMENTS

The software requirements for a surplus food management system (SFMS) essential components that enable the efficient and effective management of surplus food resources. A robust inventory management system lies at the heart of SFMS, providing the capability to track surplus food donations, manage inventory levels, and allocate resources optimally. Through real-time updates and comprehensive reporting features, this system empowers stakeholders to make informed decisions regarding surplus food distribution and utilization. Logistics and transportation software plays a crucial role in coordinating the collection and distribution of surplus food. By facilitating route planning, scheduling, vehicle tracking, and delivery management, this software ensures the timely and efficient transportation of food donations from donors to redistribution points and ultimately to recipients in need.

# CHAPTER 4 PROJECT DESCRIPTION

#### 4.1 METHODOLOGY

The methodology for implementing a surplus food management system (SFMS) involves a systematic and multifaceted approach aimed at addressing the interconnected challenges of food waste and food insecurity. It begins with a thorough needs assessment and planning phase, where stakeholders analyze the extent of food waste and food insecurity in the target area, define objectives and goals, and develop a strategic plan for SFMS implementation. Engaging stakeholders across the food supply chain is paramount, as collaboration and partnerships are essential for garnering support and participation in SFMS initiatives.

Once the groundwork is laid, the focus shifts to identifying and quantifying surplus food, establishing collection and recovery systems, and setting up distribution networks to ensure surplus food reaches those in need. Storage and preservation techniques are implemented to maintain food quality, while technology solutions and innovation are leveraged to optimize surplus food recovery and distribution processes.

Regulatory compliance and governance measures are put in place to ensure adherence to food safety regulations and legal requirements. Education and outreach efforts are conducted to raise awareness about food waste reduction and responsible consumption, while monitoring and evaluation mechanisms are employed to track SFMS performance and make informed decisions for continuous improvement. Through this comprehensive methodology, stakeholders can effectively implement and sustain an SFMS that minimizes food waste, addresses food insecurity, and promotes a more sustainable and equitable food system.

Establish distribution networks and partnerships with food banks, shelters, soup kitchens, community centers, and other organizations serving food-insecure populations.

Coordinate logistics and transportation to ensure timely and equitable distribution of surplus food to recipients. Utilize technology solutions such as digital platforms, data analytics, and inventory management systems to optimize surplus food recovery and distribution processes. Explore innovative technologies and approaches for enhancing efficiency, traceability, and transparency within the SFMS.

#### 4.2 MODULE DESCRIPTION

Surplus Food Identification Module: This module is responsible for identifying and quantifying surplus food at various points along the food supply chain. It utilizes data analytics, inventory management tools, and partnerships with food businesses to identify opportunities for surplus food recovery.

Donor Management Module: The donor management module facilitates the registration and management of food donors, including farms, manufacturers, retailers, restaurants, and households. It allows donors to input information about surplus food donations, schedule pickups, and track donation history.

Recipient Management Module: The recipient management module manages the registration and eligibility verification of recipients, such as food banks, shelters, soup kitchens, and community centers. It ensures that surplus food is distributed equitably to those in need based on predefined criteria.

Inventory Management Module: The inventory management module tracks surplus food donations, manages inventory levels, and allocates resources efficiently. It provides real-time updates on surplus food availability, expiration dates, and storage locations to stakeholders involved in surplus food redistribution.

Logistics and Transportation Module: The logistics and transportation module coordinates the collection and distribution of surplus food donations. It facilitates route planning, scheduling, vehicle tracking, and delivery management to ensure timely and efficient transportation of surplus food to redistribution points.

Quality Control and Safety Module: The quality control and safety module ensures that surplus food meets regulatory standards and is safe for consumption. It includes features for monitoring food temperature, conducting quality inspections, and managing food recalls to maintain food safety and integrity.

