
CRAFT N CODE 2024
• Problem Title- Waste Reduction
• Theme- Food Safety Monitoring
• Team Name – ATREUS

INTRODUCTION TO THE FOOD WASTE PROBLEM

What is the Problem?

What exactly is happening with food wastage today? Did you know that **one-third** of all food produced globally is wasted? This happens because of factors like **spoilage**, **overproduction**, and inaccurate **demand prediction**. But why does this matter?

Why is It Important to Address?

Why does this matter so much? Imagine this—**billions of dollars** are being thrown away with wasted food, while entire communities face **food insecurity**. And that's not all—food waste is a major contributor to **greenhouse gas emissions**, making it a silent culprit behind climate change. Isn't it shocking that we could feed **millions of people** with just the food that's being wasted?

Where Does the Waste Occur?

Where is this happening? Is it just at the consumer level? No! It's happening **across the entire supply chain**—from farms to supermarkets to households. Isn't it alarming that supermarkets discard unsold food that's still good, and consumers toss away perfectly edible food, confused by misleading expiration dates?

SOLUTIONS FOR REDUCING FOOD WASTAGE

Project goals.

This project is about developing a groundbreaking AI-powered software that will **drastically reduce food wastage**, ensure **absolute freshness**, and adapt to **seasonal demand**. By using real-time data and predictive algorithms, this software will prevent the **millions of tons** of food being lost every year due to poor planning and spoilage.

We are at a crisis point. Food wastage isn't just about losing resources; it's a **global catastrophe** that's costing **billions** in economic loss, accelerating **climate change** through greenhouse gas emissions, and leaving **millions** to starve while perfectly good food rots. This software addresses the core issues—**waste, safety, and supply management**—that, if left unchecked, will continue to worsen.

This solution will target **every point** of the food supply chain—from the farms that overproduce due to inaccurate forecasts, to retailers discarding fresh produce, to consumers throwing out food because of misleading expiration dates. By applying this software to **storage facilities**, **retailers**, and even **households**, we can drastically reduce waste and ensure food reaches those who need it most—**fresh, safe, and in the right amounts**.

TECHNICAL APPROACH

DEMAND PREDICTION

- Historical data analysis.
- Real-time data integration

FRESHNESS MONITORING

- Centralized data system
- Predictive analysis.

SEASONAL DEMAND

- Weather Data collection.
- Time Series Analysis.

SUPPLY CHAIN TRACKING

- Defect Detection
- Supply chain transparency.

DASHBOARD

- Real-time Monitoring
- Sales Trends
- Transportation Tracking
- Donation tracking

Key features of the software

* According to a Survey

TECHNOLOGY STACK

Data Collection and Storage

We will use **APIs** to gather data from various sources like grocery sales and weather forecasts. For storing this data, we'll utilize **cloud databases**

Machine Learning Algorithms

Pandas for organizing and manipulating our data.

- **Scikit-learn** for developing our predictive models to forecast food demand and reduce waste.
- **TensorFlow** for more advanced tasks, allowing us to dive deeper into machine learning

Real-time Processing

- To ensure we receive immediate updates, especially for freshness monitoring, we'll implement a tool like **Apache Kafka**. It helps us process data in real-time, ensuring that we can act quickly when necessary.

User Interface

For the user interface, we will use **React**. For the backend, we'll use **Flask**, which is easy to understand and perfect for connecting our front end to the data we collect.

Deployment

Once our application is built, we'll host it on **cloud platforms** like **Heroku** or **Google Cloud**. These platforms provide free tiers that are perfect for students, allowing us to deploy our application without any upfront costs.

FEASIBILITY AND VIABILITY

Feasibility

- **Technical Feasibility**:Utilizes well-documented technologies (e.g., Python, APIs).Supported by a robust developer community.
- **Resource Availability**:Access to free tools and cloud services.
- Low financial investment required for prototype development.
- **Scalability:**Cloud-based architecture enables easy scaling for increased demand.

Viability

- **Market Demand:**Addresses the growing need for sustainable food waste reduction.Supports businesses seeking to enhance operational efficiency.
- **Potential Partnerships:**Opportunities with grocery stores, food banks, and agricultural organizations.
- **Long-Term Impact:**Contributes to environmental sustainability and food security.

Challenges

- **Data Accuracy:**Ensuring the reliability of data collected from various sources.
- **User Adoption**:Convincing businesses to adopt new technology can be difficult.
- **Integration with Existing Systems:**Compatibility issues with current supply chain management systems.

TEAM DETAILS :

- Aranya Bandhu (Team Lead)
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