

CleanTech: Transforming Waste Management with Transfer Learning

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Project Design Phase – Proposed Solution Template

1. Problem Statement

Urban households often dispose of mixed waste due to a lack of clarity and tools for proper segregation. This results in low recycling rates, environmental hazards, and operational inefficiencies for municipal systems.

2. Idea / Solution Description

We propose a smart waste classification solution using transfer learning. The system includes a citizen-facing mobile app that uses image recognition to guide users and a backend dashboard for municipal authorities to monitor waste data.

3. Novelty / Uniqueness

The use of transfer learning enables accurate waste type detection even with limited training data. The mobile app integrates user guidance, gamified features, and feedback loops, while the dashboard ensures municipal visibility.

4. Social Impact / Customer Satisfaction

Citizens gain clarity on waste sorting, contributing to environmental sustainability. Municipalities benefit from better sorting at source, reducing landfill load and improving recycling workflows.

5. Business Model (Revenue Model)

The app is offered free for public users. Revenue is generated via SaaS subscriptions for municipalities and waste contractors. A licensing model for API access to third-party recycling companies is also planned.

6. Scalability of the Solution

The cloud-native, modular system allows easy integration with city-specific policies and language support. Transfer learning models can be retrained with local datasets, allowing rapid deployment across regions.