# CHAPTER 5 RESULTS AND DISCUSSIONS

### **5.1 OUTPUT**

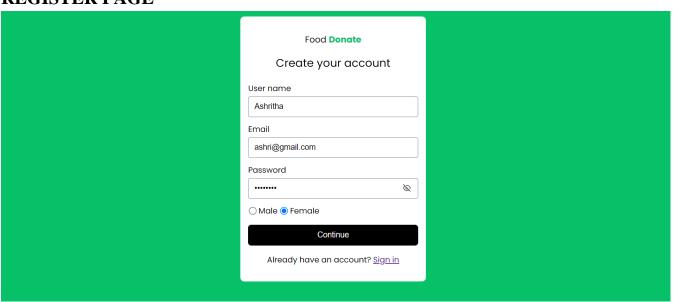
The following contains the images of the working application

### **HOMEPAGE**

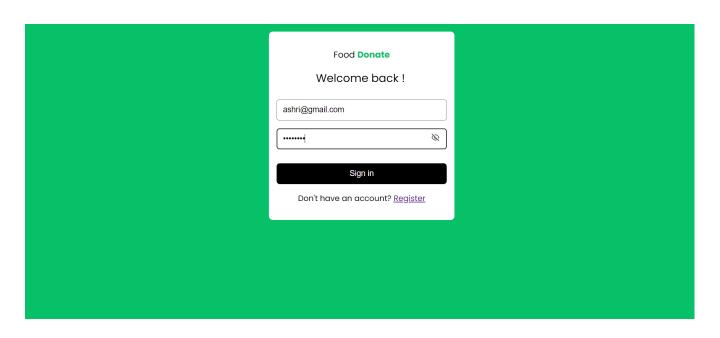


#### **USER:**

# **REGISTER PAGE**

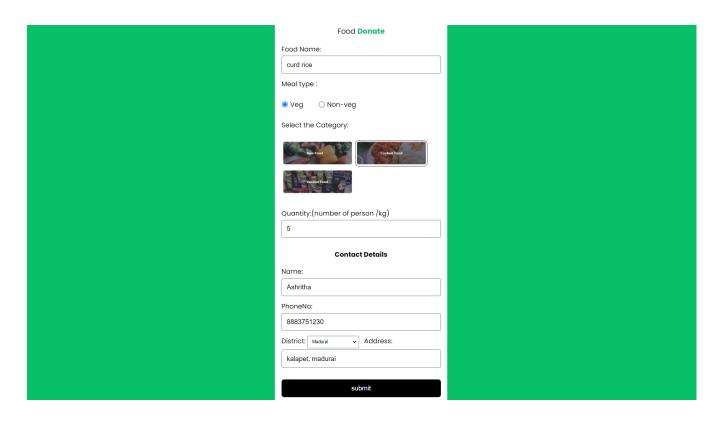


# **LOGIN PAGE**

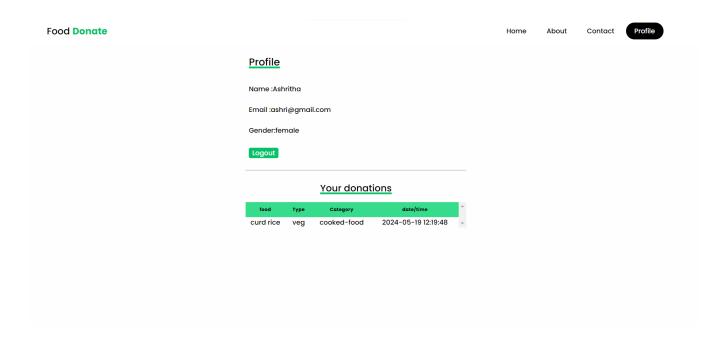




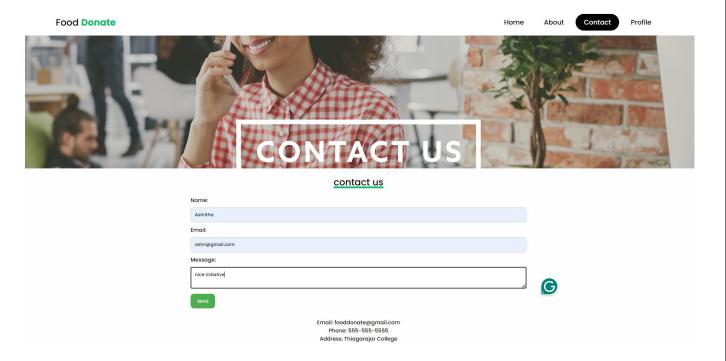
# **DONATE PAGE**



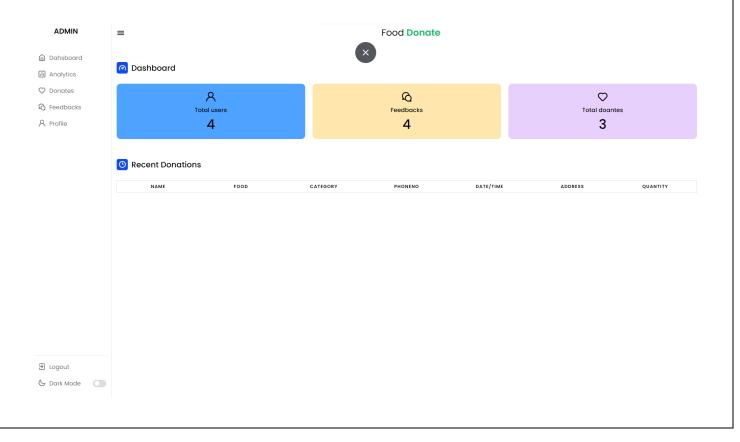
# **PROFILE PAGE**



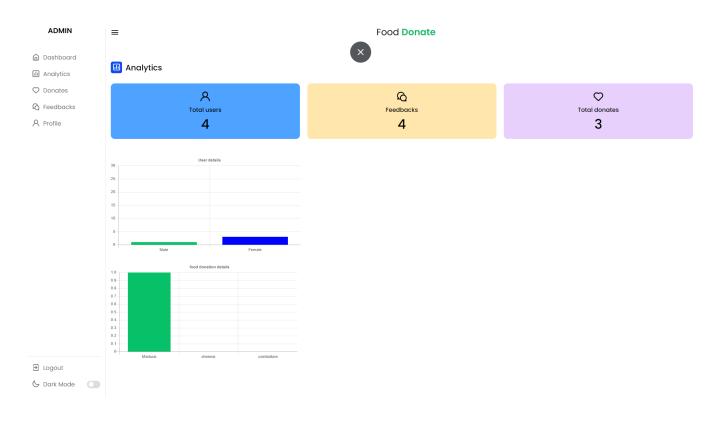
# **CONTACT PAGE**



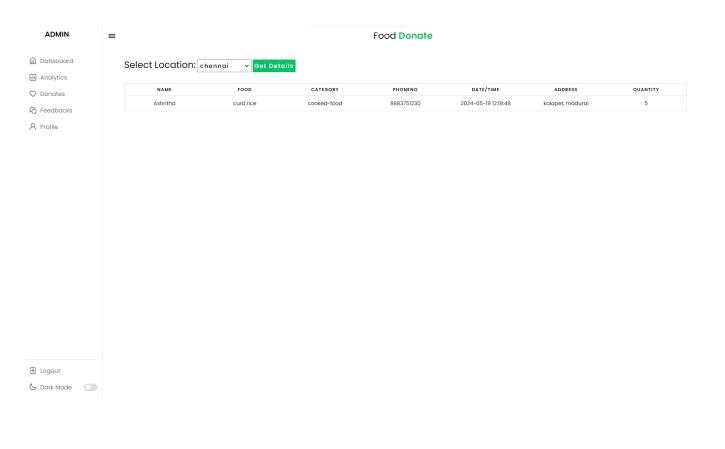
# ADMIN: DASHBOARD



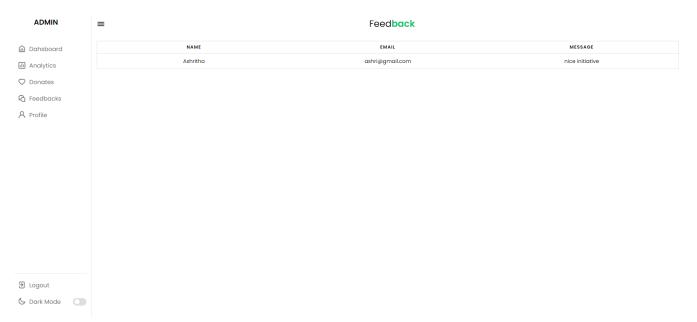
# **ANALYTICS**



# **DONATES**



# **FEEDBACK**

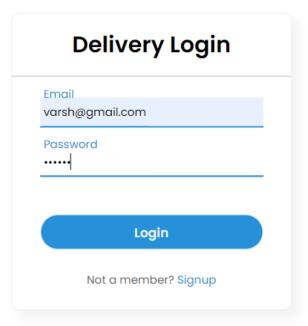


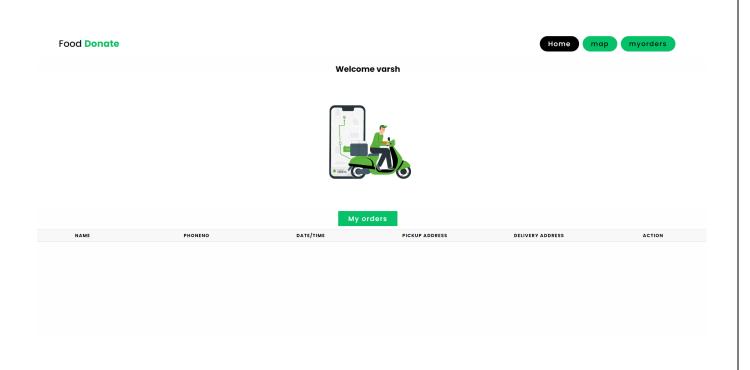
# **DELIVERY:**

# **REGISTER**



# **LOGIN**





#### **5.2 RESULT**

Implementing a surplus food management system (SFMS) yields a range of impactful outcomes, positively affecting both the environment and society. By efficiently identifying surplus food along the supply chain and redistributing it to those in need, SFMS significantly reduces food waste, leading to a notable decrease in the volume of food destined for landfills. This reduction not only minimizes greenhouse gas emissions and environmental pollution but also optimizes the utilization of food resources, maximizing the value of production while