GuruNanakInstitutionsTechnicalCampus(Autonomous)

Department of Computer Science&Engineering–Special Batch

ONLINE PLATFORM FOR FOOD WASTAGE REDUCTION

A Project Report submitted in
the part of

REALTIME PROJECT

By

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Evaluation Table			
SNO	**Criteria**	**Marks Awarded(Max10)**	**Remarks**
1	Abstract		
2	Problem Definition and Objective		
3	Literature Review and Background Work		
4	Methodology and Design		
5	Development and Implementation		
6	Innovation and Originality		
7	Report and Documentation		
8	Presentation and Communication		
9	Overall Contribution		
10	Conclusion and Future Work		

SIGNATURE OF FACULTY **SIGNATURE OF COORDINATOR**

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ABSTRACT:

Food wastage is a global challenge, contributing to environmental degradation and food insecurity. This project proposes an innovative online platform aimed at reducing food waste by connecting surplus food sources with those in need. The platform leverages technology to create a seamless system for identifying, collecting, and redistributing excess food.

The core features of the platform include a user-friendly interface for restaurants, grocery stores, and households to report surplus food, and a matching algorithm to connect them with NGOs, food banks, or individuals in need. Integrated real-time tracking ensures efficient logistics, while predictive analytics optimize supply-demand alignment to minimize wastage further. The platform also incorporates a reward system to incentivize participation and raise awareness about sustainable food practices.

Designed with scalability and accessibility in mind, the platform supports mobile and web-based interactions, ensuring broad reach. A collaborative ecosystem fosters partnerships with local governments, logistics providers, and waste management agencies. By addressing food surplus at its source and promoting redistribution, this initiative can significantly reduce the environmental footprint of wasted food while alleviating hunger.

In summary, the platform serves as a bridge between excess and scarcity, transforming potential waste into valuable resources. This sustainable, tech-driven solution not only reduces food waste but also fosters a culture of responsible consumption and social equity.

LITERATURE REVIEW:

Food wastage is a critical global issue, with approximately one-third of all food produced being wasted annually, as reported by the Food and Agriculture Organization (FAO). This wastage contributes to environmental problems like greenhouse gas emissions and exacerbates food insecurity. In recent years, digital platforms have emerged as innovative solutions to mitigate food wastage, connecting surplus food sources with recipients efficiently.

1. The Role of Technology in Food Waste Management

Studies highlight that digital platforms play a vital role in minimizing food waste by streamlining redistribution efforts. For instance, platforms like *Too Good To Go* and *OLIO* enable users to share or purchase surplus food at reduced prices, fostering community-driven waste reduction. Research emphasizes that technology enhances traceability, transparency, and logistical efficiency in food redistribution systems (Schanes et al., 2018).

2. Consumer Behavior and Participation

Behavioral studies suggest that awareness and incentives significantly influence consumer participation in food-sharing platforms. Reward mechanisms, gamification, and community-building tools haveproven effective in driving engagement (Soma et al., 2020). However, challenges such as lack of trust, cultural barriers, and inadequate infrastructure limit adoption in certain regions.

3. Policy and Regulatory Implications

Governments in many countries are supporting digital solutions through policies promoting food donation and waste reduction. The EU Waste Framework Directive and the U.S. Good Samaritan Food Donation Act encourage collaborations between businesses and food redistribution platforms.

4. Limitations and Future Directions

Existing literature identifies gaps in scalability, data integration, and regional adoption of these platforms. Future research should focus on integrating artificial intelligence for predictive analytics, enhancing supply-demand matching, and addressing logistical inefficiencies.

In conclusion, online platforms offer promising avenues for addressing food wastage, but their success depends on stakeholder collaboration, user engagement, and supportive policies.

DESIGN OF PROTOTYPE:

Objective:

Create a platform to efficiently redistribute surplus food from suppliers (restaurants, grocery stores, households) to recipients (NGOs, food banks, individuals in need) while minimizing waste and environmental impact.

Components of the Prototype

1.User Interface Design

User Categories:

Food Donors: Restaurants, supermarkets, households.

Food Recipients: NGOs, shelters, food banks.

Logistics Providers: Transport services or volunteers.

Platform Features:

Intuitive dashboard for food listing.

Real-time notifications for food matches.

Food tracking system with updates on collection and delivery.

2. Core Functionalities

Food Listing System:

Allow donors to upload details of surplus food, including type, quantity, expiration date, and location.

Matching Algorithm:

Match food listings with nearby recipients based on location, food type, and urgency.

