EcoTrack: Turning Waste into Worth

1. Project Overview :

- Objective: To minimize food waste by notifying users before food expiry, redistributing edible food, and directing non-edible waste to biogas plants and recycling industries.
- Target Users: Households, Restaurants, Supermarkets, Food Delivery Services, Recycling Industries, and Students (volunteers).

2. System Architecture :

2.1 High-Level System Flow

- 1.User Inputs Food Data: Users can scan barcodes or manually enter food details.
- 2. Expiry Alerts &Notifications: The system sends reminders 48 hours before expiration.
- 3. Decision Point:
    - If food is edible, users can donate it via integrated platforms like **Swiggy** or **Zomato.**
    - If food is non-edible, it is redirected to biogas plants or composting centers.
- 4. Plastic & Packaging Waste: Food packaging is collected separately and sent to recycling industries.
- 5. tracking & Reporting: Users can track donation, recycling, and impact metrics.

3. Features & Functionalities :

3.1 User Features

- Food Expiry Notifications– Alerts 48 hours before expiration.
- Barcode & Image-Based Food Tracking – Users can scan food barcodes or upload images to log items.
- Donation & Collection System–Connects users to food delivery apps for donation.
- Student Volunteer Program – Students can sign up for part-time participation.
- Gamification & Rewards – Incentives for donating or volunteering.

3.2 Admin & Industry Features

- Food Waste Collection Center Management– Tracks food donations and waste allocation.
- Industry Integration– Connects with biogas plants, recycling industries, and food banks.

- Analytics & Reports – Provides real-time data on food saved, waste managed, and environmental impact.

4. Technology Stack :

Component -Technology Stack

- Frontend - Flutter (Dart)
- Backend - Node.js (Express)
- Database - Firebase / PostgreSQL
- Image Processing - OpenCV for food image analysis
- AI/ML - TensorFlow (for food spoilage detection, expiry prediction)
- Cloud Storage - AWS S3 / Firebase Storage
- API Integration - Swiggy, Zomato, Google Maps (for location-based donations)

5. Workflow & Integration :

Step 1: Food Data Entry

- Users scan a barcode or enter food details manually.
- The system assigns an expiry date.

Step 2: Notification System

- Push notifications are sent **48 hours before expiry .**

Step 3: Action Based on Food Condition

- Edible Food → Sent to food banks via Swiggy/Zomato
- Non-Edible Food → Redirected to biogas plants, composting centers
- Packaging Waste → Sent to plastic recycling units

Step 4: Incentives & Reporting

- Users earn points or rewards for donations.
- The app provides *impact reports* (e.g., CO2 reduction, meals donated).

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6. Industry Partnerships :

Sector - Industry Partner (Example)

- Food Donation-Swiggy, Zomato, Local NGOs
- Biogas/Biofuel- BPCL Biofuels, Indian Oil, Mahindra Waste-to-Energy
- Plastic Recycling-Bisleri's 'Bottles for Change', Recykal, Shakti Plastic Industries

7. Expected Outcomes & Benefits :

- 30% reduction in food waste
- Millions of meals donated annually
- Increased student participation in sustainability projects
- Reduction in landfill waste & plastic pollution

8. Future Scope :

- AI-powered food spoilage detection
- Blockchain for transparent food donations
- Expansion to rural areas & government integration