lessening the strain on natural resources. Moreover, SFMS plays a pivotal role in addressing food insecurity by providing nutritious meals to foodinsecure populations, thus contributing to improved dietary diversity and enhanced food security within communities. Businesses participating in SFMS benefit from cost savings through reduced waste disposal fees and tax incentives for food donations, while streamlined processes bolster operational efficiency. Furthermore, SFMS fosters collaboration among stakeholders across the food supply chain, nurturing social networks and partnerships that strengthen surplus food management efforts. Through data-driven decision-making facilitated by SFMS, stakeholders continuously refine and enhance surplus food management practices, ensuring sustained positive impacts on public health, sustainability, and community well-being.

#### **CHAPTER 6**

#### CONCLUSION AND FUTURE ENHANCEMENT

#### 6.1 CONCLUSION

In conclusion, the surplus food management system (SFMS) stands as a critical solution to address the intertwined challenges of food waste and food insecurity. Through its systematic approach of identifying surplus food, facilitating its redistribution, and engaging stakeholders across the food supply chain, SFMS offers a multifaceted solution with far-reaching benefits.

By minimizing food waste, SFMS contributes to environmental sustainability by reducing greenhouse gas emissions, conserving natural resources, and mitigating the environmental impact of food production and disposal. Simultaneously, SFMS addresses food insecurity by ensuring that surplus food reaches those in need, thereby alleviating hunger and improving access to nutritious meals for vulnerable populations.

Moreover, SFMS fosters collaboration and partnership among diverse stakeholders, promoting community engagement and social cohesion. By leveraging technology, data-driven decision-making, and continuous improvement strategies, SFMS enables stakeholders to optimize surplus food management practices and enhance system efficiency over time.

As we move forward, it is essential to continue investing in SFMS initiatives, supporting research, innovation, and policy efforts that further strengthen surplus food management systems globally. By doing so, we can build more resilient, equitable, and sustainable food systems that prioritize the responsible utilization of food resources and ensure access to nutritious food for all.

#### **6.2 FUTURE ENHANCEMENT**

Integration of Blockchain Technology: Implementing blockchain technology can enhance transparency, traceability, and trust within surplus food management systems. Blockchainenabled solutions can provide immutable records of food transactions, ensuring the integrity and authenticity of surplus food redistribution efforts.