Real-Time Tracking:

Enable recipients and logistics providers to track food from collection to delivery.

Incentive Program:

Reward system for active users (e.g., discounts, recognition badges).

3. Technology Stack

Frontend: React.js/Flutter for user-friendly web and mobile applications.

Backend: Node.js/Python for API integration and database management.

Database: MySQL/MongoDB for storing food data, user profiles, and transaction logs.

4. Logistics Integration

Third-Party Integration: APIs for local logistics and delivery services like Uber Freight or on-demand volunteers.

Route Optimization: Algorithms to reduce transportation time and costs.

5. Sustainability and Community Building

Educational Content: Resources on reducing food waste and sustainable practices.

Community Forum: Connect users to share tips, success stories, and solutions.

Wireframe Overview

1. Homepage:

Overview of food listed for donation and urgent needs.

"Donate Now" and "Find Food" call-to-action buttons.

2. Dashboard:

Separate views for donors and recipients to manage listings and requests.

3. Tracking Page:

Real-time updates on food pick-up and delivery status.

Benefits of the Platform

Reduction in food wastage at the local and community levels.

Enhanced food security by connecting surplus with scarcity.

Promotion of environmental sustainability by minimizing waste-related emissions.

SOURCE CODE

Step 1: Set up a Django Project

Install Django:

bash

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pip install django

Create a new Django project:

bash

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django-admin startproject food_waste_reduction

cd food_waste_reduction

Create an app:

bash

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python manage.py startapp donations

Step 2: Define the Models (Database Schema)

Edit donations/models.py:

python

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```
from django.db import models

class FoodItem(models.Model):
    name = models.CharField(max_length=255)
    quantity = models.PositiveIntegerField()
    description = models.TextField(blank=True, null=True)
    expiration_date = models.DateField()
    location = models.CharField(max_length=255)
    donor_name = models.CharField(max_length=255)
    donor_contact = models.CharField(max_length=255)

    def __str__(self):
        return self.name
```

```
class Request(models.Model):
    food_item = models.ForeignKey(FoodItem, on_delete=models.CASCADE)
    requester_name = models.CharField(max_length=255)
    requester_contact = models.CharField(max_length=255)
    message = models.TextField()

    def __str__(self):
        return f"{self.requester_name} - {self.food_item.name}"
```

Run migrations:

bash

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```
python manage.py makemigrations
python manage.py migrate
```

Step 3: Create Views

Edit donations/views.py:

python

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```
from django.shortcuts import render, redirect
from .models import FoodItem, Request
from .forms import FoodItemForm, RequestForm

def home(request):
    food_items = FoodItem.objects.all()
    return render(request, "donations/home.html", {"food_items": food_items})

def donate_food(request):
    if request.method == "POST":
        form = FoodItemForm(request.POST)
        if form.is_valid():
            form.save()
            return redirect("home")
    else:
        form = FoodItemForm()
```

```
    return render(request, "donations/donate_food.html", {"form": form})

def request_food(request, item_id):
    food_item = FoodItem.objects.get(id=item_id)
    if request.method == "POST":
        form = RequestForm(request.POST)
        if form.is_valid():
            form.save()
            return redirect("home")
    else:
        form = RequestForm(initial={"food_item": food_item})
    return render(request, "donations/request_food.html", {"form": form, "food_item": food_item})
```

Step 4: Create Forms

Edit donations/forms.py:

python

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```
from django import forms
from .models import FoodItem, Request

class FoodItemForm(forms.ModelForm):
    class Meta:
        model = FoodItem
        fields = "__all__"

class RequestForm(forms.ModelForm):
    class Meta:
        model = Request
        fields = "__all__"
```

Step 5: Add URLs

Edit food_waste_reduction/urls.py:

python

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```
from django.contrib import admin
from django.urls import path
from donations import views

urlpatterns = [
    path("admin/", admin.site.urls),
    path("", views.home, name="home"),
    path("donate/", views.donate_food, name="donate_food"),
    path("request/<int:item_id>/", views.request_food, name="request_food"),
]
```

Step 6: Create Templates

Create a templates directory inside the donations app and add the following files:

home.html

```
html
Copy code
<!DOCTYPE html>
<html>
<head>
    <title>Food Waste Reduction</title>
</head>
<body>
    <h1>Available Food Items</h1>
    <ul>
        {% for item in food_items %}
        <li>
            {{ item.name }} ({{ item.quantity }}) - <a href="{% url 'request_food' item.id %}">Request</a>
        </li>
        {% endfor %}
    </ul>
    <a href="{% url 'donate_food' %}">Donate Food</a>
</body>
</html>
```

donate_food.html

html

Copy code

