Smart C&D Waste Detection Portal – Design Document

1. Overview

This document defines the technical and UI design of the Smart Construction & Demolition Waste Detection Portal.

The system enables real-time object detection using YOLO models on laptops and Raspberry Pi devices.

The portal follows a Government-style UI combined with modern SaaS dashboard usability.

2. Design Goals

- Government-grade visual authenticity
- Clean, minimal, and professional interface
- Real-time detection visualization
- Legitimacy and trust-focused visual identity
- Accessibility and usability compliance

3. Target Users

- Government waste monitoring authorities
- Municipal officers
- Field inspection officers
- Environmental agencies
- System administrators

4. UI Design Principles

Government Style Elements:

- National emblem placement
- Official color palette (Blue, White, Grey)
- Structured layouts

Modern SaaS Enhancements:

• Dashboard cards

• Clean typography

• Real-time visualization panels

• Minimalist icons

5. Page Structure

Home Dashboard

• Header with logo and system title

• Detection summary cards

• Detection video preview

Detection Page

• Upload or camera feed

• Bounding box display

• Detection results panel

Reports Page

• Detection logs

• Export options

Admin Page

• Model management

• System configuration

6. System Architecture

Frontend: React + Vite

Backend: FastAPI

AI Model: YOLOv8

Storage: Local storage + optional cloud

Deployment: Laptop / Raspberry Pi / Server

7. Visual Style Guide

Primary Color: Government Blue

Secondary Color: White

Accent Color: Grey

Font: Roboto / Inter

Layout: Structured grid system

8. Security Design

• Secure model access

• User authentication support

• Role-based access control

• Local secure storage

9. Performance Requirements

Detection speed: < 200 ms

UI load time: < 2 seconds

Supports real-time detection

10. Future Enhancements

• Cloud deployment

• Mobile support

• Multi-camera integration

• Government API integration