Artificial Intelligence for Demand Prediction: Utilizing artificial intelligence (AI) algorithms can improve the accuracy of demand prediction for surplus food items. AI-powered analytics can analyze historical data, market trends, and socioeconomic factors to forecast demand more effectively, enabling better planning and allocation of surplus food resources.

Automated Inventory Management: Implementing automated inventory management systems, equipped with sensors and IoT devices, can streamline surplus food tracking and monitoring. These systems can provide real-time updates on inventory levels, expiration dates, and storage conditions, improving efficiency and reducing the risk of food spoilage.

Mobile Applications for Donors and Recipients: Developing mobile applications for donors and recipients can enhance accessibility and user engagement in surplus food management systems. These apps can facilitate seamless donation scheduling, pickup requests, and communication between donors and recipients, making surplus food redistribution more convenient and efficient.

Collaborative Platform for Stakeholder Engagement: Creating a collaborative platform for stakeholders across the food supply chain can facilitate communication, knowledge sharing, and collaboration in surplus food management efforts. This platform can serve as a centralized hub for sharing best practices, resources, and initiatives, fostering a community-driven approach to addressing food waste and food insecurity.

Enhanced Data Analytics for Performance Monitoring: Investing in advanced data analytics capabilities can enable more comprehensive performance monitoring and evaluation of surplus food management systems.

#### **APPENDIX**

#### **SOURCE CODE:**

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Home</title>
  <!-- Bootstrap CSS -->
  link
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css"
rel="stylesheet">
  <style>
    /* Custom CSS for additional styling */
    body{
        font-family: 'Gill Sans', 'Gill Sans MT', Calibri, 'Trebuchet MS', sans-
serif;
  padding-bottom: 500px; /* Adjust the value as needed */
}
    .navbar {
      background-color:#41C9E2; /* Change the background color of the navbar */
      padding: 20px 0; /* Increased padding for the navbar */
      font-size: 22px;
      /* Larger font size for navbar links */
    .navbar-brand {
      font-size: 26px; /* Larger font size for brand logo */
      font-weight: bold;
    .image-container {
      display: flex; /* Use flexbox for horizontal alignment */
      justify-content: space-between; /* Space between images */
      margin-top: 20px;
      padding-left: 5px;/* Margin between content and images */
    .image-container img {
     border-radius: 10px;
      width: 400px;
      margin-right: 20px; /* Rounded corners for images */
    /* Zoom effect */
    .zoom-image {
      transition: transform 0.3s; /* Smooth transition for zoom effect */
    .zoom-image:hover {
      transform: scale(1.1); /* Zoom in effect on hover */
    }
```

```
.btn-container {
      display: flex;
      justify-content: space-between;
      margin-top: 20px;
    .btn {
      padding: 10px 20px;
      font-size: 16px;
      text-transform: uppercase;
      border: none;
      cursor: pointer;
      transition: background-color 0.3s, color 0.3s;
    }
    /* Donate button */
    .donate-btn {
     background-color:#008DDA;
      color: #fff;
      margin-right: 100px;
    }
    .donate-btn:hover {
      background-color: #BBE2EC;
    /* Volunteer button */
    .volunteer-btn {
     background-color: #28a745;
      color: #fff;
    }
    .volunteer-btn:hover {
      background-color: #4CCD99;
    }
    .support{
     font-weight: bold;
     font-size: 50px;
      cursor: pointer;
      color: #41C9E2;
      transition: transform 0.3s, font-size 0.3s, text-decoration 0.3s;
      padding-left: 10px;
      padding-top: 70px;
    }
    .support:hover {
     transform: translateY(-5px) scale(1.1); /* Move text up and make it bigger */
      text-decoration: underline;
    /* Footer styles */
    /* Footer styles */
footer {
 background-color: #333; /* Dark background color for footer */
 color: #fff; /* Light text color for footer */
 padding: 20px 0; /* Increased padding for footer */
```