```
<!DOCTYPE html>
<html>
<head>
    <title>Donate Food</title>
</head>
<body>
    <h1>Donate Food</h1>
    <form method="post">
        {% csrf_token %}
        {{ form.as_p }}
        <button type="submit">Submit</button>
    </form>
    <a href="{% url 'home' %}">Back to Home</a>
</body>
</html>
```

request_food.html

html

Copy code

```
<!DOCTYPE html>
<html>
<head>
    <title>Request Food</title>
</head>
<body>
    <h1>Request Food - {{ food_item.name }}</h1>
    <form method="post">
        {% csrf_token %}
        {{ form.as_p }}
        <button type="submit">Submit</button>
    </form>
    <a href="{% url 'home' %}">Back to Home</a>
</body>
```

```
</html>
```

Step 7: Run the Server

Start the server:

bash

Copy code

```
python manage.py runserver
```

INNOVATION AND ORIGINALITY

1. Real-Time Food Rescue Network

- Idea: Connect restaurants, grocery stores, and households with local charities and individuals in need through a real-time platform.
- Unique Features:
    - AI-powered matching system to pair surplus food donors with nearby recipients.
    - Live tracking of food pickup and delivery.
    - Integration with ride-sharing services for transportation.

2. Dynamic Expiry Management System

- Idea: A system that helps individuals and businesses manage food nearing expiry.
- Unique Features:
    - Barcode scanning to track expiry dates of products.
    - Notifications or alerts when items are close to expiration.
    - Suggestions for recipes to use items before they go bad.

3. Gamified Food Sharing

- Idea: Use gamification to encourage individuals to donate or share surplus food.
- Unique Features:
    - Users earn points or rewards for every food donation.
    - Leaderboards showcasing top contributors.
    - Achievements for milestones, like reducing a certain amount of food waste.

4. Blockchain-Based Food Transparency

- Idea: Leverage blockchain to ensure transparency in the food donation process.
- Unique Features:
    - Track and verify the journey of food from donor to recipient.
    - Publicly viewable records to ensure accountability.
    - Incentives for participants based on verified donations.

5. AI-Driven Food Redistribution

- Idea: AI analyzes surplus food data to predict and redistribute food efficiently.
- Unique Features:
    - Predictive analytics to identify high-waste areas or events.
    - Smart redistribution routes for faster delivery.
    - Insights for businesses to optimize inventory.

6. Virtual Food Market for Surplus

- Idea: A marketplace for buying, selling, or trading surplus food at discounted rates.

- Unique Features:
    -
    - Mobile app integration for user-friendly access.
    - Live bidding or "flash sales" for items nearing expiration.
    - Option to donate unsold items directly to charities.

7. Educational Component

- Idea: Educate users about food wastage and sustainable practices.
- Unique Features:
    - Interactive modules and quizzes on food waste reduction.
    - Weekly challenges to promote zero-waste living.
    - Community forums for sharing tips and ideas.

8. Food Waste Analytics Dashboard

- Idea: Provide detailed analytics to users about their food usage and wastage.
- Unique Features:
    - Reports on the environmental impact of reduced waste.
    - Personalized tips for improving food usage habits.
    - Integration with IoT devices for automated tracking.

9. Social Collaboration and Networking

- Idea: Build a community where users collaborate on food waste reduction projects.
- Unique Features:
    - Groups for organizing food drives or local initiatives.
    - Peer-to-peer sharing of surplus food via the platform.
    - Social media-like features for sharing success stories.

10. Integration with Smart Home Technology

- Idea: Sync the platform with smart fridges and pantry systems.
- Unique Features:
    - Automated alerts for expiring food items in smart devices.
    - AI-powered shopping lists based on current inventory.
    - Recommendations for food purchases to avoid overstocking.

CONCLUSION

In conclusion, an online platform for food wastage reduction has the potential to address one of the most pressing global challenges—food waste. By leveraging technology, innovative features, and a user-centric approach, such a platform can create a robust ecosystem that benefits individuals, businesses, and communities. Key outcomes include reducing food waste at the source, redistributing surplus food to those in need, promoting sustainability, and raising awareness about responsible food consumption. Furthermore, partnerships with charities, governments, and businesses can amplify the platform's impact, while features like gamification, blockchain transparency, and AI-driven insights ensure scalability and engagement.

Ultimately, the success of this initiative lies in fostering a culture of mindfulness about food waste and building a connected community that actively participates in creating a more sustainable and equitable food system.