```
position: fixed; /* Fixed position */
 bottom: 0; /* Stick to the bottom */
 left: 0; /* Align to the left */
 width: 100%; /* Full width */
 text-align: center;
 height: 150px; /* Center align content */
.footer-content {
 display: flex; /* Use flexbox for horizontal alignment */
 justify-content: center; /* Center content horizontally */
 align-items: center; /* Center vertically */
 flex-wrap: wrap; /* Allow items to wrap */
 max-width: 1200px; /* Limit width of content */
 margin: 0 auto; /* Center content */
.footer-content > div {
 flex: 1; /* Equal width for all columns */
 margin: 10px; /* Margin between columns */
.footer-content h3 {
 color: #41C9E2; /* Change color of headings */
  font-size: 20px; /* Adjust font size */
.footer-content p {
 font-size: 16px; /* Adjust font size */
/* Copyright text */
footer p {
 margin-top: 20px; /* Add margin between content and copyright */
/* Add margin between content and copyright */
  </style>
</head>
<body>
 <!-- Navigation bar -->
  <nav class="navbar navbar-expand-lq navbar-dark">
    <div class="container">
       <a class="navbar-brand" href="#">
           <img src="donate.jpg" height="40px" width="auto" alt="Your Logo">
Nourish Now
         </a>
      <button class="navbar-toggler" type="button" data-toggle="collapse" data-</pre>
target="#navbarNav" aria-controls="navbarNav" aria-expanded="false" aria-
label="Toggle navigation">
       <span class="navbar-toggler-icon"></span>
      </button>
     <div class="collapse navbar-collapse" id="navbarNav">
       <a class="nav-link" href="home.html">Home <span class="sr-</pre>
only">(current)</span></a>
         class="nav-item">
```

```
<a class="nav-link" href="about.html">About </a>
         <a class="nav-link" href="contact.html">Contact</a>
         <a class="nav-link" href="profile.html">Profile</a>
         </div>
   </div>
  </nav>
 <!-- Content section -->
  <div class="container mt-5">
   <div class="row">
     <div class="col-md-6">
       <h1>Welcome to Our Website</h1><br>
       At NourishNow, we are committed to making a
meaningful impact in the lives of individuals and families facing food insecurity.
Our organization was founded on the belief that no one should ever have to go
hungry, and we work tirelessly to ensure that nutritious food is accessible to all
members of our community.
       Support Our Cause
     </div>
     <div class="col-md-6">
       <!-- You can add more content or images here -->
       <imq src="meal.jpg " width="1000" height="1190" alt="Your Image"</pre>
class="img-fluid">
     </div>
     <div class="btn-container">
       <button class="btn donate-btn"</pre>
onclick="window.location.href='donate.html';" >Donate/button>
       <button class="btn volunteer-btn"</pre>
onclick="window.location.href='volunteer.html';">Volunteer</button>
     </div>
     <div class="image-container">
       <img src="p3.jpeg" alt="Image 1" class="img-fluid zoom-image">
       <imq src="children.jpq" alt="Image 2" class="imq-fluid zoom-image">
       <img src="p4.jpeg" alt="Image 3" class="img-fluid zoom-image">
   </di>
   <footer class="text-center">
     <div class="container footer-content">
       <div>
         <h3>About Us</h3>
         NourishNow is dedicated to fighting food insecurity and ensuring
everyone has access to nutritious meals.
       </div>
       < div >
         <h3>Get Involved</h3>
         Join us in our mission to end hunger. Donate or volunteer today!
       </div>
       <div>
```

```
<h3>Contact Us</h3>
         Email: info@nourishnow.org
         Phone: 123-456-7890
        </div>
      </div>
      © 2024 NourishNow. All rights reserved.
    </footer>
  </div>
  <!-- Bootstrap JS (optional, for certain features like collapse, carousel, etc.)
 <script src="https://code.jquery.com/jquery-3.5.1.slim.min.js"></script>
 <script
src="https://cdn.jsdelivr.net/npm/popper.js@1.16.1/dist/umd/popper.min.js"></script</pre>
 <script
src="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/js/bootstrap.min.js"></scri</pre>
 <!-- Footer section -->
</body>
</html>
```

#### REFERENCES

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